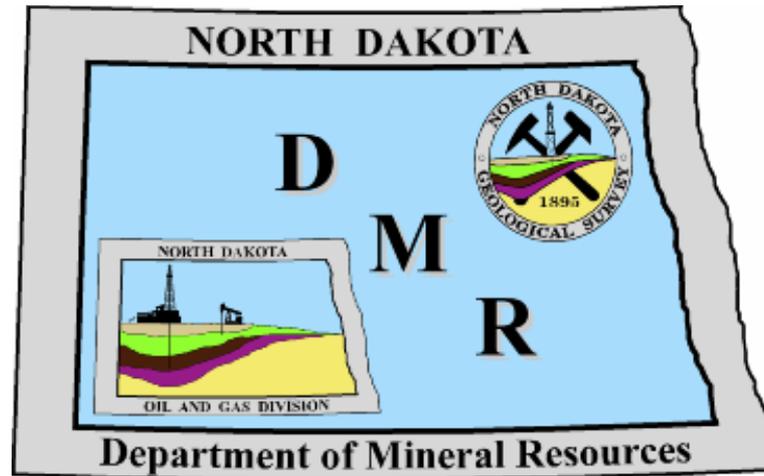


# NDIC Department of Mineral Resources EDT Committee August 30, 2016

Presentation by a representative of the Industrial Commission on oil and gas production trends



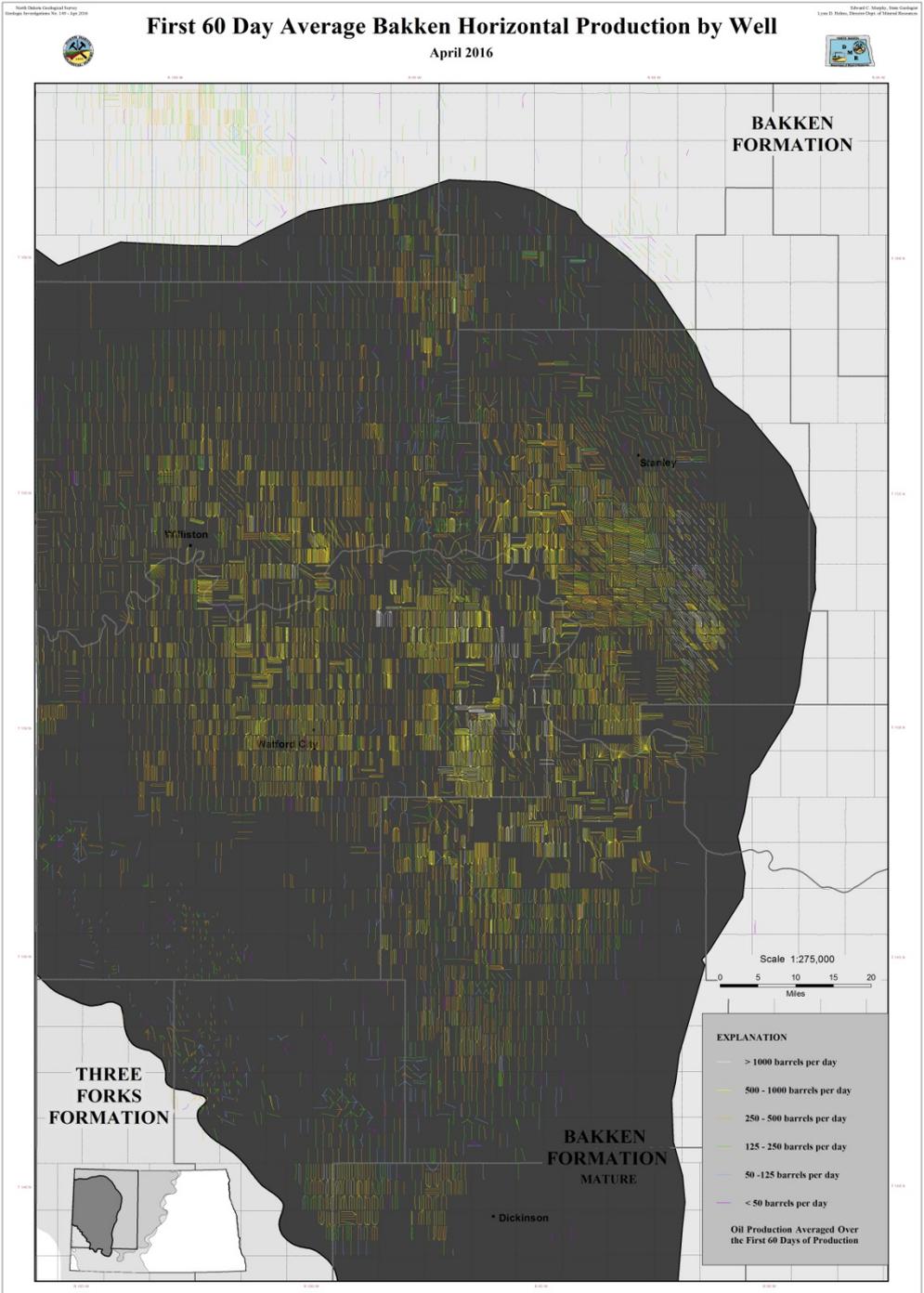
<https://www.dmr.nd.gov/oilgas>  
(701) 328-8020

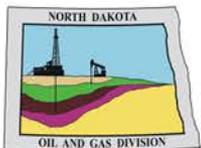
<https://www.dmr.nd.gov/ndgs>  
(701) 328-8000

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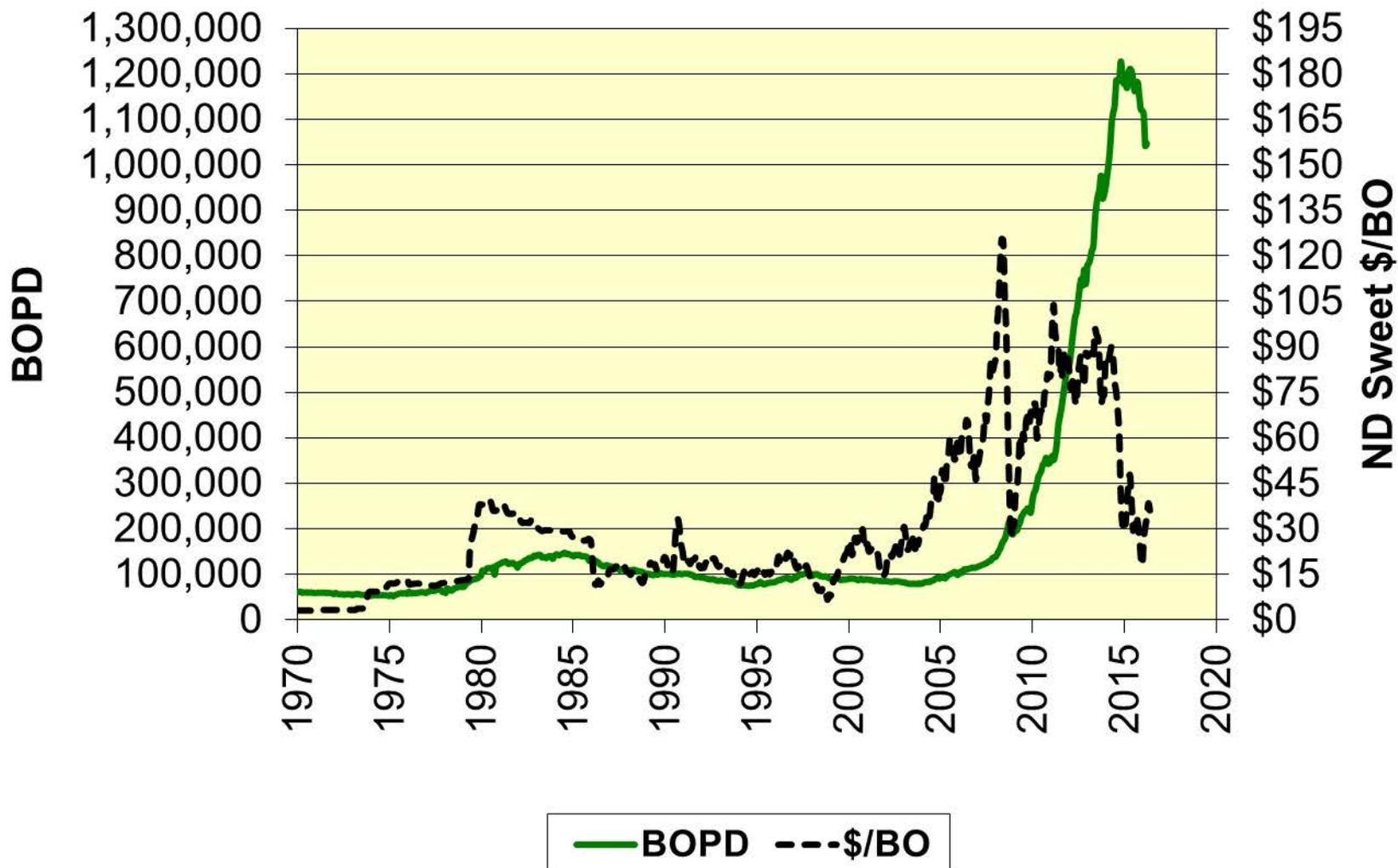
# Wells

- 13,239 active
  - 2,110 conventional
  - 11,129 Bakken/Three Forks
- 1,486 inactive
  - +\$40 for 90 days
- 887 waiting on completion
  - +\$50 for 90 days
  - NYMEX March 2017
- 1,992 permitted
  - +\$60 for 90 days
  - NYMEX June 2024
- 13,720 increased density approved
- 31,324 total
  
- 55,000-65,000 estimated final
  
- 8,675 reclaimed and bond released
- 1,361 reclamation in progress



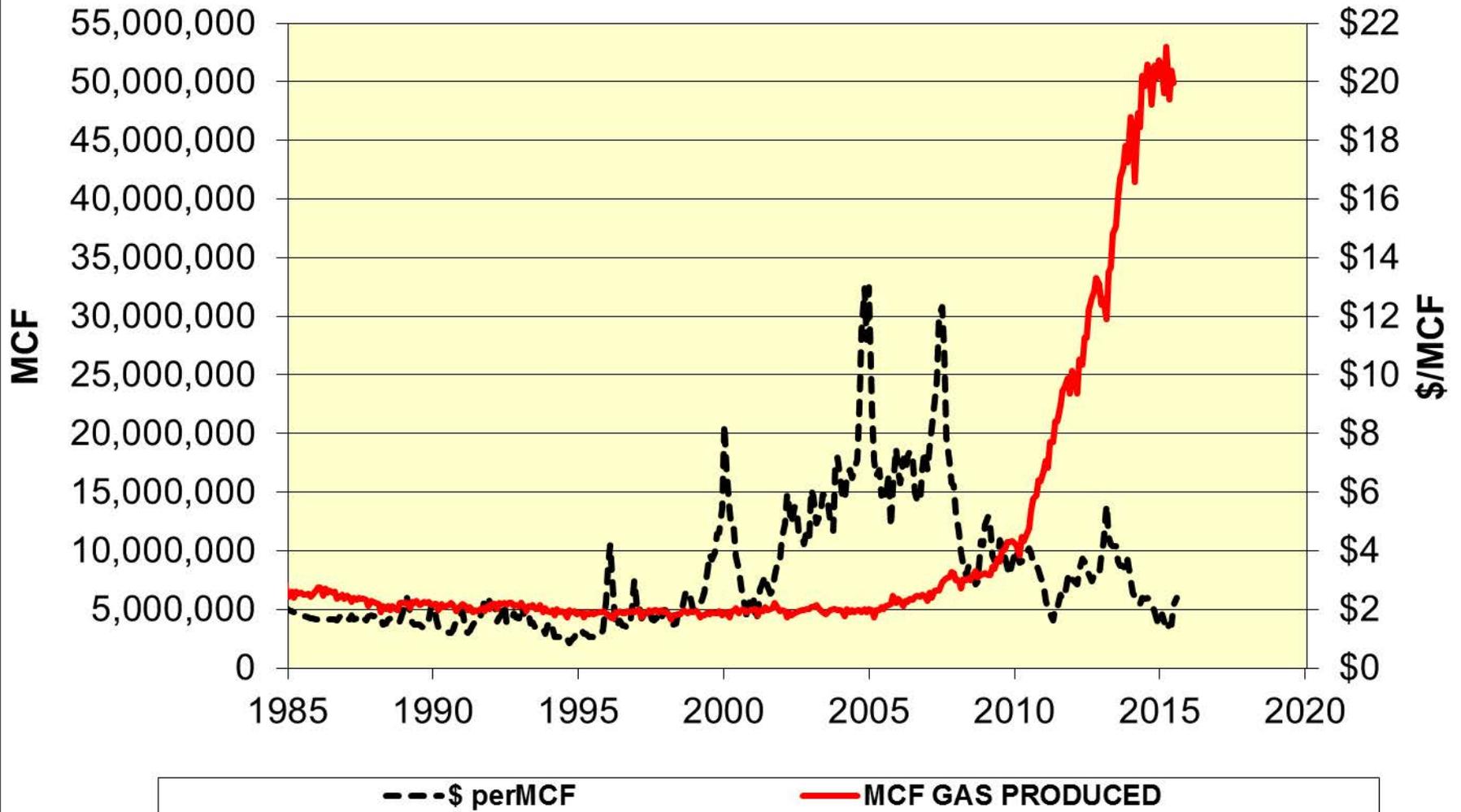


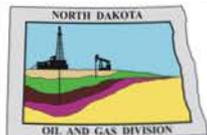
## North Dakota Daily Oil Produced and Price



