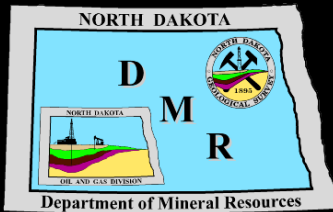


DEVELOPMENT OF THE BAKKEN RESOURCE

Minot, ND– June 26, 2015



NARO

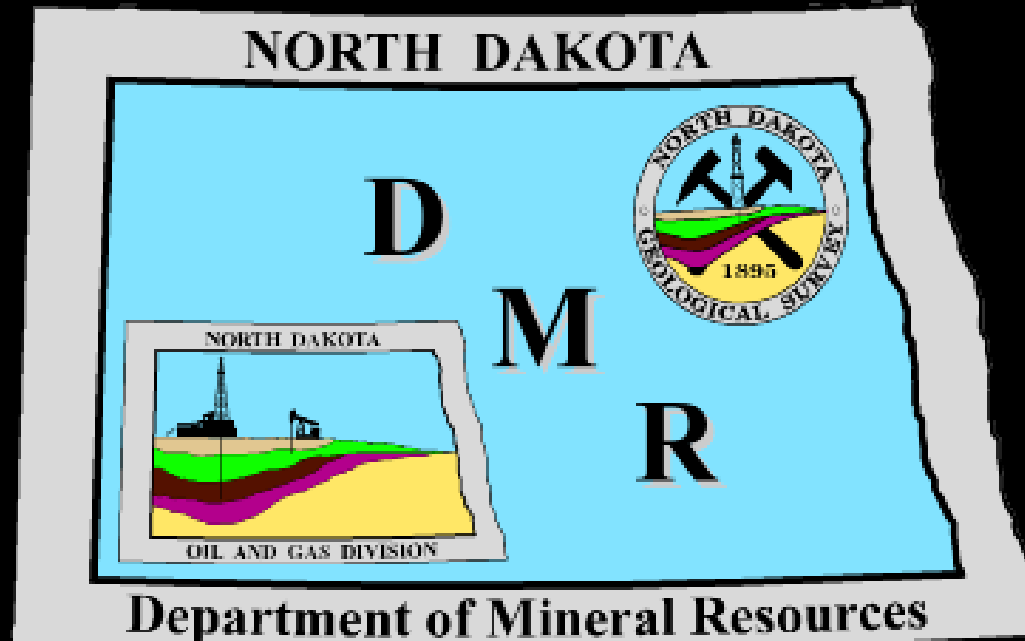
NATIONAL ASSOCIATION OF ROYALTY OWNERS

North Dakota Development

- **Resource Play**
- **Development**
- **Bakken Results**
- **Gas Capture**
- **Hearing Testimony**

*Bruce E. Hicks
Assistant Director
NDIC-DMR-OGD
Bismarck, ND*

North Dakota Department of Mineral Resources



<https://www.dmr.nd.gov/oilgas/>

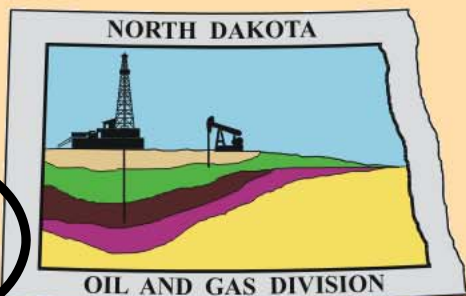
<https://www.dmr.nd.gov/ndgs/>

600 East Boulevard Ave. - Dept 405

Bismarck, ND 58505-0840

(701) 328-8020 (701) 328-8000

- Services
- Rules & Regulations
- Policies & Guidance
- Forms
- Hearing Dockets
- Active Drilling Rigs
- Daily Activity Reports
- Information Center
- Confidential Well List
- General Statistics
- Seismic
- Well Search
- Report a Spill/Incident
- Gathering Pipelines
- GIS Map Server
- Publications
- Surface Mineral Owner
- Basic Services
- Premium Services
- Electronic Filing
- Related Links
- FAQ & Web Help
- Employment Opportunities
- Contact Us
- Employee Directory
- Email Addresses



Welcome to the North Dakota Industrial Commission, Department of Mineral Resources

Please check out the new [Information Center](#) and [Policies & Guidance](#)

Bakken and Three Forks Information!

