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ND Industrial Commission
Oil and Gas Division
UIC and Treating Plant Manager
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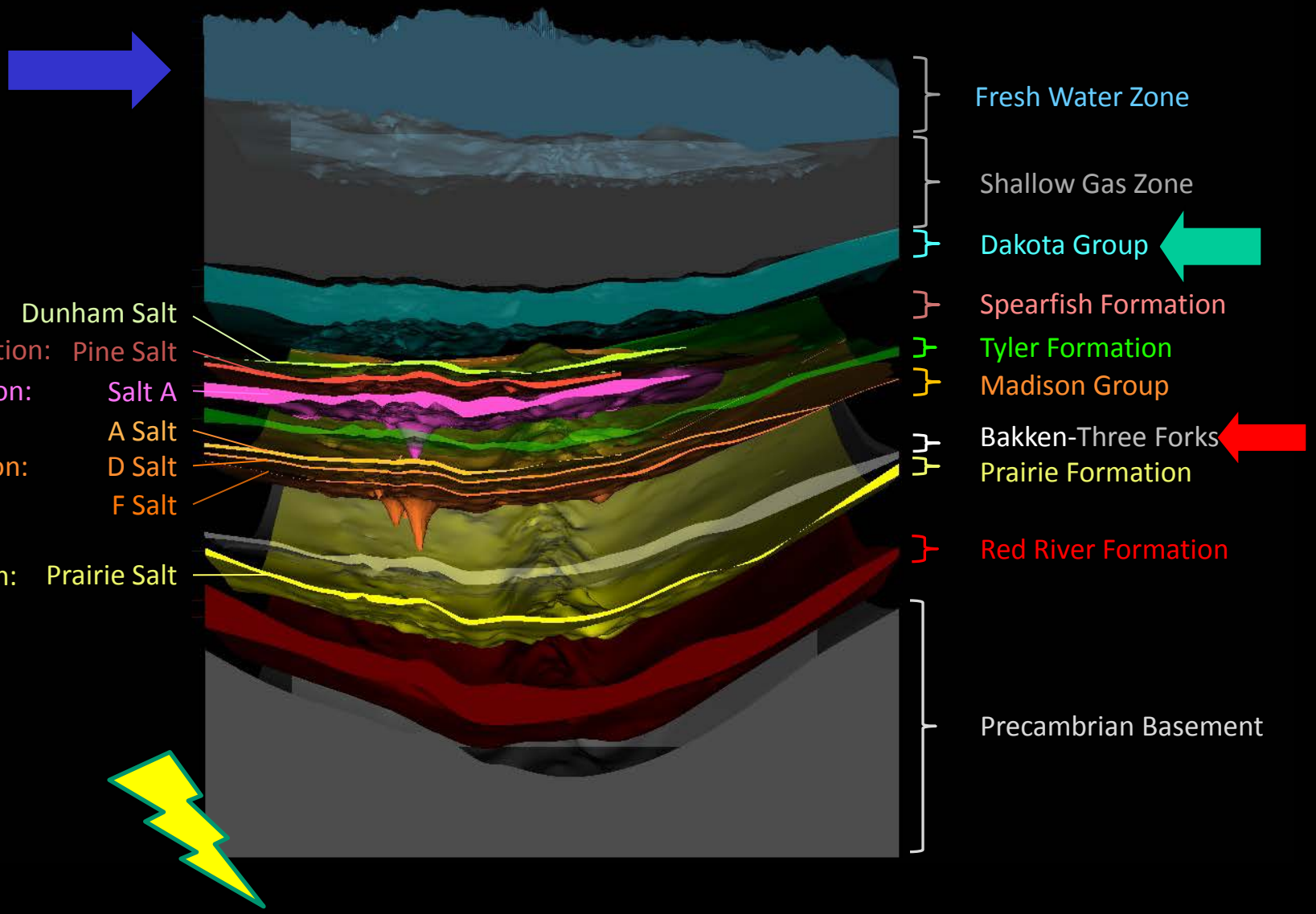
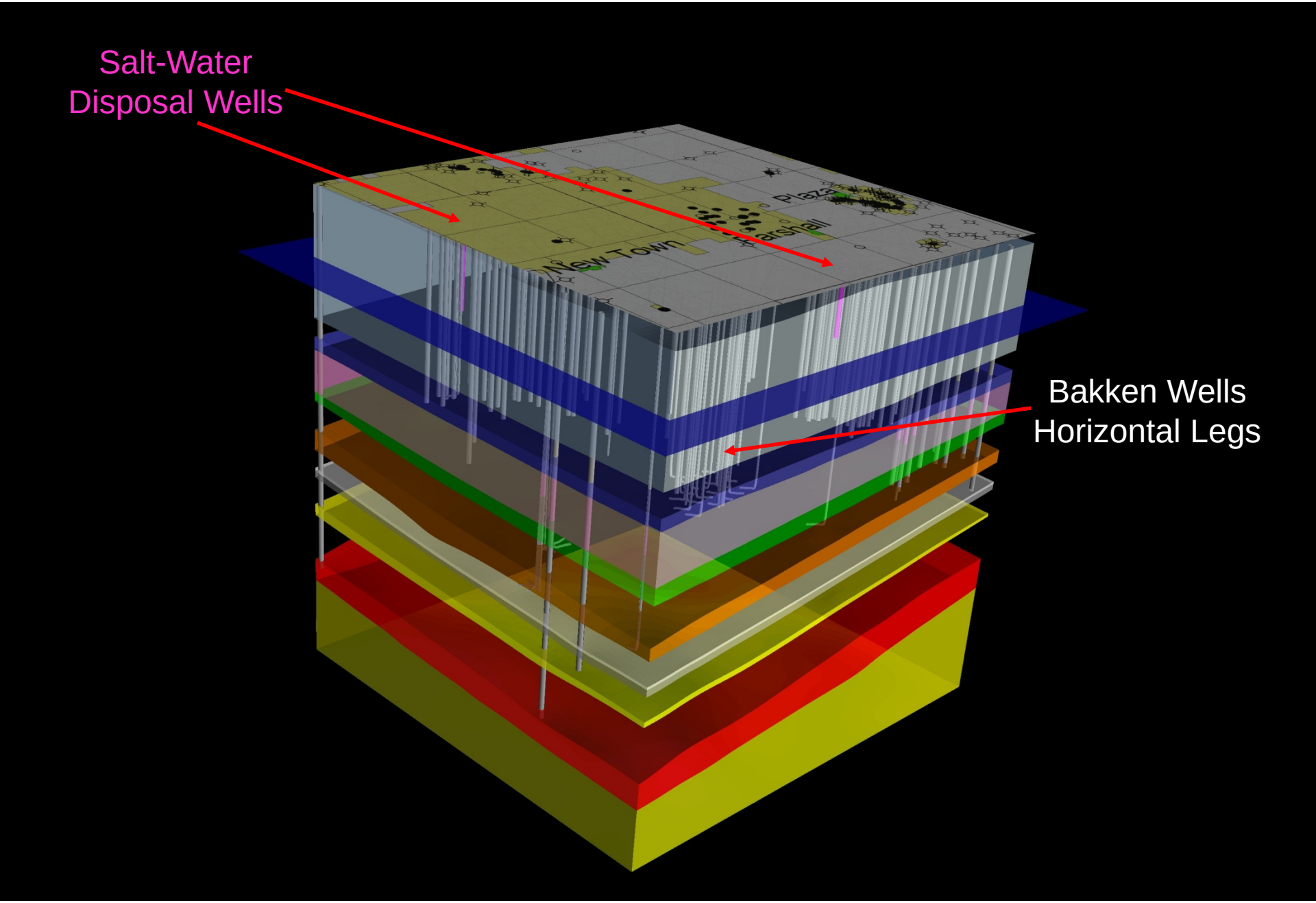
UIC Supervisor