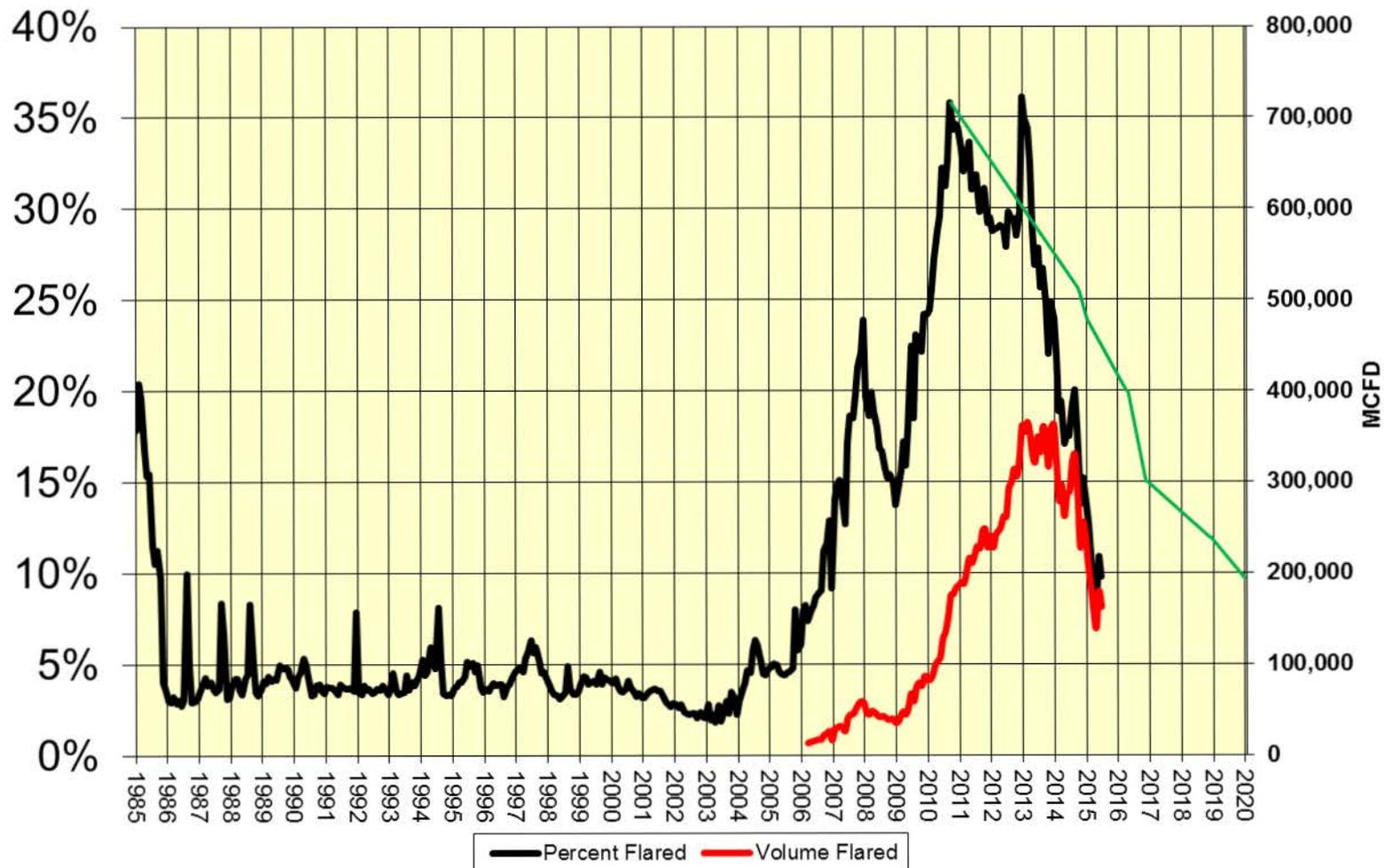


## North Dakota Monthly Gas Produced and Price

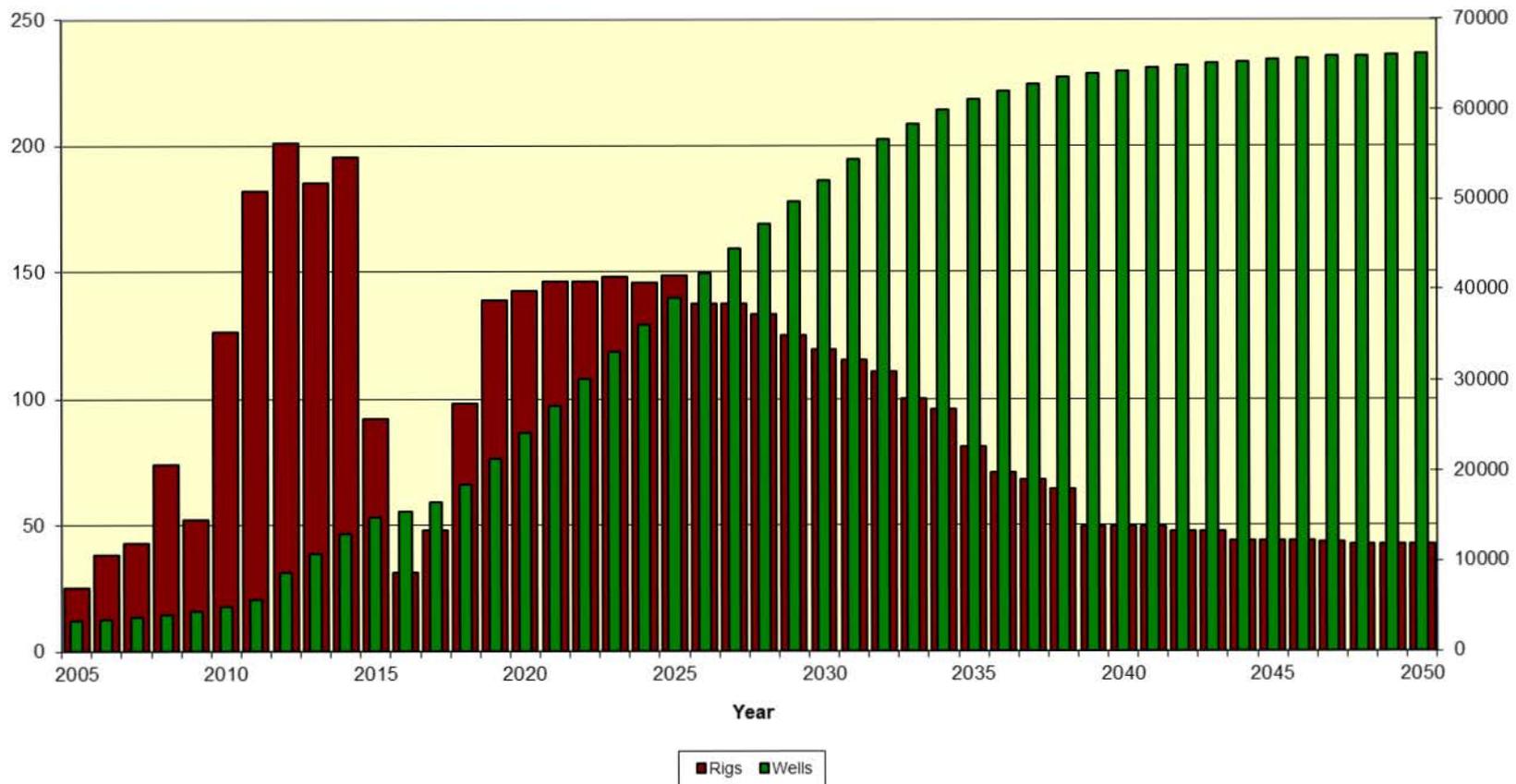




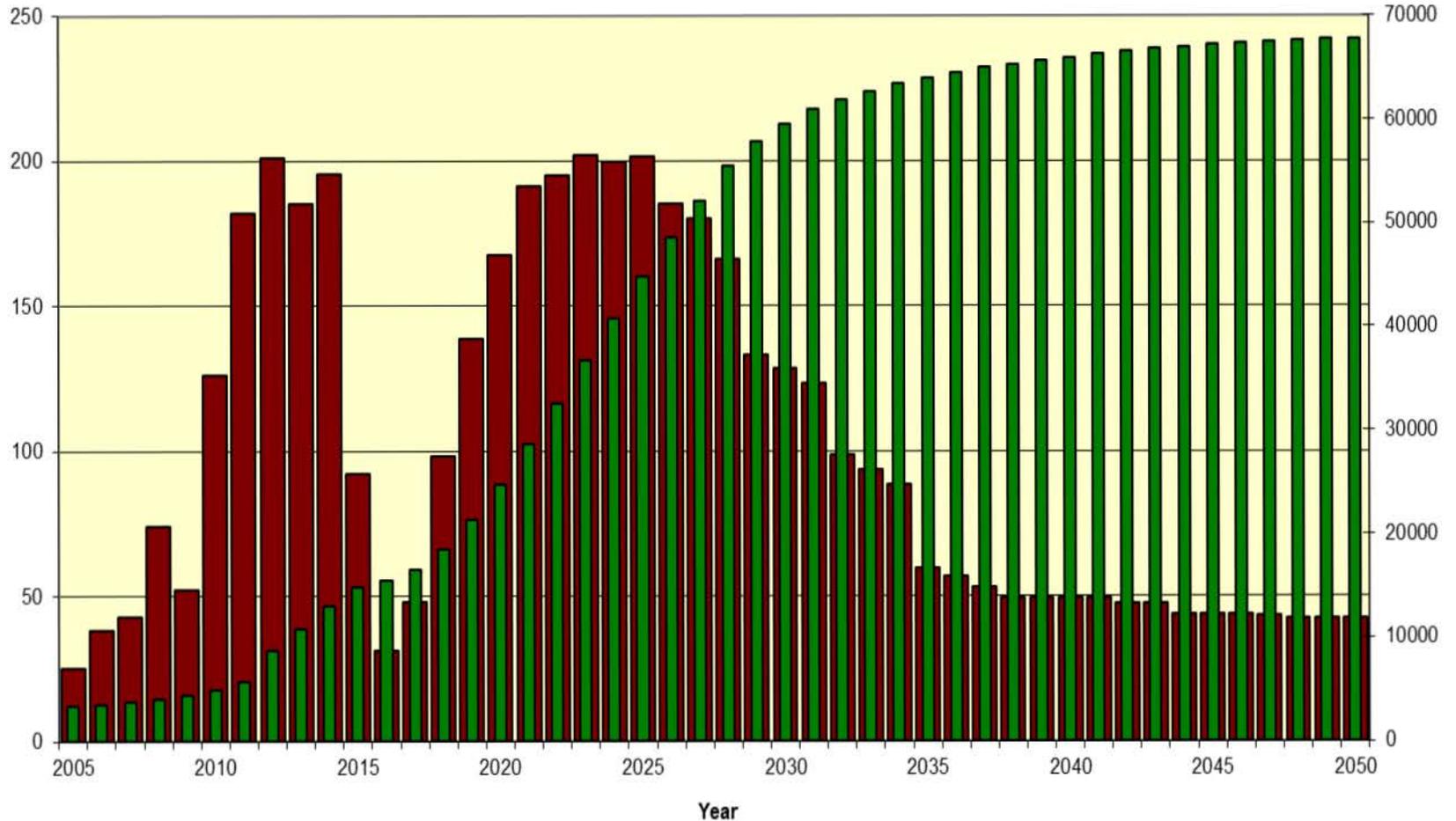
# North Dakota Monthly Gas Flared



### North Dakota Rigs and Wells



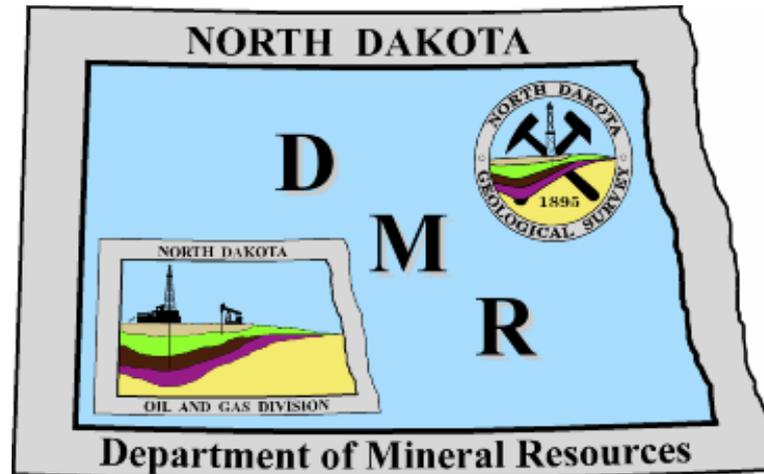
# North Dakota Rigs and Wells



■ Rigs ■ Wells

# NDIC Department of Mineral Resources EDT Committee August 30, 2016

Presentation by a representative of the Industrial Commission on the abandoned oil and gas well plugging and site reclamation fund



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<https://www.dmr.nd.gov/ndgs>  
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# Abandoned Well Plugging and Site Restoration Fund “AWPSRF”

