

PERMIT FOR CARBON DIOXIDE CLASS VI INJECTION

OPERATOR: Dakota Gasification Company

ADDRESS: 1717 East Interstate Avenue, Bismarck, ND 58503

WELL NAME & NO.: Coteau 4

WELL FILE NO.: 38918

LOCATION: NE SW Section 1, T145N, R88W, Mercer County, ND

AUTHORIZED STORAGE RESERVOIR: Broom Creek

STORAGE FACILITY: DGC Beulah Broom Creek Storage Facility #1

STORAGE FACILITY NO.: 90000347

PERMIT DATE: September 14, 2023

This permit is conditioned upon the storage facility operator (operator) complying with the provisions set forth in North Dakota Administrative Code (NDAC) Chapters 43-05-01, 43-02-03, 43-02-05, in addition to North Dakota Industrial Commission (Commission) Orders No. 32250, 32251, 32252, and any other rules or orders of the Commission when applicable, and the following stipulations:

- (1) Dakota Gasification Company must contact NDIC Field Inspector Jared Thuner (701-495-4227) prior to re-entering the well.
- (2) A Commission Field Inspector must witness a satisfactory mechanical integrity test of 30 minutes on the tubing-casing annulus prior to injecting carbon dioxide pursuant to NDAC Section 43-05-01-11(14).
- (3) The operator shall notify the Director at least 48 hours in advance to witness a mechanical integrity test of the tubing-casing annulus. The packer must be set within 100 feet of the upper most perforation and in the 13CR-80 casing.
- (4) A pressure test approved by the Director must be performed on the carbon dioxide flow line between the injection facility and the well head prior to injecting carbon dioxide. The results of this test shall be reported on a Sundry Notice through NorthSTAR detailing the test results (e.g. date of test, starting and ending pressures and pressure at 5 minute intervals, testing medium, etc.). The Sundry Notice should also include details on the flow line (e.g. length of the line, installation date, type of pipe, type of fittings, pressure rating of pipe and fittings, etc.).

- (5) The maximum allowable injection pressure at surface is established as 1980 psi. The maximum allowable injection bottomhole pressure is established at 3789 psi.
- (6) A pressure fall-off test and pump test or injectivity test approved by the Director must be performed on the injection zone prior to injecting carbon dioxide pursuant to NDAC Section 43-05-01-11.2(5).
- (7) Within thirty days after conversion, a Well Completion Report through NorthSTAR shall be submitted detailing the conversion, and including at least the following:
 - a. A final schematic diagram of the surface injection system and its appurtenances;
 - b. A final well bore diagram showing the name, description, and depths of the storage reservoir, the base of the deepest underground source of drinking water, and depicting the casing strings, cement emplacement, perforations, tubing, plugs or plugbacks, and packer;
 - c. The results of a mechanical integrity test of the casing-tubing annulus; and
 - d. The results of the pressure fall-off test and pump test or injectivity test.
- (8) The operator shall submit the results of all baseline testing pursuant to the approved Testing and Monitoring Plan. The results shall be reported on a Sundry Notice through NorthSTAR and include at least the following:
 - a. An affidavit specifying the chemical constituents, their relative proportions and the physical properties of the carbon dioxide stream, and the source of the carbon dioxide stream;
 - b. A map showing the name and location of all monitoring locations;
 - c. Test results for atmospheric monitoring;
 - d. Test results for soil gas monitoring; and
 - e. Test results for groundwater monitoring.
- (9) Injection is prohibited until construction is complete, and
 - a. The operator has submitted notice outlined in the paragraphs 2, 3, 5, 6, and 7 to the Director;
 - b. The Commission Field Inspector has inspected or otherwise reviewed the injection well and finds it is in compliance with the conditions of the permit;
 - c. The operator has submitted a Sundry Notice through NorthSTAR requesting a variance to NDAC Section 43-05-01- 11.3(3) and such notice has been approved by the Director if applicable; and
 - d. The operator has submitted a Sundry Notice through NorthSTAR requesting authorization to begin injection and such notice has been approved by the Director.
- (10) The operator shall continuously monitor the surface casing-intermediate string casing annulus with a gauge not to exceed 300 psi. The Commission must be notified in advance if there is pressure that needs to be bled off.