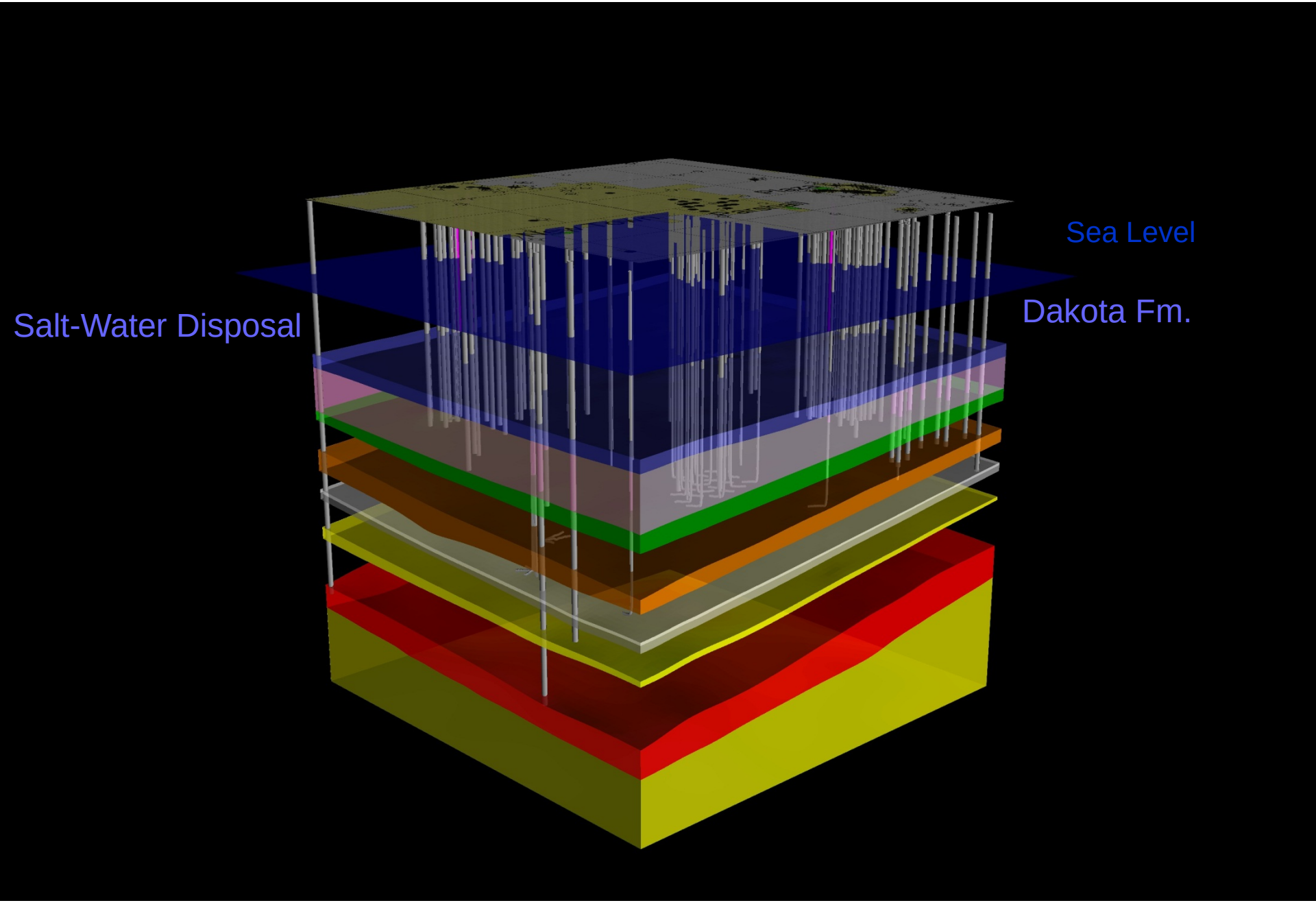
Saltwater Disposal and Injection

- GEOLOGY
- REQUIREMENTS OF NDAC
- GENERAL REQUIREMENTS
- UIC REQUIREMENTS
- WELL CONSTRUCTION
- MONITORING AND TESTING
- SURFACE FACILITIES
- STATISITICS

Sedimentary Rocks of Western North Dakota




Salt-Water
Disposal Wells
Bakken Wells
Horizontal Legs
New Town
Plaza
Marshall


Sea Level
Dakota Fm.
Salt-Water Disposal

NORTH DAKOTA ADMINISTRATIVE CODE

43-02-03-19.2. DISPOSAL OF WASTE. All waste associated with exploration or production of oil and gas must be properly disposed of in an authorized facility in accord with all applicable local, state, and federal laws and regulations.

43-02-03-21. CASING, TUBING, AND CEMENTING REQUIREMENTS. All wells drilled for oil, natural gas or injection shall be completed with strings of casing which shall be properly cemented at sufficient depths to adequately protect and isolate all formations containing water, oil or gas or any combination of these; protect the pipe through salt sections encountered; and isolate the uppermost sand of the Dakota group.

43-02-03-29. WELL AND LEASE EQUIPMENT. Wellhead and lease equipment with a working pressure at least equivalent to the calculated or known pressure to which the equipment may be subjected shall be installed and maintained. Valves shall be installed and maintained in good working order to permit pressure readings to be obtained on both casing and tubing.

NORTH DAKOTA ADMINISTRATIVE CODE

43-02-03-29. WELL AND LEASE EQUIPMENT. All newly constructed underground **gathering** pipelines must be devoid of leaks and constructed of materials resistant to external corrosion and to the effects of transported fluids. All such pipelines installed in a trench must be installed in a manner that minimizes interference with agriculture, road and utility construction, the introduction of secondary stresses, the possibility of damage to the pipe, and tracer wire shall be buried with any nonconductive pipe installed. When a trench for an oil and gas underground gathering pipeline is backfilled, it must be backfilled in a manner that provides firm support under the pipe and prevents damage to the pipe and pipe coating from equipment or from the backfill material.