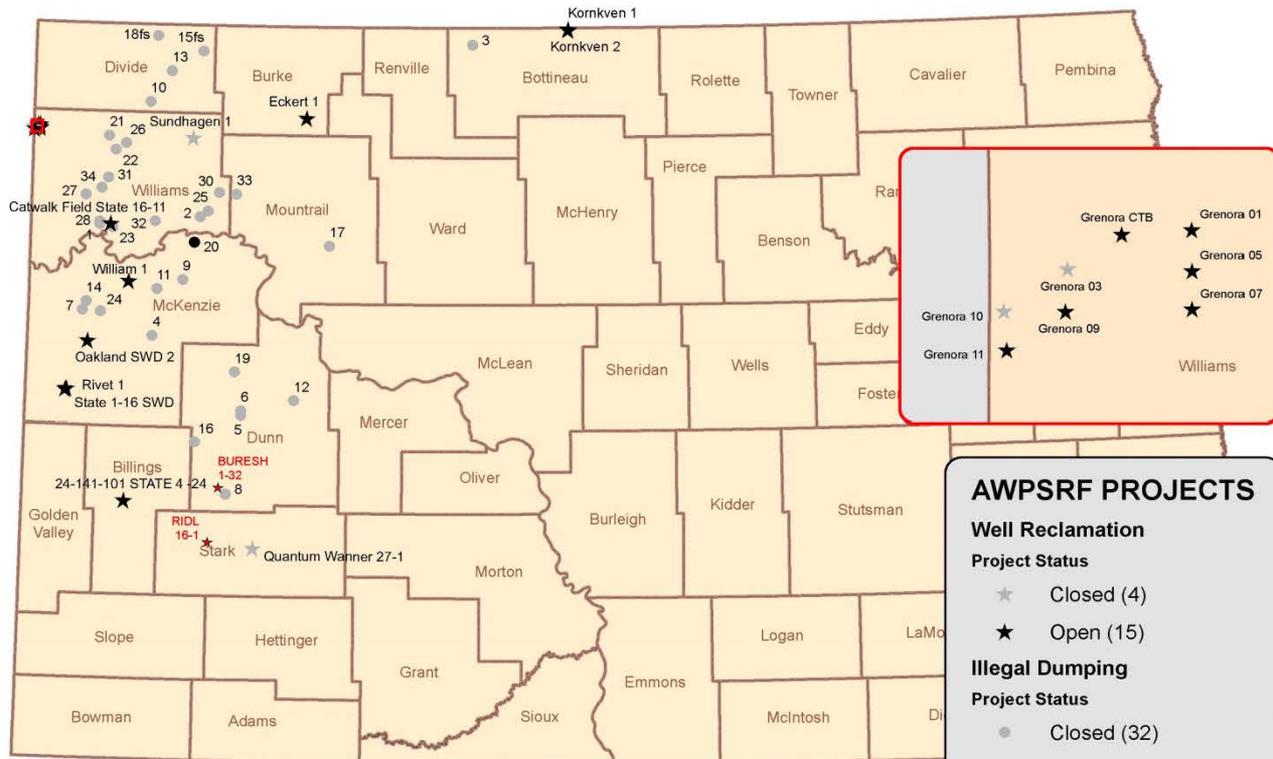
- Established 1983
- Pay plugging and reclamation costs where no responsible party exists
- Originally funded by:
  - Fees paid to the Oil and Gas Division
  - Confiscated bonds
- Amended 2013 the fund is currently supported through a combination of:
  - A portion of the gross production tax (\$7.5 million per fiscal year)
  - Fees paid to the Oil and Gas Division
  - Confiscated bonds
  - Collected civil penalties
- The AWPSRF currently has approximately \$12.2 million dollars
  - Fund capped at \$100 million
  - General Program
  - Legacy Program limited to \$1.5 million per biennium

# AWPSRF – General Program

- General Program
  - Plugging and reclamation of sites (1983-present)
    - Where a company has defaulted on their responsibilities and the state seized the bond, equipment, and salable oil
    - The commission shall seek reimbursement for all reasonable expenses incurred in plugging any well or reclaiming any well site through an action instituted by the Attorney General
  - Illegal dumping of oil-field waste
    - Examples include:
      - Production Water
      - Filter Socks
      - Frac fluid and proppant
      - Production equipment

# AWPSRF – General Program

## Abandoned Well Plugging and Site Restoration Fund Program (AWPSRF)



### AWPSRF PROJECTS

#### Well Reclamation

##### Project Status

★ Closed (4)

★ Open (15)

#### Illegal Dumping

##### Project Status

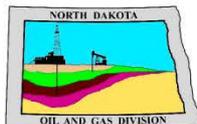
● Closed (32)

● Open (1)

#### Orphan Wells

##### Project Status

★ Open (2)



North Dakota Industrial Commission  
Department of Mineral Resources  
Oil and Gas Division

# State 4-24: Re-plugging Billings County, ND; Spring 2016



Well PA 1984 – 2 historical operators – no longer exist

# State 4-24: Re-plugging Billings County, ND; Spring 2016



# State 4-24: Re-plugging Billings County, ND; Spring 2016



\$180,000 – re-plugged and reclaimed

# AWPSRF #9: Illegal Dumping

## McKenzie County, ND; Winter 2014-Spring 2016



Salt water dumped off county road onto private pasture  
Affected ½ mile of drainage and two stock ponds  
No responsible party identified

# AWPSRF #9: Illegal Dumping

## McKenzie County, ND; Winter 2014-Spring 2016



# AWPSRF #9: Illegal Dumping

## McKenzie County, ND; Winter 2014-Spring 2016



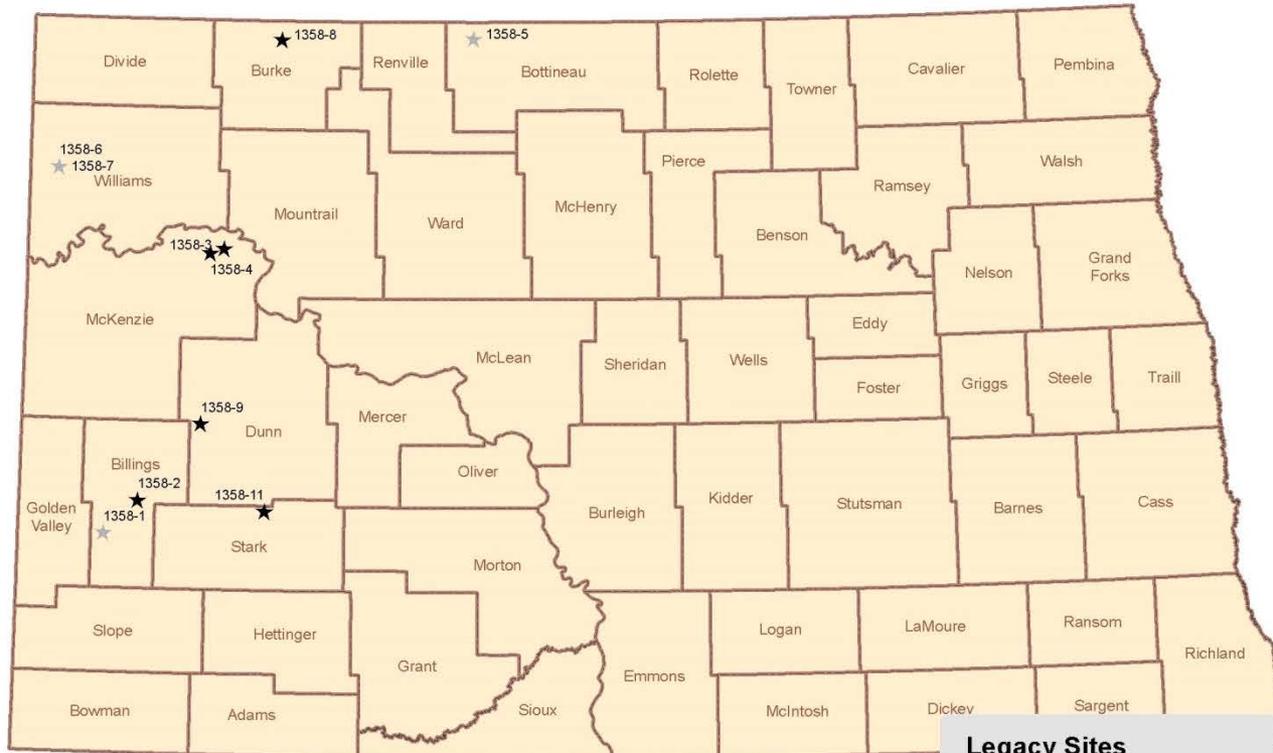
\$456,000 - remediation, reclamation, revegetation

# AWPSRF - Legacy Program

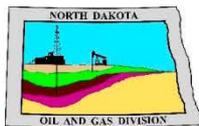
- 2015 State Legislature expanded the scope of the AWPSRF to include the legacy program
- Allocated additional \$1.5 million dollars per biennium
  - Dedicated to “legacy” pre-1983 oil field issues
  - No continuing reclamation responsibility covered under state law
    - Situations originated prior to state laws requiring reclamation
  - Allowed AWPSRF to cover reclamation of eligible pre-1983 oil filed issues
  - Examples include:
    - Reclaiming old reserve pits
    - Properly abandoning old flowlines
    - Plugging seismic “shot holes”

# AWPSRF - Legacy Program

## House Bill 1358 Legacy Sites



Legacy Sites Status	
★	Closed (4)
★	Open (6)



North Dakota Industrial Commission  
 Department of Mineral Resources  
 Oil and Gas Division

# 1358-1: Historical Reserve Pit

Billings County, ND; Fall 2015-Spring 2016



Dry hole plugged and released form bond in 1966  
Met all reclamation requirements at the time  
Reserve pit eroding into Little Missouri River

# 1358-1: Historical Reserve Pit

Billings County, ND; Fall 2015-Spring 2016



# 1358-1: Historical Reserve Pit Billings County, ND; Fall 2015-Spring 2016



\$569,000 – excavated and recalimed

# 1358-5: Flow line

## Bottineau County, ND; Fall 2015



Wells plugged in 1968 and 2001  
No flow line abandonment rules at that time  
Flow line to central tank battery

# 1358-5: Flow line

## Bottineau County, ND; Fall 2015



# 1358-5: Flow line Bottineau County, ND; Fall 2015



\$102,000 – excavated, reclaimed, and reseeded

# 1358-6/7: Plugged Shot Holes

## Williams County, ND; Fall 2015-Spring 2016



Artesian flow from 11 seismic shot holes improperly plugged in the 1970s  
Approximately 30 acres too wet to farm

# 1358-6/7: Plugged Shot Holes

## Williams County, ND; Fall 2015-Spring 2016



# 1358-6/7: Plugged Shot Holes

## Williams County, ND; Fall 2015-Spring 2016



\$115,000 – plugged and ready to farm next spring

# AWPSRF Balance Sheet

## Fiscal Year 2013 - Present

- July 1, 2013 beginning balance      \$2.3 Million

---

- Revenue      \$15.8 M

- Gross Production Tax      \$14.0 M
- Conf. Bonds/Civil Penalties      \$0.6 M
- OGD Fees      \$1.2 M

- General Program      \$2.6 M

- Plugging and Reclaim      \$0.4 M
- Illegal Dumping      \$2.2 M

- Legacy Program      \$1.2 M

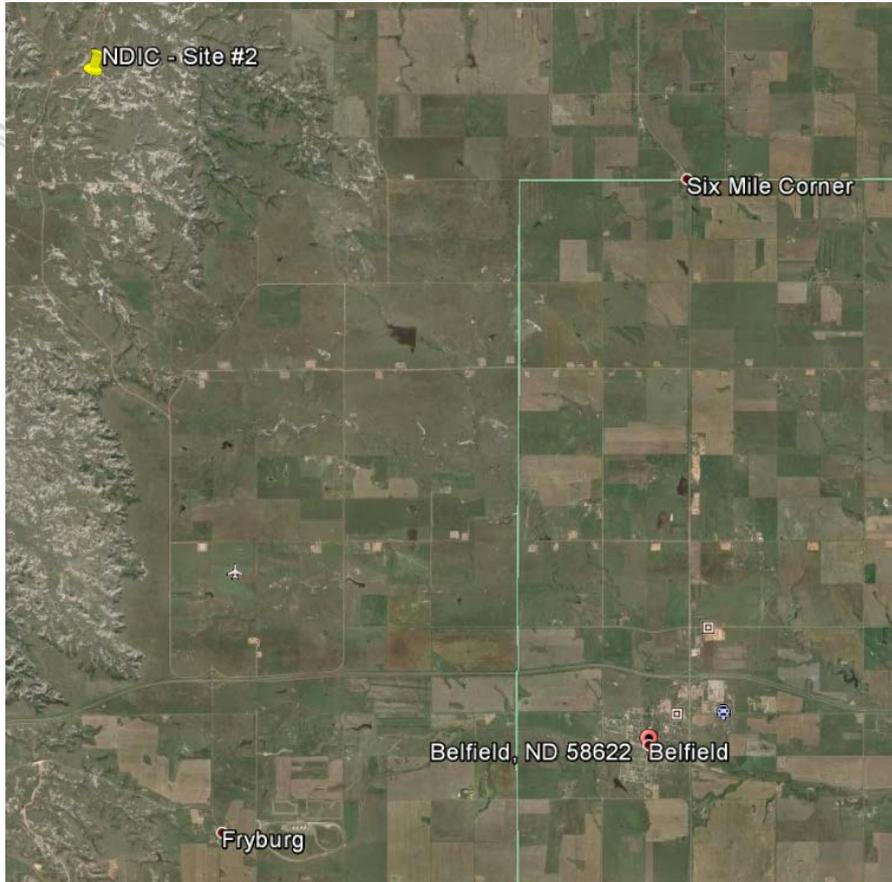
- Site Reclaim      \$0.9 M
- Study      \$0.3 M