- (11) Internal mechanical integrity must be continuously monitored with a gauge on each casing string. The well shall continuously monitor for surface and annular pressure anomalies by maintaining a consistent pressure of 200 psi on the tubing-casing annulus with a nitrogen cushion that will be placed above the packer and maintained on top of the annulus fluid. Tubing-casing annulus pressure testing shall be performed no less than once every 5 years. Casing inspection logs should be run during workovers when tubing is pulled or as directed by the Commission. The Commission must be notified within 24 hours of failure or malfunction of any gauges.
- (12) To demonstrate external mechanical integrity; once annually (on a rotating bimonthly schedule with the other six injection wells) the operator shall gather downhole data, including a pulsed-neutron log, temperature log, and a bottom hole pressure test. During the first quarter of operations a bottom hole pressure survey will be acquired each month. The Commission must be notified if the bottom hole pressure survey does not confirm with the calculated bottom hole pressures taken using wellhead pressure measurements. Additionally, an ultrasonic casing inspection log shall be run during workovers when tubing is pulled or as directed by the Commission.
- (13) The operator shall run an ultrasonic or other log capable of evaluating internal and external pipe condition prior to injecting carbon dioxide to establish a baseline and on a 5-year schedule, unless analysis of corrosion coupons necessitate a more frequent schedule and submit such log to the Commission.
- (14) The operator shall report any noncompliance with regulations or permit conditions to the Director within 24 hours followed by a written explanation within five days.
- (15) Director approval shall be obtained prior to attempting any remedial work to the casing strings, tubing, or packer.
- (16) Following any remedial work done to this well, a Sundry Notice shall be submitted through NorthSTAR detailing the work done. This report shall include the reason for the workover, the work done, dates, size and type of tubing, type and location of packer, result of pressure test, and any other pertinent data.
- (17) Following the completion of any remedial work, the Director is authorized to order further mechanical integrity tests or other remedial work as deemed necessary to ensure the mechanical integrity of the well and to prevent the movement of carbon dioxide and displaced fluids into an underground source of drinking water or a zone other than authorized.
- (18) Operations shall cease immediately if so directed by the Director or one of their representatives.

- (19) This permit shall expire twelve months from the date of issue if the permitted well has not been completed for injection.
- (20) Injection well permits must be maintained by the operator for the operating life of the storage facility and the closure period.
- (21) Verbal notice must be given to the Director of the date of first injection immediately. Sundry Notice through NorthSTAR must be given to the Director within 24 hours of first injection and of any discontinuance within ten days. Sundry Notice through NorthSTAR notice must also be given of the date injection recommences.
- (22) The operator shall report monthly, regardless of the status of the operations, the volume of the carbon dioxide injected or withdrawn since the last report, the average injection rate, and the wellhead and bottomhole temperature and pressure data.
- (23) This permit shall be reviewed by the Commission at least once every five years to determine whether it should be modified, revoked, or a minor modification made.
- (24) For the purposes of enforcement, compliance with this injection well permit during its term means compliance with NDAC Chapter 43-05-01 and North Dakota Century Code Chapter 38-22. However, a permit may be modified, revoked, or terminated during its term pursuant to NDAC Section 43-05-01-12.
- (25) All other stipulations specified on the approved NorthStar Permit Form: 133250.

This permit is effective the date set forth below and is transferable only upon approval of the Commission.

Dated this day of September 14, 2023.

North Dakota Industrial Commission
Department of Mineral Resources
Lynn D. Helms
Director

By: Tamara Madche
Tamara Madche
CCS Geologist