- Underground gathering pipeline placed into service after August 1, 2011, must file within one hundred eighty days of placing into service a geographical information system layer showing the location of the pipeline centerline.
- Affidavit of completion including: outside diameter, wall thickness, composition, internal yield pressure, maximum temperature rating, anticipated operating pressure, fluid type, flow direction, test pressure, minimum burial depth, in-service date, leak detection and monitoring methods.
- Abandonment: isolate, cut off at pipeline level, purge, remove cathodic protection, cap.

NORTH DAKOTA ADMINISTRATIVE CODE

43-02-03-47. PRODUCED WATER. Monthly water production from each well must be determined through the use of properly calibrated meter measurements, tank measurements, or an alternate measurement method approved by the director. This includes allocating water production back to individual wells on a monthly basis, provided the method of volume determination and allocation procedure results in reasonably accurate production volumes. Operators shall report monthly to the director the amount of water produced by each well on form 5. The reports must be filed on or before the first day of the second month following that in which production occurred.

43-02-03-53. SALTWATER HANDLING FACILITIES.

1. All saltwater liquids or brines produced with oil and natural gas shall be processed, stored, and disposed of without pollution of freshwater supplies. At no time shall saltwater liquids or brines be allowed to flow over or pool on the surface of the land or infiltrate the soil.

2. Underground injection of saltwater liquids and brines shall be in accordance with chapter 43-02-05.

NORTH DAKOTA ADMINISTRATIVE CODE

3. Surface facilities are acceptable provided that:

   a. They are devoid of leaks and constructed of materials resistant to the effects of produced saltwater liquids, brines, or chemicals that may be contained therein. The above materials requirement may be waived by the director for tanks presently in service and in good condition. Unusable tanks and injection equipment must be removed from the site or repaired and placed into service, within a reasonable time period, not to exceed one year.

   b. Dikes must be erected and maintained around saltwater tanks at any saltwater handling facility built or rebuilt on or after July 1, 2000. Dikes must be erected around saltwater tanks at any new facility within thirty days after the well has been completed. Dikes must be erected and maintained around saltwater tanks at saltwater handling facilities built prior to July 1, 2000, when deemed necessary by the director. Dikes must be constructed of sufficiently impermeable material to provide emergency containment and of sufficient dimension to contain the total capacity of the largest tank plus one day’s fluid production. The required capacity of the dike may be lowered by the director if the necessity therefor can be demonstrated to the director's satisfaction. Discharged saltwater liquids or brines must be properly removed and may not be allowed to remain standing within or outside of any diked areas.

4. The operator shall take steps to minimize the amount of solids stored at the facility.

NORTH DAKOTA ADMINISTRATIVE CODE

43-02-03-88.1. SPECIAL PROCEDURES FOR UNDERGROUND INJECTION.

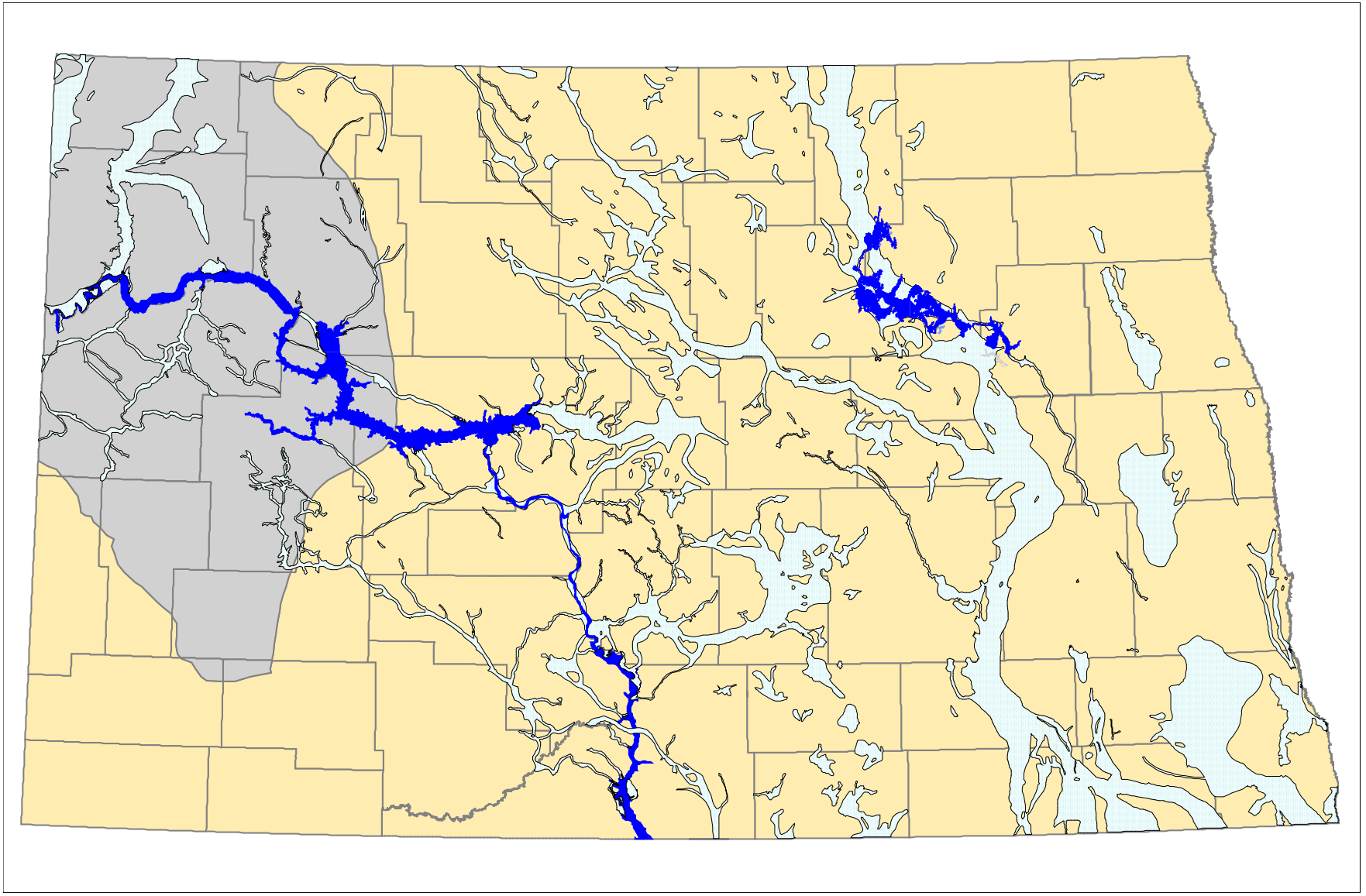
2. The commission shall give the county auditor notice at least fifteen days prior to the hearing of any application in which a request for a disposal under chapter 43-02-05 is received.

43-02-05-04. PERMIT REQUIREMENTS.