- Legislative Transfers      \$2.1 M

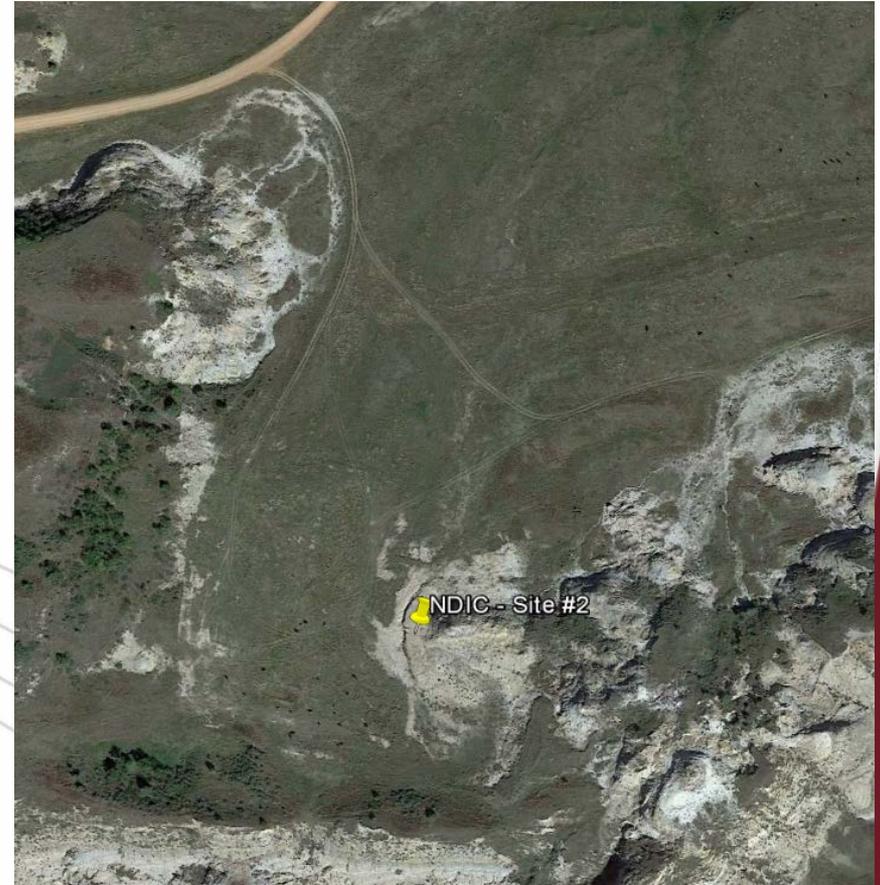
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- **AWPSRF**      **\$12.2 Million**

# Future Site – Pit Washing into Pasture Land, NW of Fryburg / Belfield, ND



Approximately 9 miles north of Fryburg, ND



10 foot gully cutting through pit – depositing NE

# Panoramic view or Pit, Gully cutting through Pit, & Outwash Area

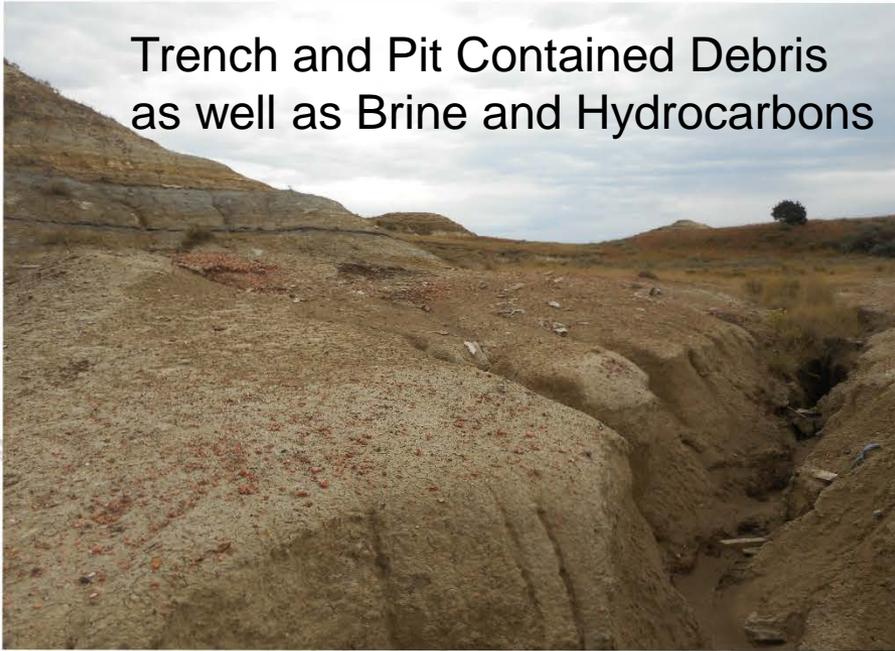


Gully cutting through Pit



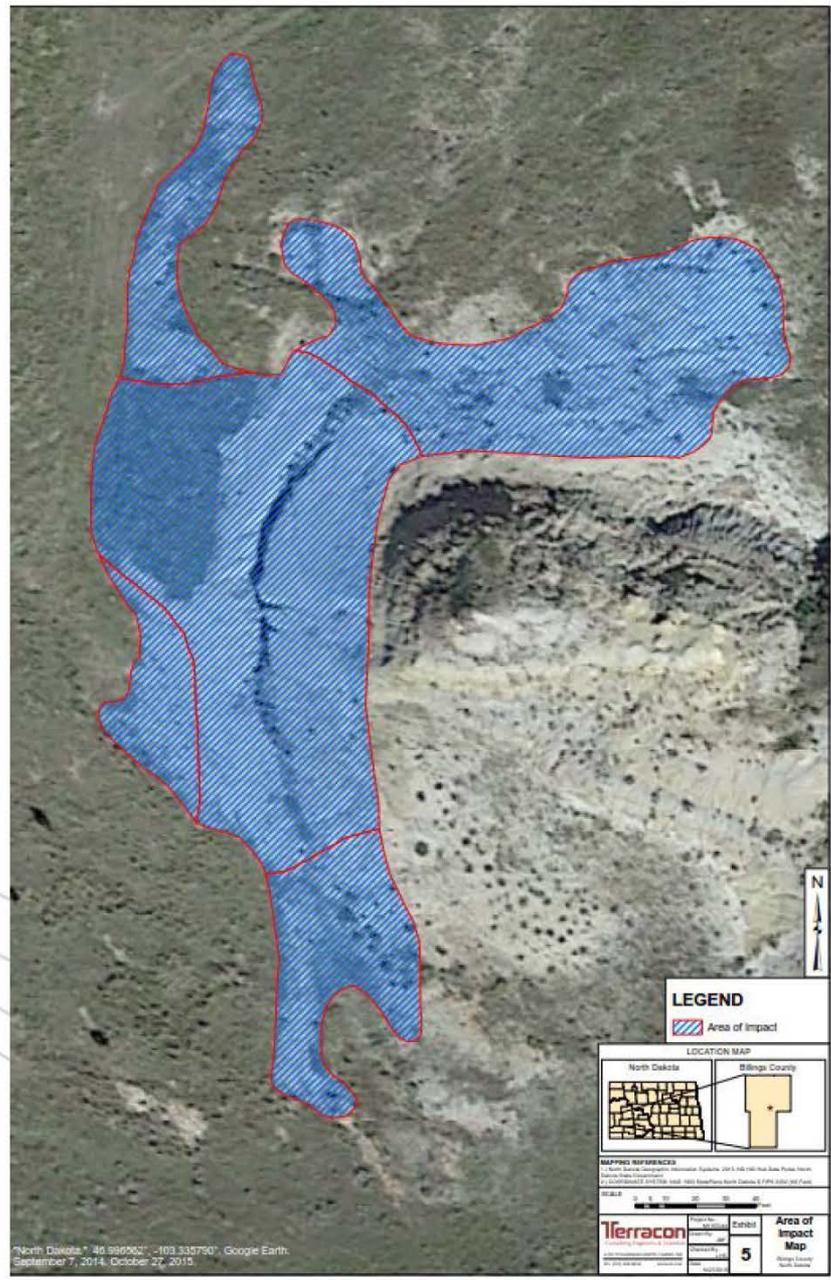
Outwash Area

Trench and Pit Contained Debris  
as well as Brine and Hydrocarbons



Outwash – High EC, Chlorides,  
& Hydrocarbon Residue.

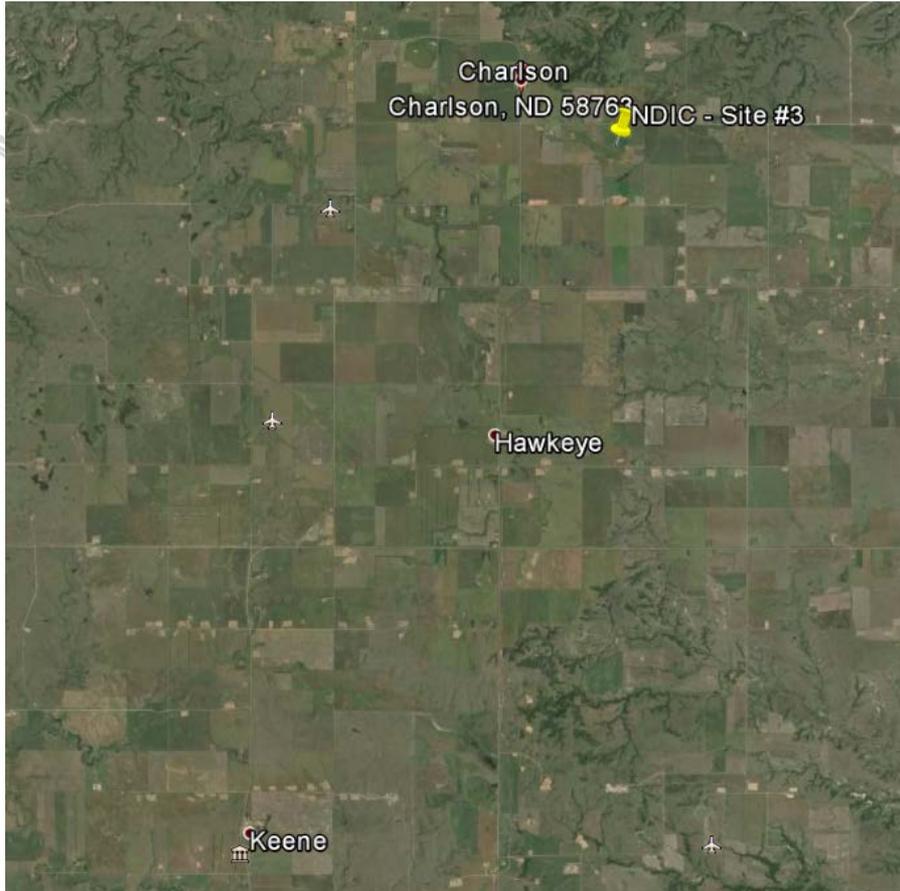




# Proposed Costs for Removal

- Subcontractor Cost - \$616,000 (SM)
- Terracon - \$ 62,000
- Total Cost - Removal \$678,000
  
- Subcontractor Bids – 6 Companies
  - Mobilization, Excavation, Truck Hauling & Removal, Disposal, Backfilling General Fill and Topsoil, Finish Grading, and Seeding.
  - 22 Days to Complete
  - Bids Ranged from \$616,000 – \$817,000

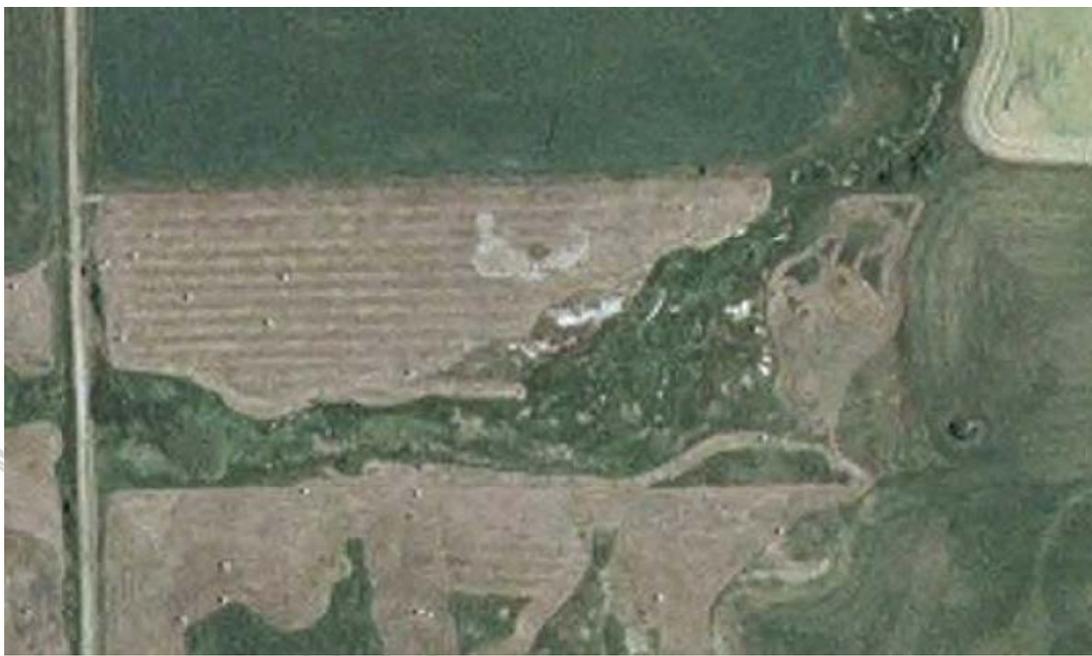
# Future Site – Pit Washing into Little Antelope Creek SE of Charlson, NE of Keene, ND