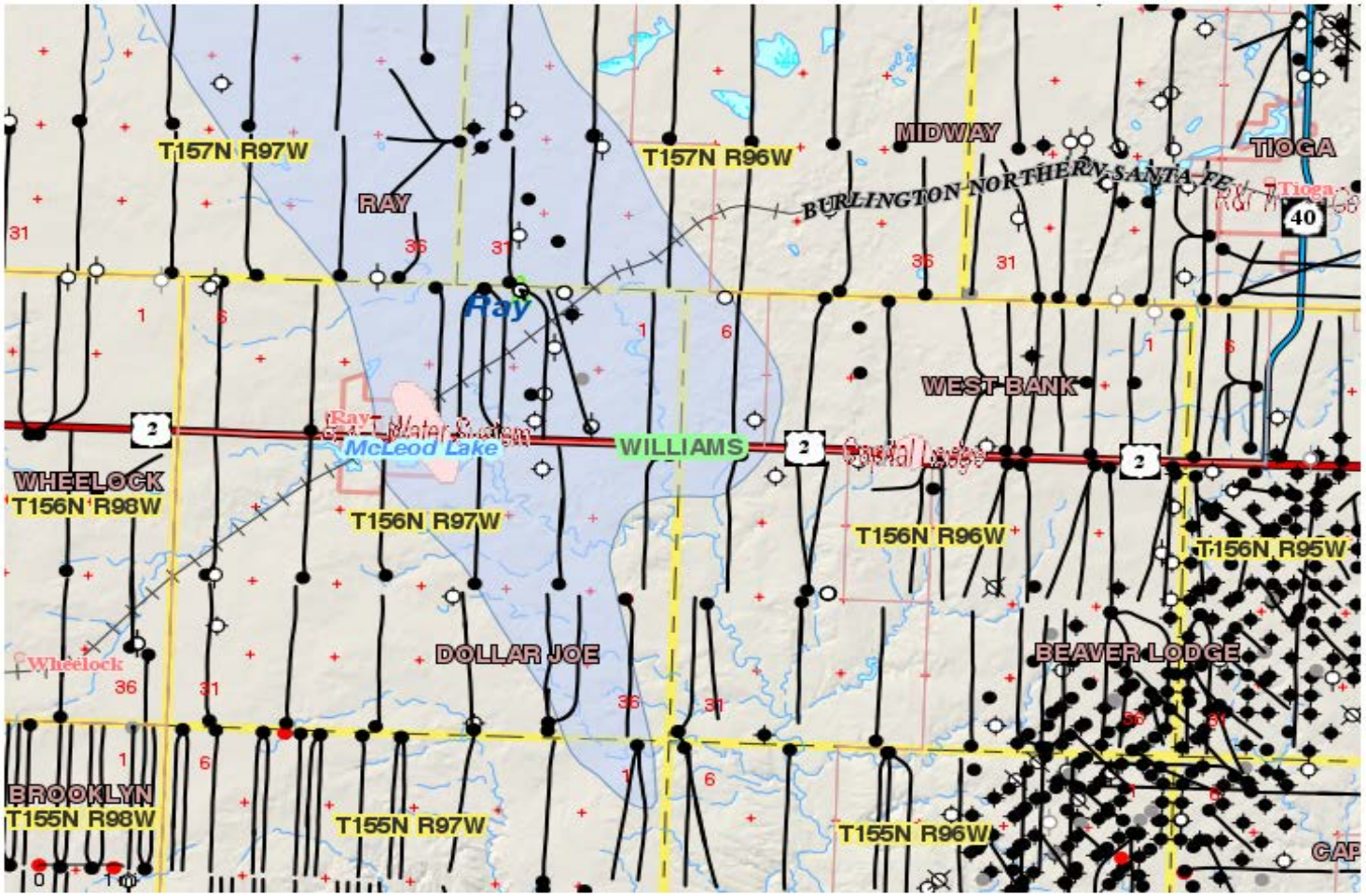
1. No underground injection may be conducted without obtaining a permit from the commission after notice and hearing. The application shall be on a form 14 provided by the commission and shall include at least the following information:

- Geology review to confirm formation isolation.
- Injection pressure review.
- Construction review.
- Review of wells and geology within one-quarter mile. May require corrective action.
- Sampling of two nearest freshwater wells.
- Landowner notification within one-quarter mile.
- Surface facility review including diking and traffic flow.
- Surficial aquifer review

Glacial Drift Aquifers



Glacial Aquifers and Wellhead Protection Area



NORTH DAKOTA ADMINISTRATIVE CODE

43-02-05-06. CONSTRUCTION REQUIREMENTS.

1. All injection wells shall be cased and cemented to prevent movement of fluids into or between underground sources of drinking water or into an unauthorized zone. The casing and cement used in construction of each new injection well shall be designed for the life expectancy of the well.

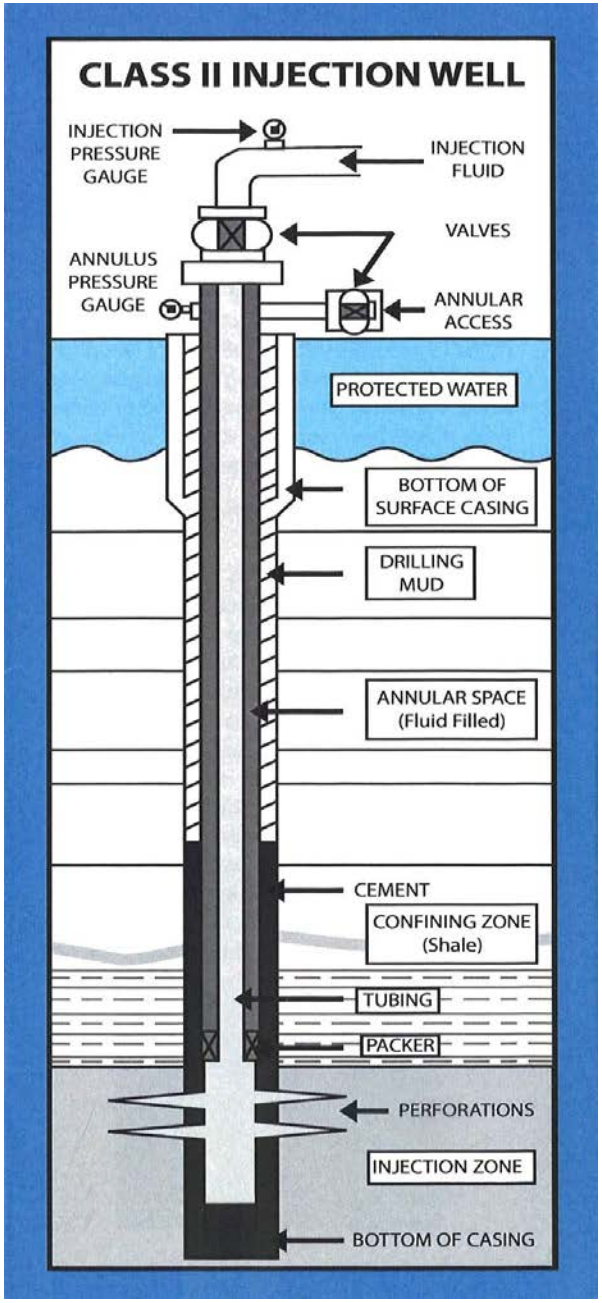
3. All injection wells must be equipped with tubing and packer set at a depth approved by the director.

43-02-05-07. MECHANICAL INTEGRITY.

1. Prior to commencing operations, the operator of a new injection well must demonstrate the mechanical integrity of the well. All existing injection wells must demonstrate continual mechanical integrity and be tested at least once every five years.

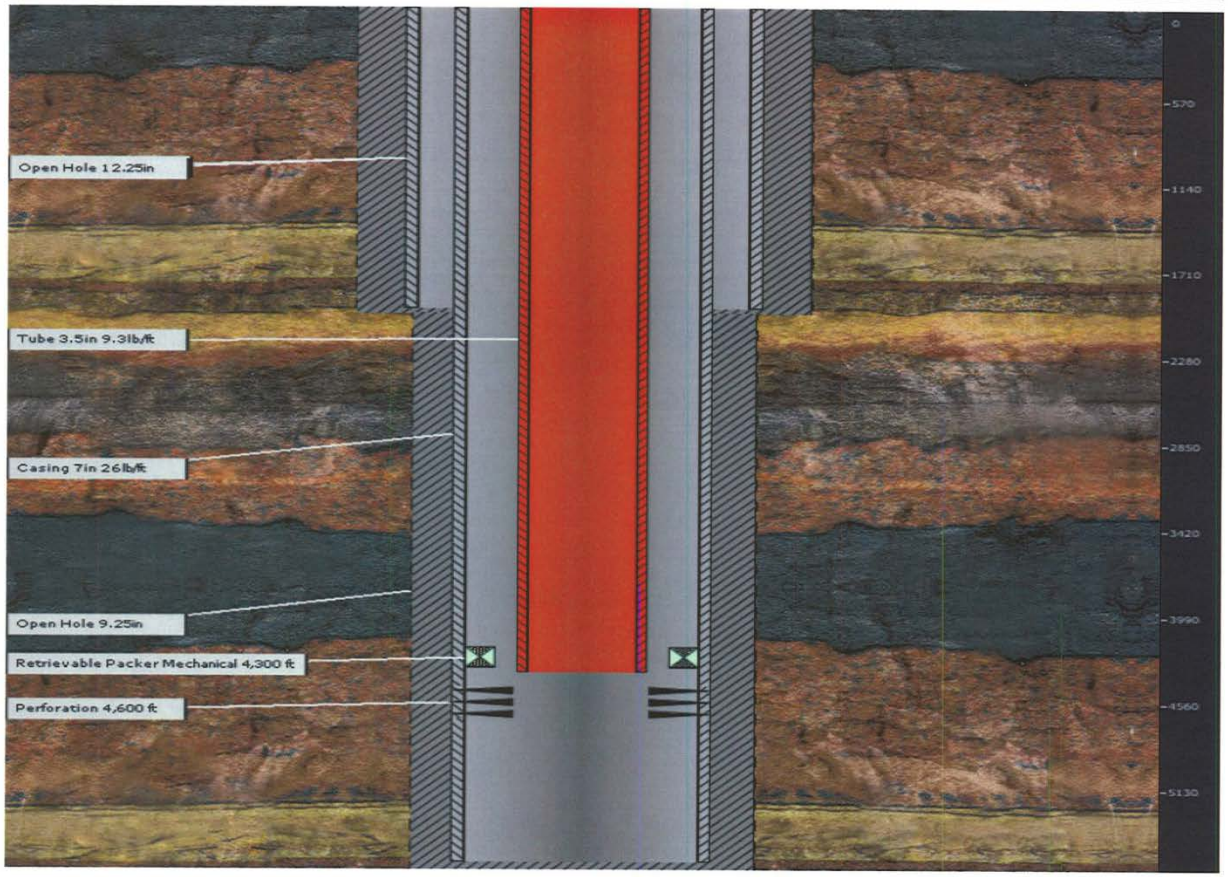
3. One of the following methods must be used to establish the absence of significant fluid movement: log from which cement can be determined or well records demonstrating the presence of adequate cement to prevent such migration or Radioactive tracer survey, temperature log, or noise log.

- Must perform MIT if requested.
- Must perform MIT after any workover.


CLASS II INJECTION WELL
INJECTION PRESSURE GAUGE
INJECTION FLUID
VALVES
ANNULUS PRESSURE GAUGE
ANNULAR ACCESS
PROTECTED WATER
BOTTOM OF SURFACE CASING
DRILLING MUD
ANNULAR SPACE (Fluid Filled)
CEMENT
CONFINING ZONE (Shale)
TUBING
PACKER
PERFORATIONS
INJECTION ZONE
BOTTOM OF CASING

WELL CONFIGURATION

HALLIBURTON



Measured Depth - 5700 ft

Legend:

- Perforation
- Tubing
- Casing
- Open Hole
- Retrievable Packer Mechanical

NORTH DAKOTA ADMINISTRATIVE CODE

43-02-05-12. REPORTING AND MONITORING REQUIREMENTS.

1. The operator of an injection well shall meter or use an approved method to keep records and shall report monthly to the industrial commission, oil and gas division, the volume and nature, i.e., produced water, makeup water, etc., of the fluid injected, the injection pressure, and such other information as the commission may require.

2. Immediately upon the commencement or recommencement of injection, the operator shall notify the oil and gas division of the injection date.

3. The operator shall place accurate gauges on the tubing and the tubing-casing annulus. Accurate gauges shall also be placed on any other annuluses deemed necessary by the director.

4. The operator of an injection well shall keep the well and injection system under continuing surveillance and conduct such monitoring and sampling as the commission may require.

5. The operator of an injection well shall report any noncompliance with regulations or permit conditions to the director orally within twenty-four hours. The operator shall cease injection operations if so directed by the director.

7. Upon the completion or recompletion of an injection well or the completion of any remedial work or attempted remedial work a report on the operation shall be filed on a form 4 sundry notice with the director within thirty days.

- EPA's determination found that the following wastes are exempt from RCRA hazardous waste management requirements. The list below identifies many but not all exempt wastes. In general, E&P exempt wastes are generated in "primary field operations", and not as a result of maintenance or transportation activities. (53 FR 25453-25454)
- "Produced water
- "Drilling fluids
- "Drill cuttings
- "Rig wash
- "Well completion, treatment, and stimulation fluids
- "BS&W and other tank bottoms from storage facilities
- "Accumulated materials such as hydrocarbons, solids, sand, and emulsion from production separators, fluid treating vessels, and production impoundments
- "Pit sludges and contaminated bottoms from storage or disposal of exempt wastes
- "Workover wastes
- "Gas plant dehydration wastes, including glycol-based compounds, glycol filters, filter media, backwash, and molecular sieves
- "Gas plant sweetening wastes for sulfur removal, including amine, amine filters, amine filter media, backwash, precipitated amine sludge, iron sponge, and hydrogen sulfide scrubber liquid and sludge
- "Cooing tower blowdown
- "Spent filters, filter media, and backwash
- "Packing fluids
- "Produced sand
- "Pipe scale, hydrocarbon solids, hydrates, and other deposits removed from piping and equipment prior to transportation
- "Hydrocarbon-bearing soil
- "Pigging wastes from gathering lines
- "Wastes from subsurface gas storage and retrieval, except for the listed nonexempt wastes
- "Constituents removed from produced water before it is injected or otherwise disposed of
- "Liquid hydrocarbons removed from the production stream but not from oil refining
- "Gases removed from the production stream, such as hydrogen sulfide and carbon dioxide
- "Waste crude oil from primary field operations and production