Approximately 12 miles Northeast of Keene, ND



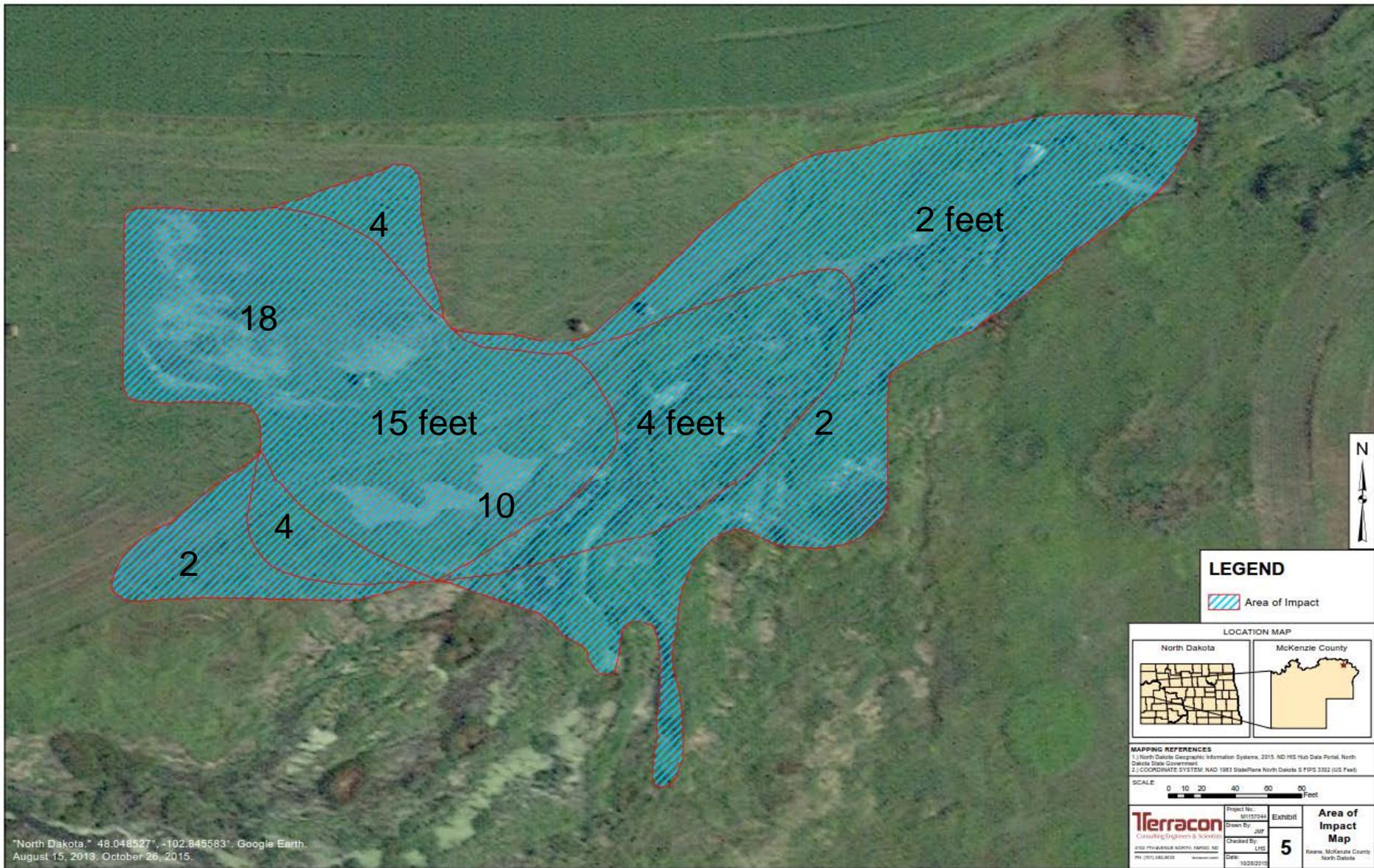
Pit washing into coulee.



## Air Photos from 2003 and 1995

The pit has been exposed for more than 20 years (probably more than 30 years). The contaminated plume has grown in size and into Little Antelope Creek to the south.





"North Dakota." 48.048527°, -102.845583°, Google Earth.  
 August 15, 2013, October 26, 2015.

# Proposed Costs for Removal - #3

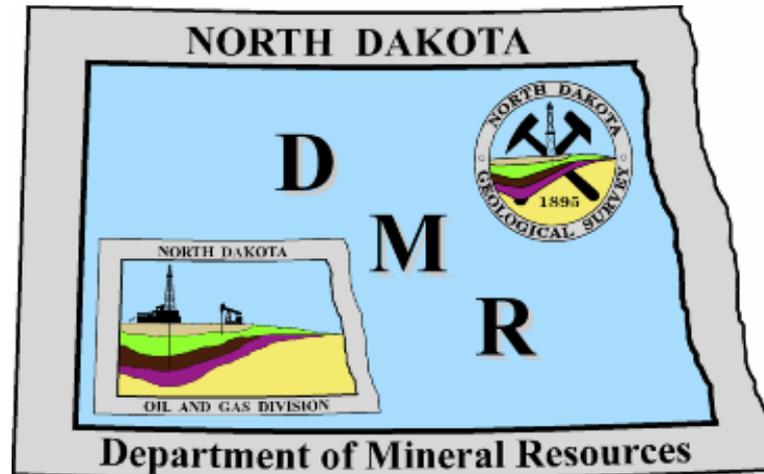
- Subcontractor Cost - \$2,600,000 (ABS)
- Terracon - \$ 111,400
- Total Cost - Removal \$2,711,400
  
- Subcontractor Bids – 7 Companies
  - Mobilization, Excavation, Truck Hauling & Removal, Disposal, Backfilling General Fill and Topsoil, Finish Grading, and Seeding.
  - 40 Days to Complete
  - Bids Ranged from \$2,600,000 - \$3,750,000

# Summary - Estimated Costs

	<u>Discription</u>	<u>Status</u>	<u>Cost estimate</u>	<u>Project Cost to Date</u>
Site #1	Pit	Done		\$568,853.05
Site #2	Pit		\$678,000	\$33,997.55
Site #3	Pit		\$2,742,400	\$45,861.53
Site #4	Doesn't Qualify			
Site #5	Leaking Pipeline	Done		\$102,200.63
Site #6	Seismic Shot Holes	Done		\$65,458.66
Site #7	Seismic Shot Holes	Done		\$53,814.82
Site #8	Possible Leaking well		\$190,000	
Site #9	Seismic Shot Holes		\$50 to 70K	
Site #10	Seismic Shot Holes		\$50 to 70K	
<u>Site #11</u>	<u>Seismic Shot Holes</u>		<u>\$50 to 70K</u>	
			\$3.8 million	
Total				\$870,186.42

# NDIC Department of Mineral Resources EDT Committee August 30, 2016

Presentation by a representative of the Industrial Commission on status of brine holding pond remediation research in nor-central North Dakota



<https://www.dmr.nd.gov/oilgas>  
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(701) 328-8000

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Bismarck, ND 58505-0840**

**Reclamation Options for Soils Surrounding Legacy  
Brine Waste Pits in Northcentral North Dakota**



Ryan Limb<sup>1</sup>, Aaron Daigh<sup>2</sup>, Kevin Sedivec<sup>1</sup>, Thomas DeSutter<sup>2</sup>,  
Amit Chatterjee<sup>2</sup>, Frank Casey<sup>2</sup>, Shawn DeKeyser<sup>1</sup>

<sup>1</sup>Range Program, <sup>2</sup>Department of Soil Science - School of Natural Resource Sciences  
North Dakota State University

# \$309, 508 - "Reclamation Options for Soils Surrounding Legacy Brine Waste Pits in Northcentral North Dakota"

PROPOSED ACTION 1 - Create a Pilot Program on soils surrounding Legacy Brine Waste Pits

We've completed site establishment, pre- and post-amendment soil sampling, applying the amendments, and planting for our field study. The last step will be assessing plant (plug) survival and seeding the plots in early September.

PROPOSED ACTION 2 - Greenhouse Studies at North Dakota State University

Preparations are underway to begin the greenhouse experiments fall 2016

PROPOSED ACTION 3 - Laboratory Studies at North Dakota State University

We have completed run #1 of the laboratory column experiment and are preparing to analyze the soil and leachate samples.

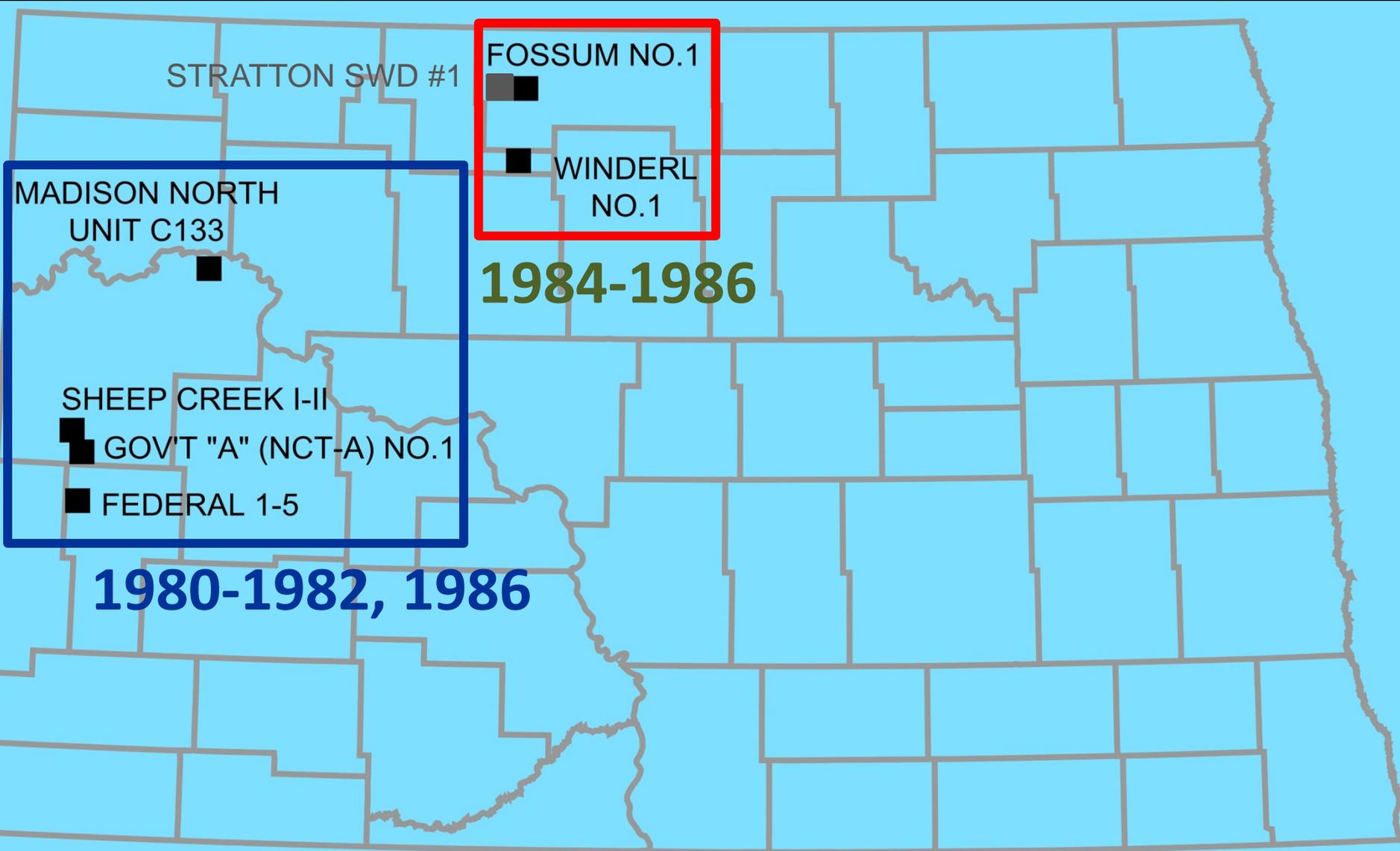
Run #2 is being prepared and will be initiated August 22, 2016.