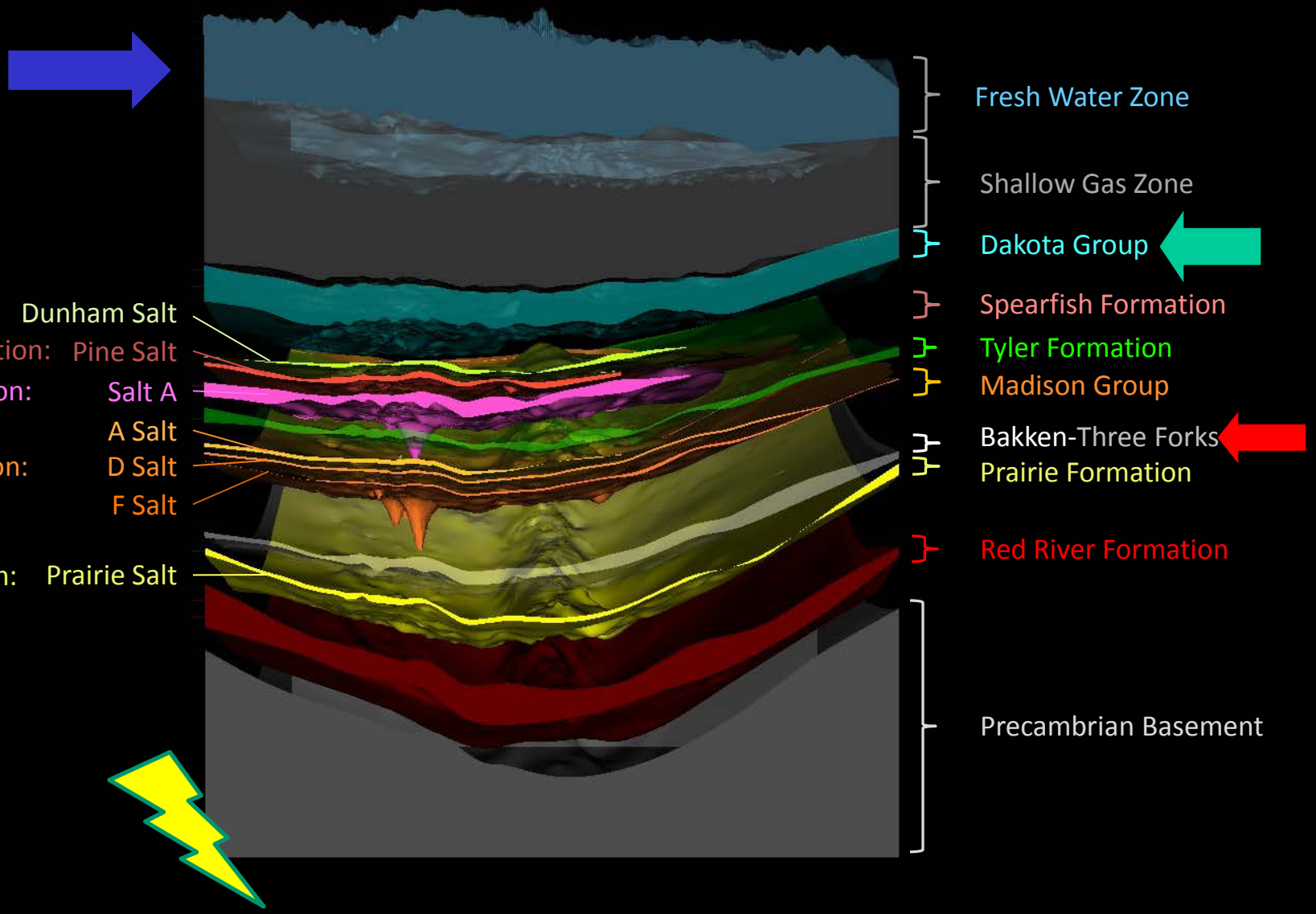
NON-EXEMPT WASTES

- "Unused fracturing fluids or acids
- "Gas plant cooling tower cleaning wastes
- "Painting wastes
- "Oil and gas service company wastes, such as empty drums, drum rinsate, vacuum truck rinsate, sandblast media, painting wastes, spent solvents, spilled chemicals, and waste acids
- "Vacuum truck and drum rinsate from trucks and drums transporting or containing nonexempt waste
- "Refinery wastes
- "Liquid and solid wastes generated by crude oil and tank bottom reclaimers
- "Used equipment lubrication oils
- "Waste compressor oil, filters, and blowdown
- "Used hydraulic fluids
- "Waste solvents
- "Waste in transportation pipeline-related pits
- "Caustic or acid cleaners
- "Boiler cleaning wastes
- "Boiler refractory bricks
- "Incinerator ash
- "Laboratory wastes
- "Sanitary wastes
- "Pesticide wastes
- "Radioactive tracer wastes
- "Drums, insulation, and miscellaneous solids"

INDUCED SEISMICITY

- Disposal zone is 1/2 mile below potable waters with impermeable shale between and >2 miles above earthquake zone with many layers including salt between.
- Underground disposal zone(s) must be separated from earthquake zones.

Sedimentary Rocks of Western North Dakota




SECURITY NOTICE
THIS PROPERTY IS PROTECTED BY ELECTRONIC SURVEILLANCE
ATTENTION DRIVERS
When High Tank Alarm Goes Off You Have 2 Minutes To Stop Pumping. Motor Valve Will Close Discharge Line.