The objective of the laboratory column experiments is to evaluate brine-remediation-products potential to leach salts away from the soil surface

# NORTH DAKOTA GEOLOGICAL SURVEY

- **1980 - 1982** Studied four buried reserve pits in western North Dakota (one report, one paper, numerous presentations).
- **1986** Resampled Apache site (one report, one presentation).
- **1984 - 1986** Studied two buried reserve pits in north-central North Dakota (one report, several presentations).
- **1984 - 1985** Studied an abandoned brine holding pond in north-central North Dakota (two reports).

# RESERVE PIT & BRINE POND STUDIES



# BRINE HOLDING PONDS

Operated in North Dakota from 1951-1982.

NDGS personnel began field investigating and condemning brine holding ponds in the 1960s.

The exact number of brine ponds that existed from 1951-1982 is unknown (*est. 2,000 – 3,000*).

# NDSU SOILS DEPT 1984 STUDY

Identified 121 old brine pond sites in Bottineau and Renville Counties.

Estimated the area contaminated by old brine ponds at 1,450 acres (average of 12 acres per site).

Interpreted aerial photographs from various years and scales.

# NDSU SOILS DEPT 1984 STUDY

## Wylie Field

Studied an area of 15 square miles in Wylie Field and identified 60 old brine pond locations.

Interpreted aerial photographs from various years and scales.

# NDSU SOILS DEPT 1984 STUDY

## Wylie Field

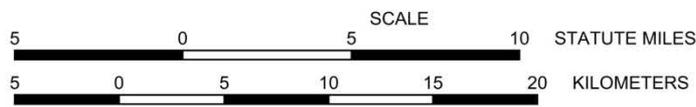
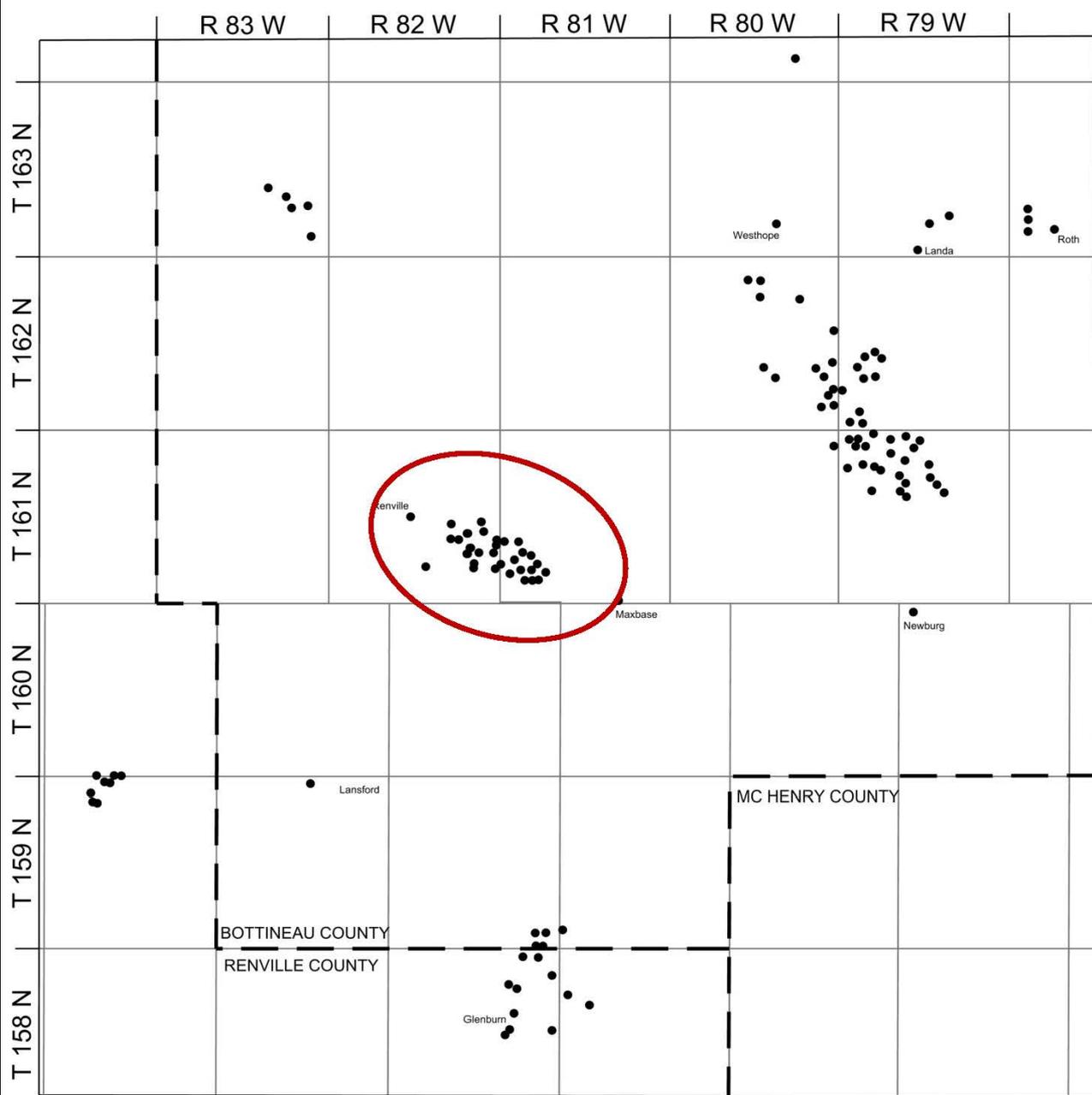
Mapped 23 of the 60 sites.

Salt-impacted area ranged from 0 to 42 acres at each site.

Average impact of 11.5 acres per site.

Total impact of 266 acres.

Electromagnetic soil conductivity meter (EM-38).



# BRINE HOLDING PONDS

## Dimensions:

45 x 60 ft up to 90 x 180 ft

4 to 9 feet deep

1) Unlined

2) Clay liner

3) Polyethylene liner

# BRINE HOLDING PONDS



1961

# 2006-2010 Wylie Field Study Sites

Bull

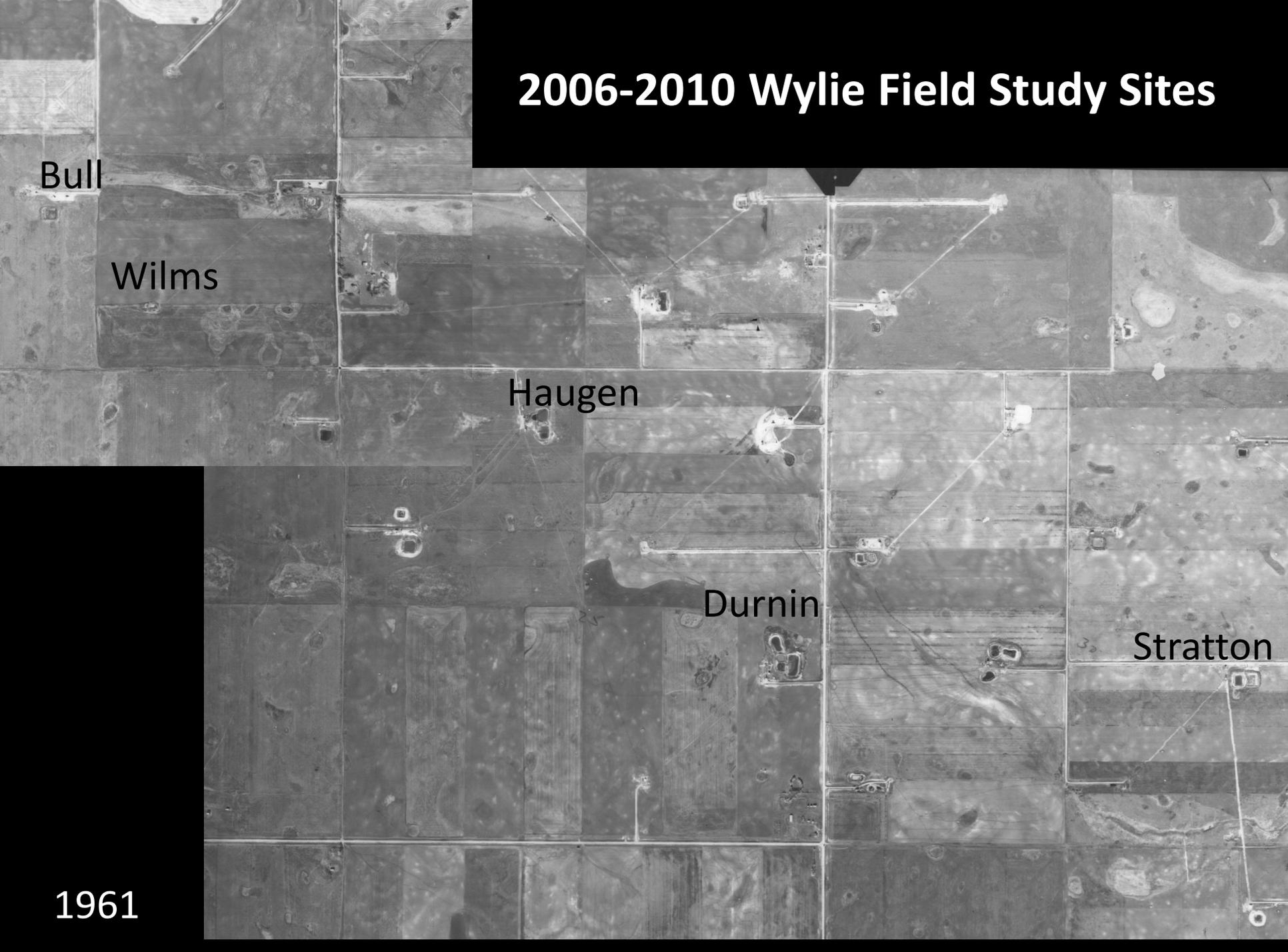
Wilms

Haugen

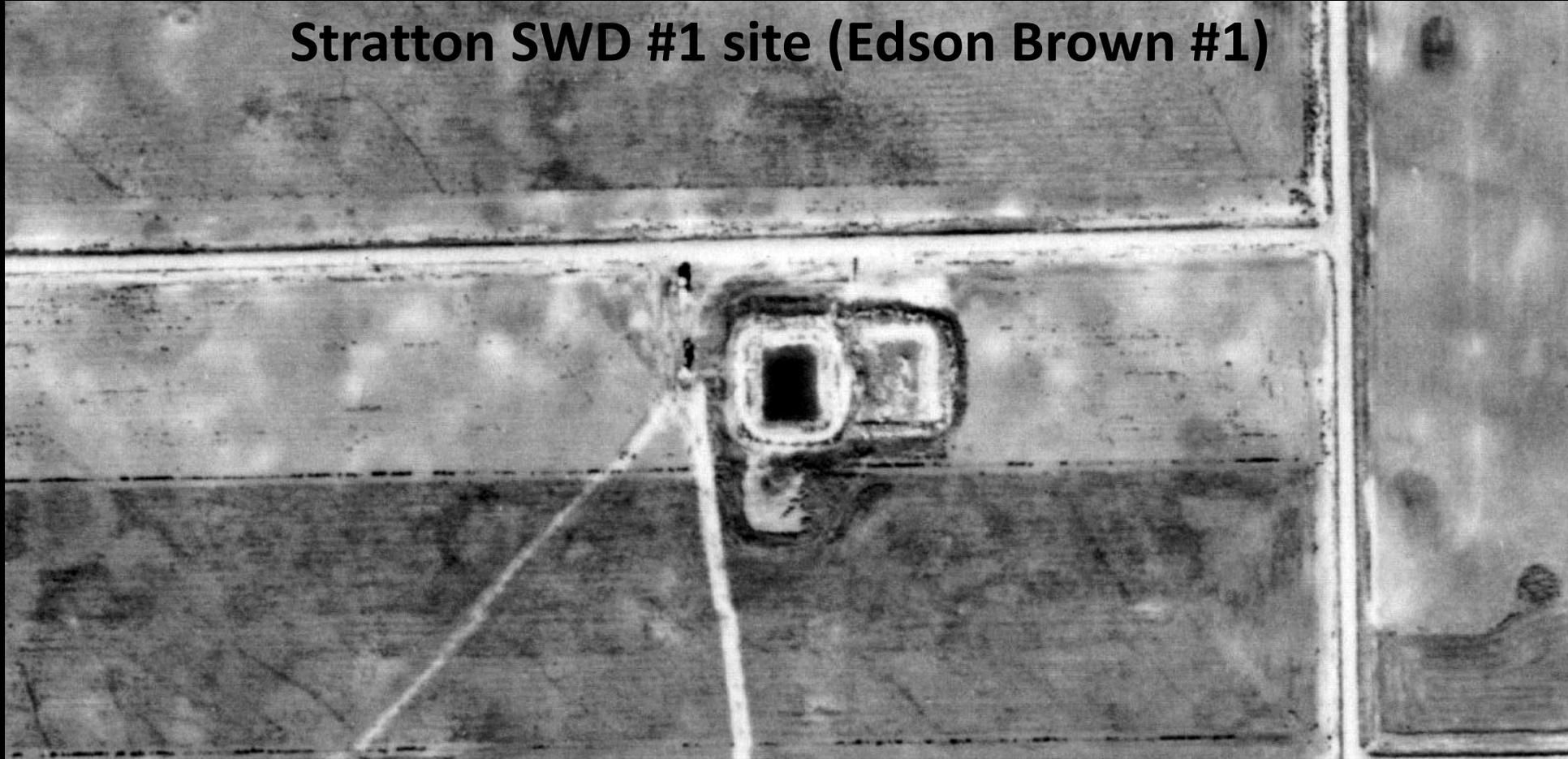
Durnin

Stratton

1961

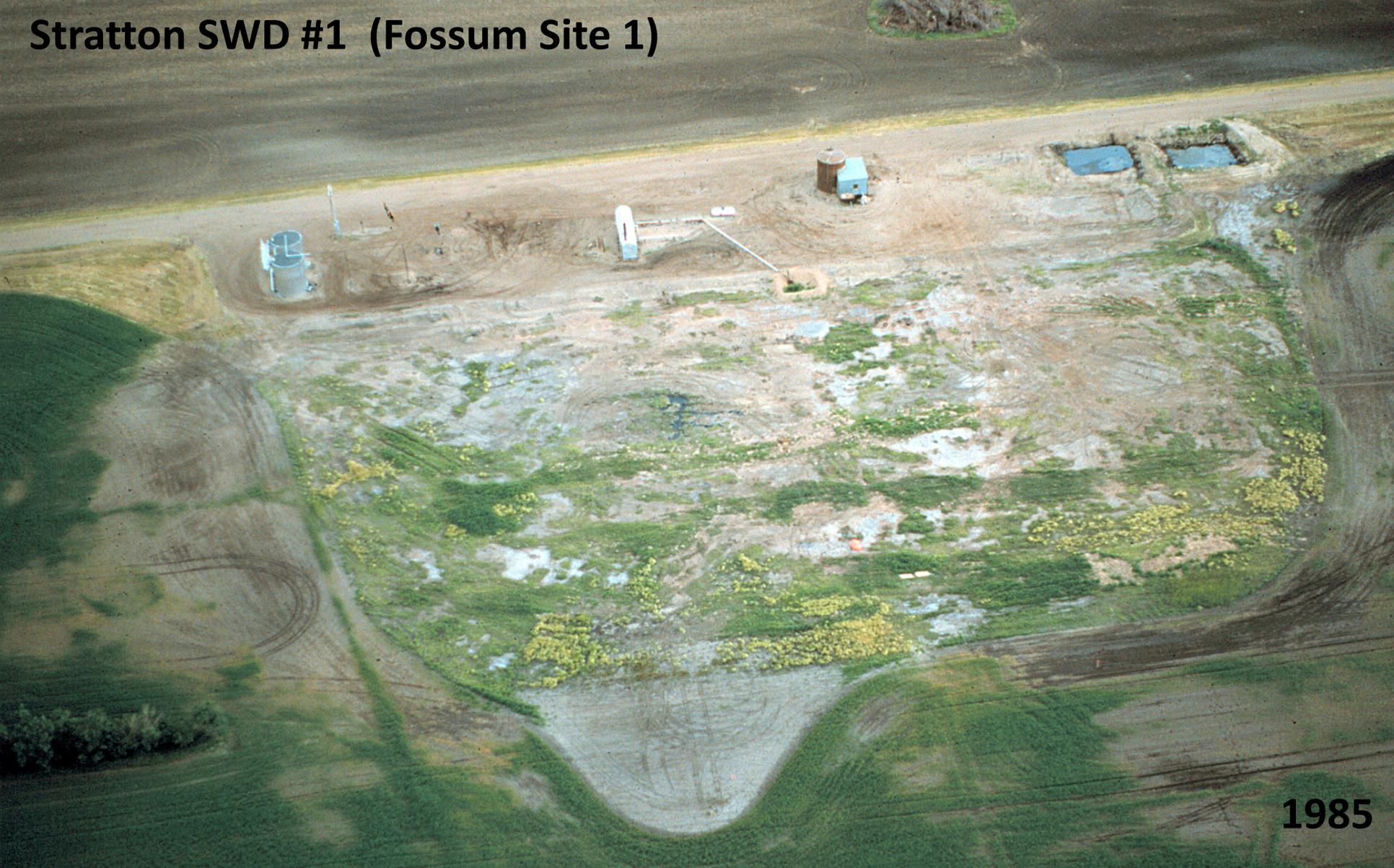


## Stratton SWD #1 site (Edson Brown #1)



Drilled in 1959 by Cardinal Petroleum (Edson Brown #1). Produced oil from 1959-1970. Converted to a saltwater disposal well by Phillips Petroleum in 1978 (Stratton SWD #1). The site contained two brine holding ponds from 1959 to at least 1970 (with dimensions of 100 x 90 ft and 60 x 100 ft and 5 feet deep). Produced 178,000 barrels of saltwater.

# Stratton SWD #1 (Fossum Site 1)



1985

In 1984-1985 NDSU estimated 500 tons of NaCl in the top 10 feet of the Stratton Site. This works out to 22 tons per acre for this site.

**Stratton SWD # 1**

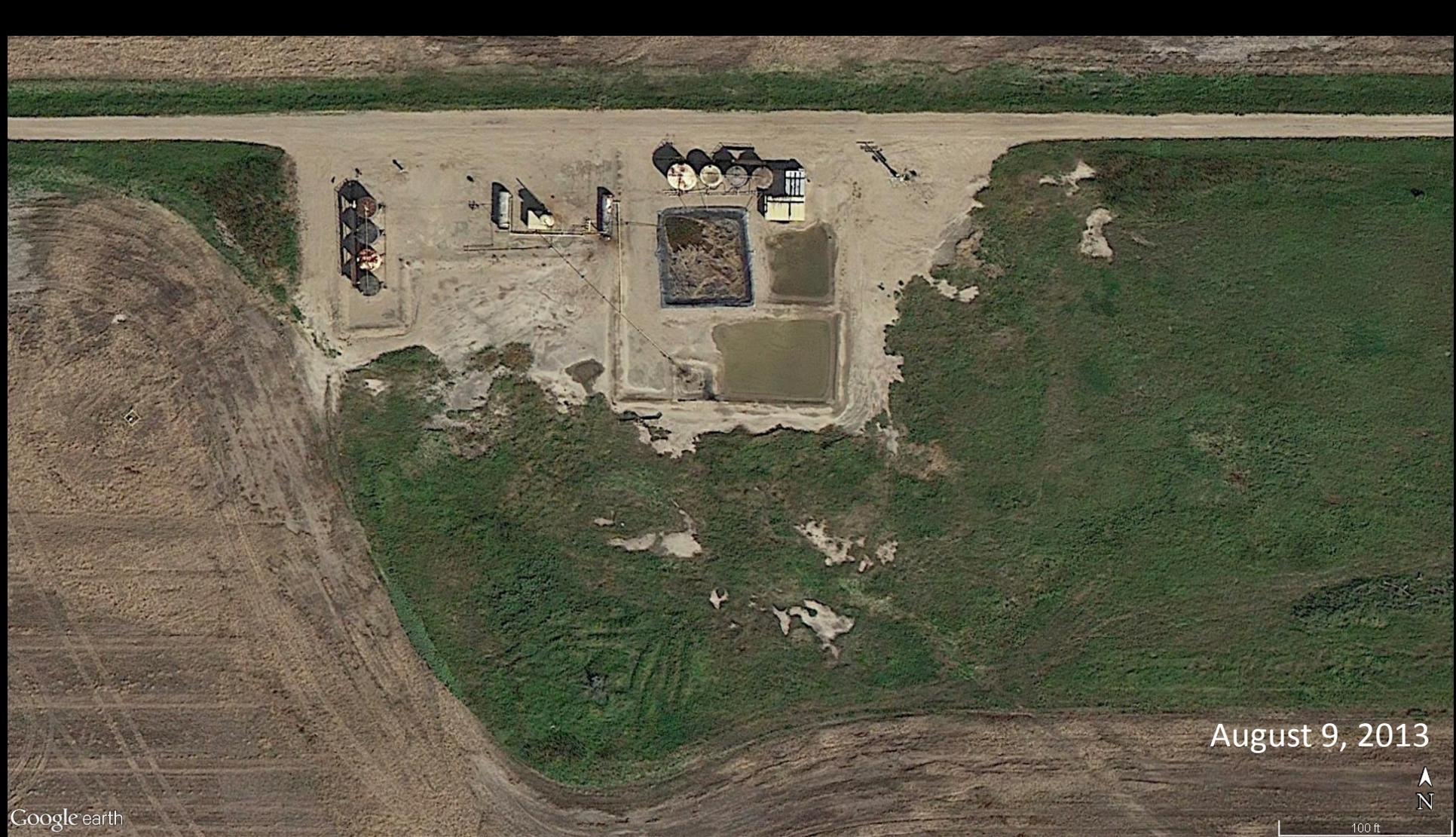


**1985**



**Stratton SWD # 1**

**1985**



August 9, 2013



100 ft

Google earth

# STRATTON SWD #1

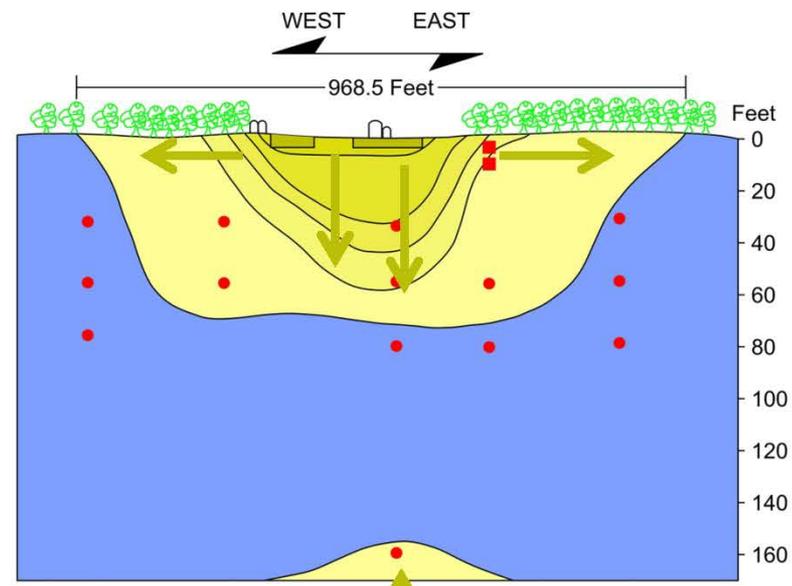
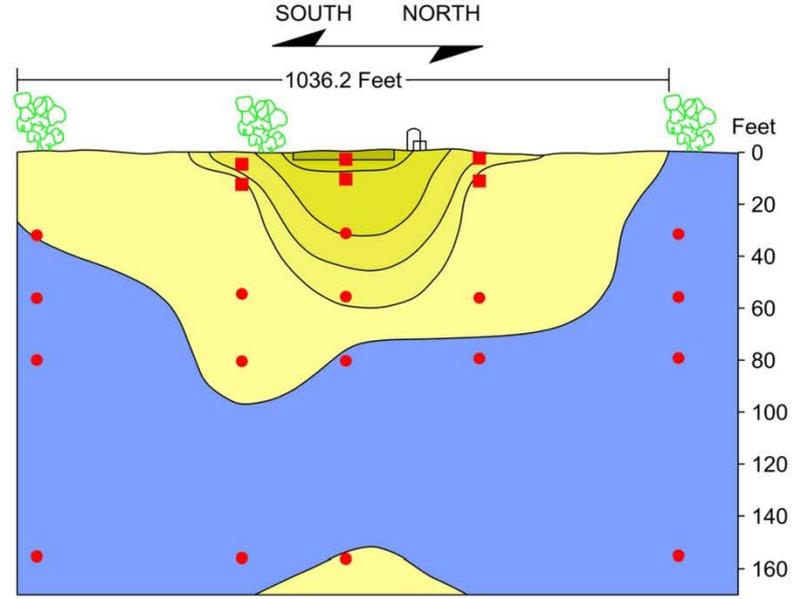
A high salt plume extends laterally around the site over an area of 250,000 ft<sup>2</sup> (about 6 acres).

This plume extends to a depth of more than 80 feet (highest concentrations in top 40 feet).

Brine plume restricted to till and not impacting any useable water supply (ND Health Dept concurred in 2006).

Chloride levels at 160 feet (500 - 750 mg/l) appear to be coming from the underlying Fox Hills Formation (hydraulic heads).

# Stratton SWD #1



- Cl<sup>-</sup> (Mg/l)
- BRINE PIT
  - >100,000
  - 75,000 - 100,000
  - 50,000 - 75,000
  - 25,000 - 50,000
  - 500 - 25,000
  - PIEZOMETER SCREEN
  - LYSIMETER

**Fox Hills**

0 100 FEET  
(30.5m)  
VERTICAL  
EXAGGERATION  
OF 4X  
50 FEET (15.2m)

# ATTEMPTS TO CLEAN UP OLD BRINE PONDS IN THE WYLIE FIELD 2006 – 2010

## Well Sites

Stratton D01 (Stratton SWD #1)

Bull B1R

Wilms A D01

Haugen B1

Durnin A & D01

# ATTEMPTS TO CLEAN UP OLD BRINE PONDS IN THE WYLIE FIELD 2006 – 2010

## Soil Parameter Monitoring

Sediment samples from 0-1 feet and 1-2 feet.

## Groundwater Monitoring

Durnin Site                      Three, 15 ft deep monitoring well.

Stratton Site                     Three, 15 ft deep monitoring well.

## Soil Amendment Application

Gypsum, fertilizer, manure, straw application-- lightly tilled.