7816

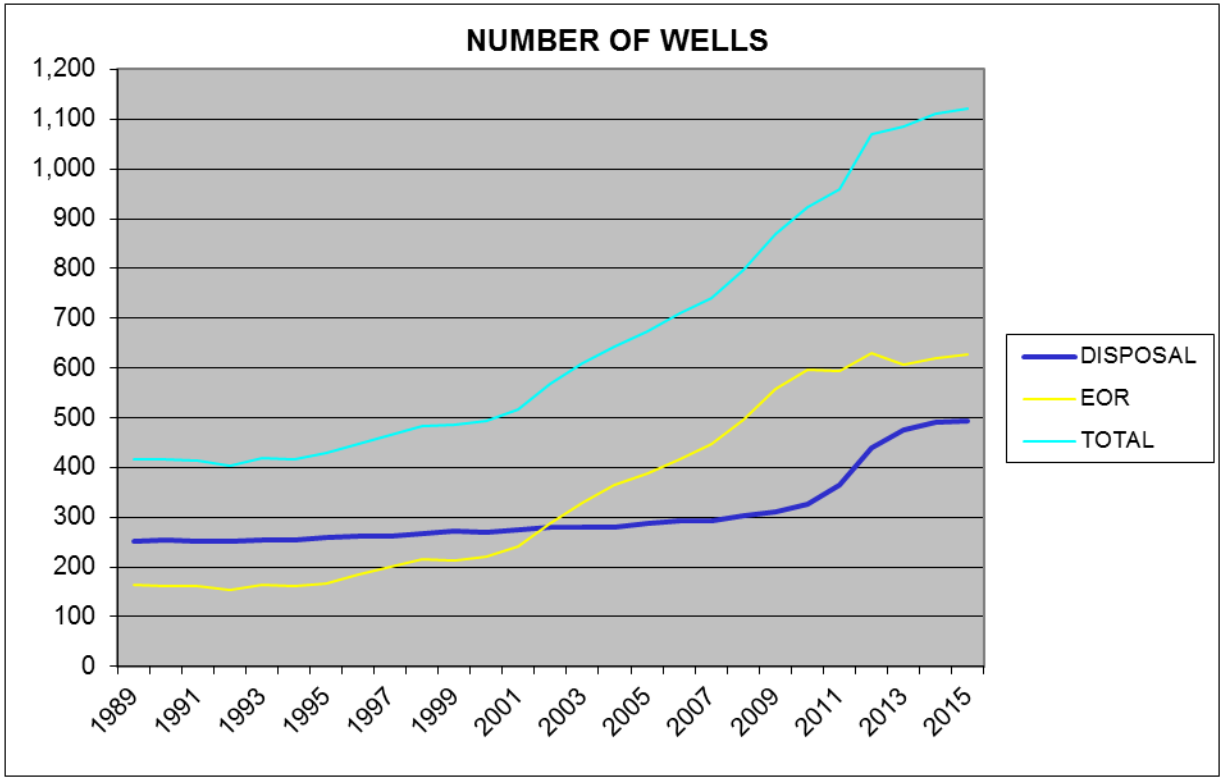

800
1000
1200
600
1400
400
1600
200
psi
1800
0
2000
XMAS TREE
GAUGE

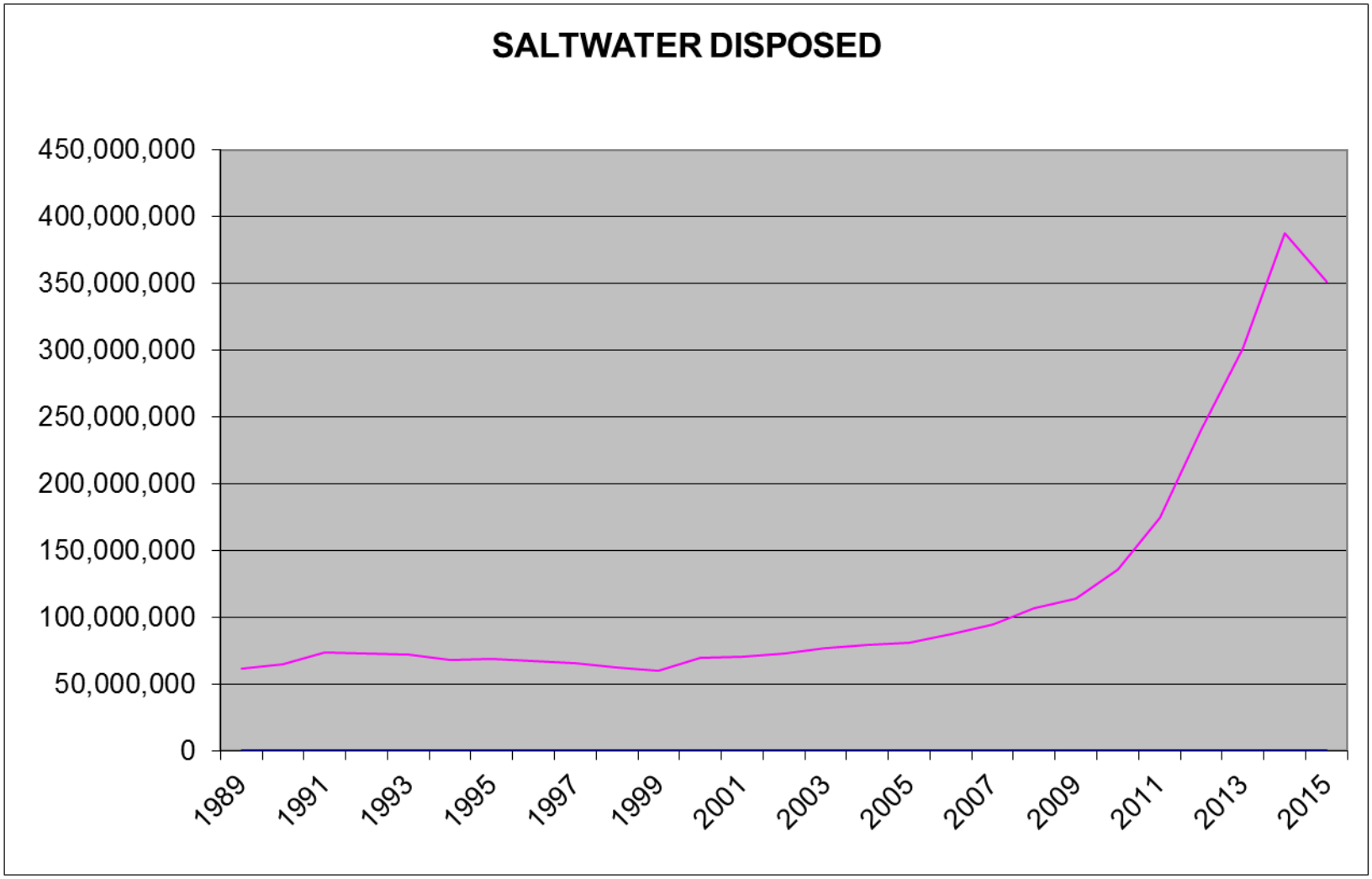
200
400
600
800
1000
1200
1400
1600
1800
2000
psi