## Water Application

Three times per week at each site due to drought conditions.

## Geophysical Survey

Conductivity and resistivity surveys at the Durnin site.

# ATTEMPTS TO CLEAN UP OLD BRINE PONDS IN THE WYLIE FIELD

2006 – 2010

*(50 – 80% reduction)*

## Stratton SWD #1 Site

Chloride levels exhibited a decreasing trend in soils.

Chloride levels did not decrease in groundwater.

Area of surface scaring reduced from 14 acres to 3 acres.

## Bull Site

Chloride levels exhibited a decreasing trend in soils.

Area of surface scaring reduced from 3.5 acres to 1 acre.

## Wilms Site

Chloride levels exhibited a decreasing trend in soils.

Area of surface scaring reduced from 1.5 acres to 0.5 acres.

## Haugen Site

Chloride levels exhibited a decreasing trend in soils.

Area of surface scaring reduced from 3.5 acres to 1.75 acres.

# Wilson M. Laird Core & Sample Library Expansion

## House Bill 1014, Section 25 (2015)



# House Bill 1014, Section 25 (2015)

**SECTION 25. INDUSTRIAL COMMISSION - CORE LIBRARY EXPANSION PROJECT - EXEMPTION - LEGISLATIVE MANAGEMENT REPORT - STRATEGIC INVESTMENT AND IMPROVEMENTS FUND.** The capital assets line item in subdivision 1 of section 1 of this Act includes **\$13,625,322** from **the strategic investment and improvements fund** for the purpose of expanding the core library. The funding appropriated for this purpose is not subject to section 54-44.1-11 and any unexpended funds are available during the biennium beginning July 1, 2017, and ending June 30, 2019. The industrial commission shall report to the legislative management and to the appropriations committees of the sixty-fifth legislative assembly on the use of the funding provided for the core library project, including the amounts spent to date and the amounts anticipated to be continued into the 2017-19 biennium, and on the progress of the project.

**SECTION 28. EMERGENCY.** The amount of \$13,625,322 from the strategic investment and improvements fund in the capital assets line item in subdivision 1 of section 1 of this Act for the core library expansion project and sections 7 and 13 of this Act are declared to be an emergency measure.

# UND/DMR Memorandum of Agreement

In 2014 we signed a 14 point Memorandum of Agreement (MOA) with the University of North Dakota in order to avoid any misunderstandings due to the expansion of our state-owned building on university property. One of the agreement points was that UND's Facilities Management Department would be responsible for project oversight and coordination. Another agreement point required us to follow the Construction Manager at Risk (CMAR) process.

The CMAR allows the agency to retain a builder based upon qualifications and the results of an interview process who in turn bids out the work competitively. The CMAR also provides a guaranteed maximum price (GMP) which makes it more likely the project will be completed on budget.



# PROJECT TIMELINE

March 10, 2015	EAPC chosen as project architect.
May 13, 2015	Governor Dalrymple signs HB 1014.
June 9, 2015	McGough chosen as the CMAR.
August 28, 2015	Site work begins (reducing UND's coal pile).
October 6, 2015	Site work begins on the core library.
December 2, 2015	The GMP (\$11,332,017) is accepted.
March 21, 2016	Warehouse and lab area enclosed.
September 20, 2016	Anticipated completion date.
September 27, 2016	Dedication ceremony.



<b>CORE LIBRARY EXPENSES</b>	<b>Budget Presented During HB1014 Testimony</b>	<b>Estimates with GMP</b>	<b>Spending To Date</b>
McGOUGH (GMP)	\$11,492,002	<b>\$11,332,017</b>	\$6,721,872.00
BRAUN INTERTEC CORPORATION Geotech Investigation	\$0	<b>\$16,677</b>	\$16,677.00
COMMISSIONING SOLUTIONS Testing of Mechanical System	\$0	<b>\$55,080</b>	\$23,133.60
EAPC ARCHITECTS ENGINEERS	\$753,741	<b>\$684,410</b>	\$620,328.55
UNIVERSITY OF NORTH DAKOTA Management Fee	\$231,920	<b>\$301,252</b>	\$141,633.00
UNIVERSITY OF NORTH DAKOTA Direct Costs	\$0	<b>\$50,000</b>	\$37,240.00
FURNITURE, FIXTURES, AND EQUIPMENT	\$1,147,658	<b>\$738,859</b>	\$0.00
GMP AMENDMENTS (Contingency Fund)	\$0	<b>\$250,000</b>	\$0.00
<b>TOTAL</b>	\$13,625,322	<b>\$13,428,295</b>	<b>\$7,560,884.15</b>
<b>TOTAL BUDGET</b>	\$13,625,322	<b>\$13,625,322</b>	<b>\$13,625,322</b>
ANTICIPATED TURNBACK TO OMB	\$0	<b>\$197,027</b>	

We do not anticipate carrying any building funds over into the 17-19 Biennium.



# NDIC Department of Mineral Resources EDT Committee August 30, 2016

Presentation by a representative of the Industrial Commission on underground gathering pipeline oversight

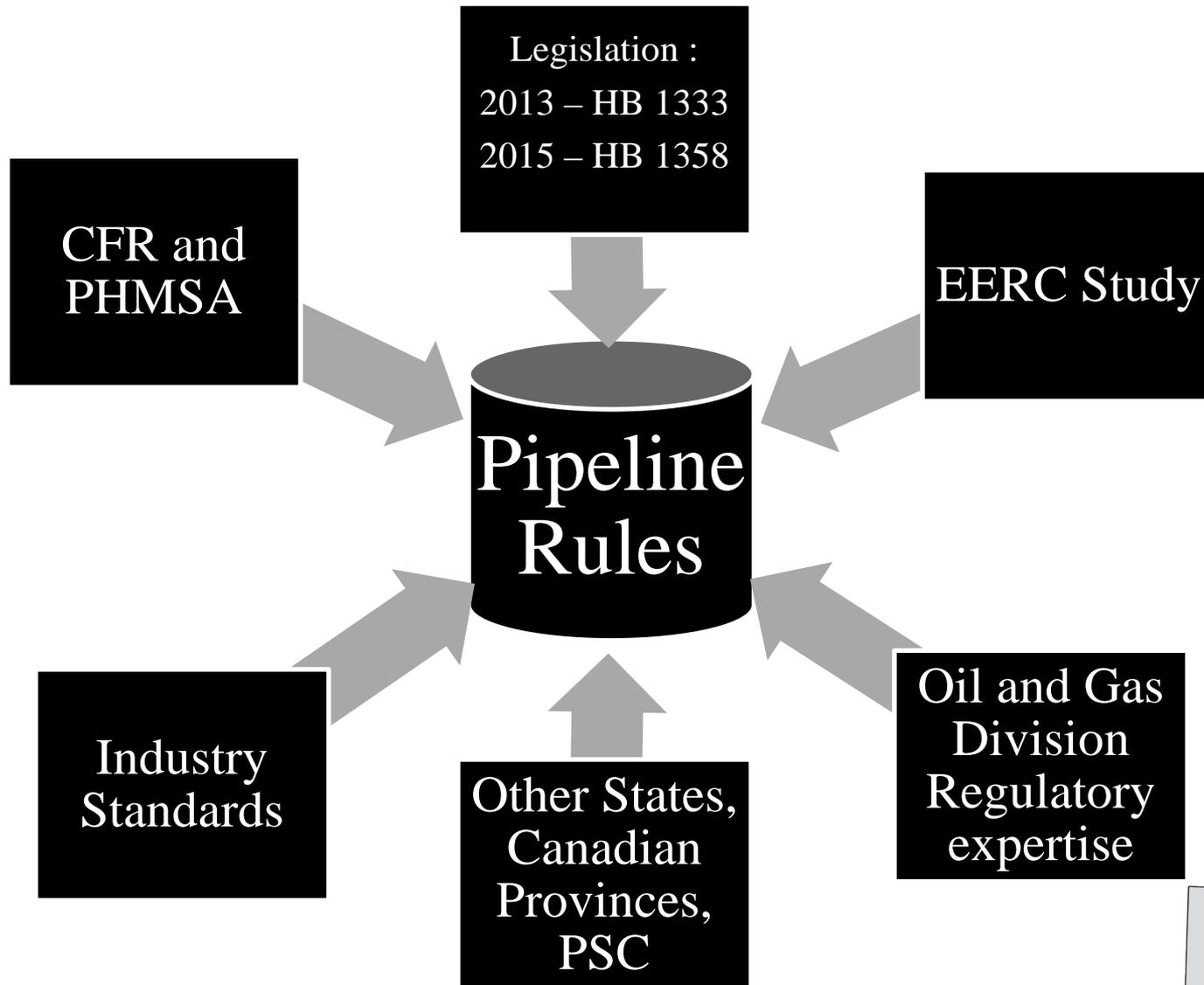


<https://www.dmr.nd.gov/oilgas>  
(701) 328-8020

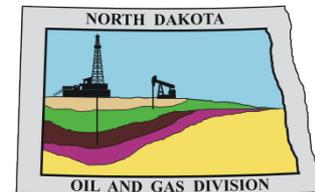
<https://www.dmr.nd.gov/ndgs>  
(701) 328-8000

**600 East Boulevard Ave. - Dept 405  
Bismarck, ND 58505-0840**

# Influencing Regulation



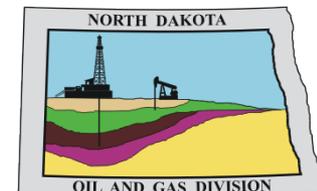
NDIC – DMR Oil and Gas Division



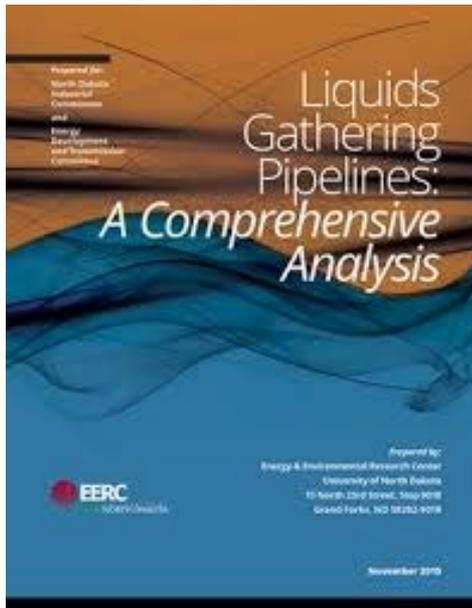
# History -2015 Legislation

## House Bill 1358 – North Dakota Century Code Section 38-08-27

- Upon request, the operator shall provide the commission the underground gathering pipeline engineering construction design drawings, list of independent inspectors, and a plan for leak protection (after August 1, 2015).
- Within 60 days of an underground gathering pipeline being placed into service, the operator of that pipeline shall file with the commission an independent inspector's certificate of hydrostatic or pneumatic testing of the underground gathering pipeline.
- Commission may now require a bond (amendment to 38-08-04 §1).
- Surface owner may now share GIS information (amendment to 38-08-26).
- The commission shall adopt the necessary administrative rules necessary to improve produced water and crude oil pipeline safety and integrity.
- Effective April 20th, 2015.



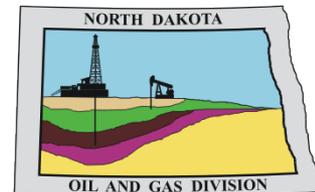
# EERC Study – “Liquids Gathering Pipelines: A Comprehensive Analysis”



- Phase I – Provided the report with recommendations to the NDIC and the Energy Development and Transmission Committee on December 1st, 2015.
- Following receipt of the Phase I report the NDIC Oil and Gas Division began rulemaking.
- NDIC Oil and Gas Division used 15 of the 23 recommendations while drafting proposed administrative rule changes (the other 8 are policy and industry best practice recommendations)



NDIC – DMR Oil and Gas Division



# Focus of the Rules

## Bonding

## Prior Notification

- All new construction
- Prior to pressure testing
- Before any repair or replacement

## Installation

- Properly trained construction crews in all manufacturer-prescribed installation procedures.
- Proper handling, backfilling, and minimum cover depth.
- HDD – environmentally sensitive areas

## Right-of-way Reclamation

## Third-Party Independent Inspectors

- Responsible for ensuring the pipeline manufacturer's specifications are precisely followed.

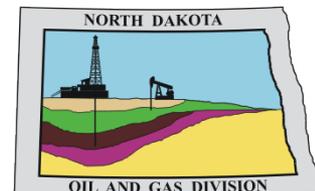
## Above ground associated facilities

## Leak Detection and Monitoring

## Spill Response



<https://www.dmr.nd.gov/oilgas/> Approved rules, FAQ, Comments, Notice, Hearing audio



# Next Steps

## Adopting Administrative Rules

- February 16, 2016 – Propose Rules to the Industrial Commission request approval to proceed with rulemaking.
- Public Hearings – April 11 – 14, 2016 (Bismarck, Dickinson, Williston, and Minot)
- Comment period – April 25, 2016 at 5:00 pm
- NDIC approved June 29, 2016.
- Attorney General opinion received July 29, 2016.
- **Legislative Administrative Rules Committee September 13, 2016.**
- **Pipeline rules to become effective October 1, 2017.**

### In the Meantime....

- Hired Pipeline Staff (10)
- Developing a Pipeline Program Data Management System.
- Make our presences known through meetings and field inspections.