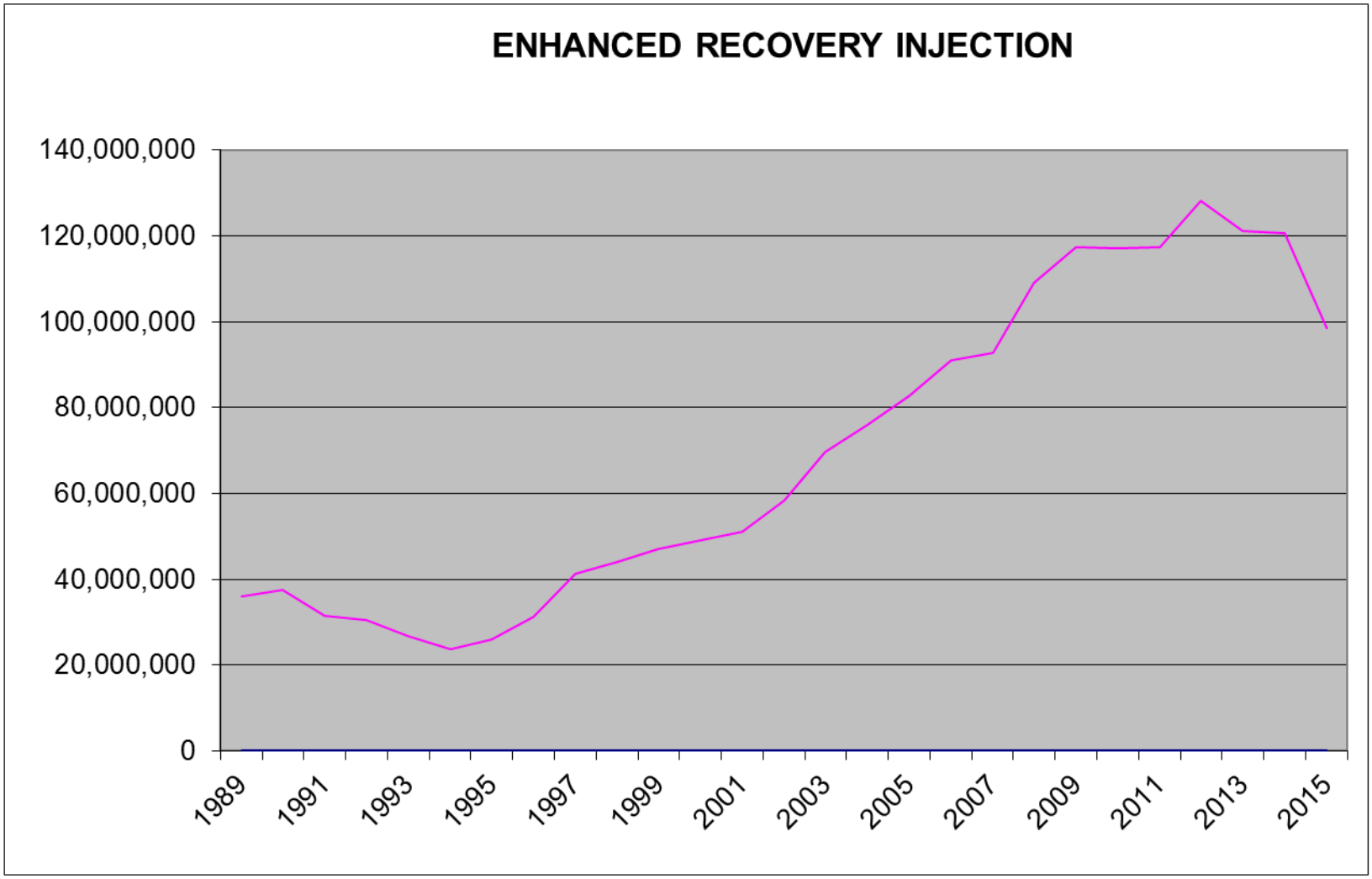
Year	DISPOSED BARRELS	EOR BARRELS	TOTAL BARRELS	DISPOSAL WELLS	EOR WELLS	TOTAL WELLS
1989	61,355,476	35,970,279	97,325,755	252	164	416
1990	65,177,960	37,492,007	102,669,967	254	162	416
1991	73,428,101	31,377,616	104,805,717	252	161	413
1992	72,967,046	30,551,246	103,518,292	251	153	404
1993	72,520,325	26,767,445	99,287,770	255	165	420
1994	68,359,434	23,585,923	91,945,357	255	162	417
1995	69,069,460	25,908,701	94,978,161	260	168	428
1996	67,221,001	31,138,807	98,359,808	262	184	446
1997	65,703,390	41,167,339	106,870,729	263	201	464
1998	62,592,956	43,949,813	106,542,769	268	216	484
1999	60,254,690	47,015,147	107,269,837	273	213	486
2000	69,901,602	49,142,001	119,043,603	271	222	493
2001	70,826,005	51,141,456	121,967,461	275	242	517
2002	73,370,619	58,352,278	131,722,897	279	288	567
2003	76,800,945	69,649,331	146,450,276	280	330	610
2004	79,095,287	75,914,556	155,009,843	280	364	644
2005	80,865,464	82,779,951	163,645,415	287	387	674
2006	87,649,381	91,000,291	178,649,672	292	417	709
2007	94,545,760	92,674,084	187,219,844	293	448	741
2008	107,111,902	109,066,380	216,178,282	302	496	798
2009	114,082,667	117,251,157	231,333,824	311	558	869
2010	136,004,243	117,095,872	253,100,115	326	597	923
2011	174,578,395	117,439,043	292,017,438	365	594	959
2012	240,114,452	128,086,890	368,201,342	440	629	1,069
2013	301,525,705	121,222,882	422,748,587	476	608	1,084
2014	388,017,514	120,730,472	508,747,986	491	620	1,111
2015	351,622,649	98,587,012	450,209,661	494	628	1,122

Production

Year	BOPD	Well Count	Year Oil Total	Year SW Total
2005	97,740	3,391	35,675,194	120,542,862
2006	109,396	3,554	39,929,639	128,412,142
2007	123,685	3,767	45,145,183	134,522,087
2008	171,948	4,221	62,760,939	149,874,914
2009	218,608	4,596	79,791,769	155,216,275
2010	309,686	5,357	113,035,467	178,641,586
2011	419,208	6,548	153,010,922	210,564,824
2012	666,544	8,357	243,288,646	291,103,597
2013	859,770	10,288	313,816,037	349,478,251
2014	1,087,365	12,503	396,888,131	442,772,522
2015	988,119	13,565	360,663,531	408,134,284


NUMBER OF WELLS
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
DISPOSAL
EOR
TOTAL


SALTWATER DISPOSED
450,000,000
400,000,000
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015


ENHANCED RECOVERY INJECTION
140,000,000
120,000,000
100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015

PERMITS ISSUED

YEAR	SWD	EOR	SWD INSP	EOR INSP
2009	12	30	3187	4476
2010	38	22	2855	4147
2011	79	16	2905	2753
2012	91	22	3464	3703
2013	45	13	4510	4987
2014	23	40	5349	6205
2015	30	15	6080	6785

North Dakota nd.gov | Official Portal for North Dakota State Government

Related Links

- Active Drilling Rigs
- Daily Activity Reports
- Confidential Well List

Information Center

The Director's Cut is an update on current activity in the North Dakota oil patch from the Director of the Department of Mineral Resources.

Director's Cut - 11/13/2015
Director's Cut Archive
Director's Cut Webinars

Recent Presentations

View press releases from the Oil and Gas Division

Oil Conditioning
Approved Oil Conditioning Order #25417
Oil Conditioning FAQ

Oil and Gas Division Program Descriptions:

This section of the Information Center is dedicated to program descriptions within the Oil and Gas Division. We will be adding descriptions as they become available, so check back for further information.

Underground Injection Control Program