Available on the ND Petroleum Council web site are the [Surface Owner Information Center](#), the [Royalty Owner Information Center](#)

The Oil and Gas Division regulates the drilling and production of oil and gas in North Dakota. Our mission is to encourage and promote the development, production, and utilization of oil and gas in the state in such a manner as will prevent waste, maximize economic recovery, and fully protect the correlative rights of all owners to the end that the landowners, the royalty owners, the producers, and the general public realize the greatest possible good from these vital natural resources.

Phone: (701) 328-8020
Fax: (701) 328-8022
Mail:
NDIC Oil and Gas Division
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840
General Shipping:
NDIC Oil and Gas Division
1016 East Calgary Ave
Bismarck, ND 58503-5512
Core and Samples Shipping:
ND Geological Survey Core Library
2835 Campus Rd., Stop 8156
Grand Forks, ND 58202

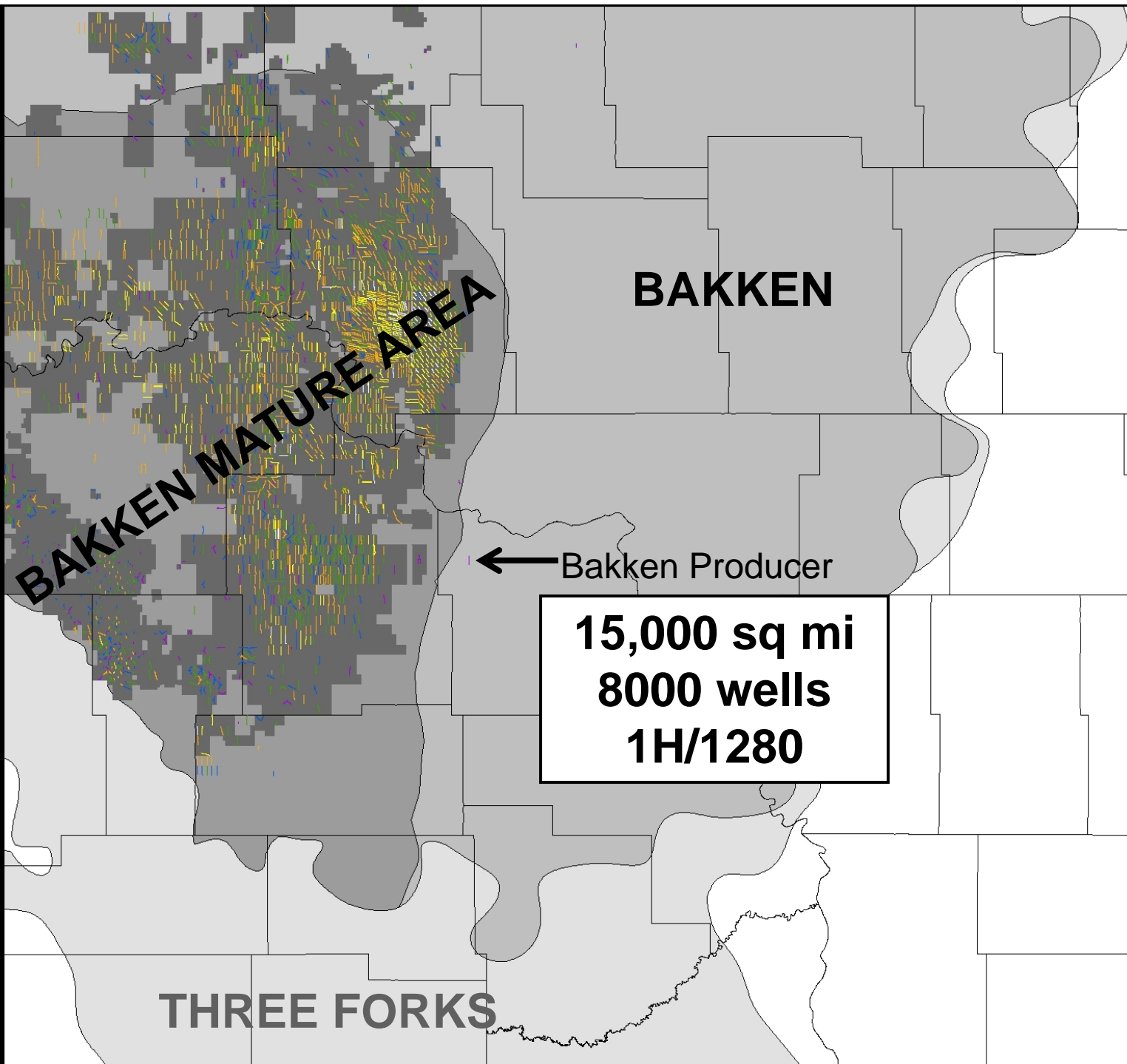
Get Adobe Reader Adobe Acrobat Reader

Get ADOBE FLASHPLAYER Flash Player is required

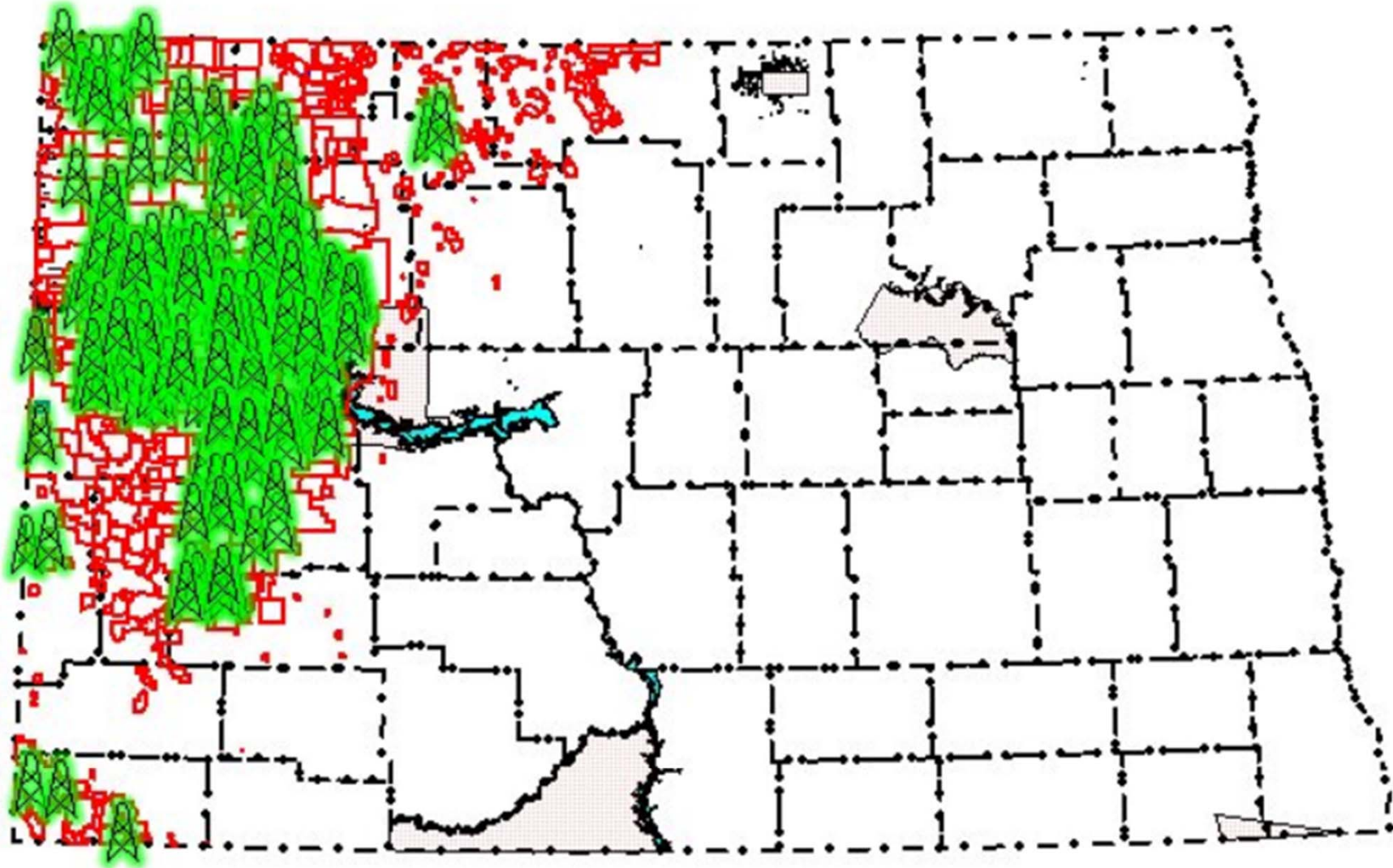
GROUNDWATER PROTECTION COUNCIL This web site was

North Dakota Development

- **Resource Play**
- Development
- Bakken Results
- Gas Capture
- Hearing Testimony

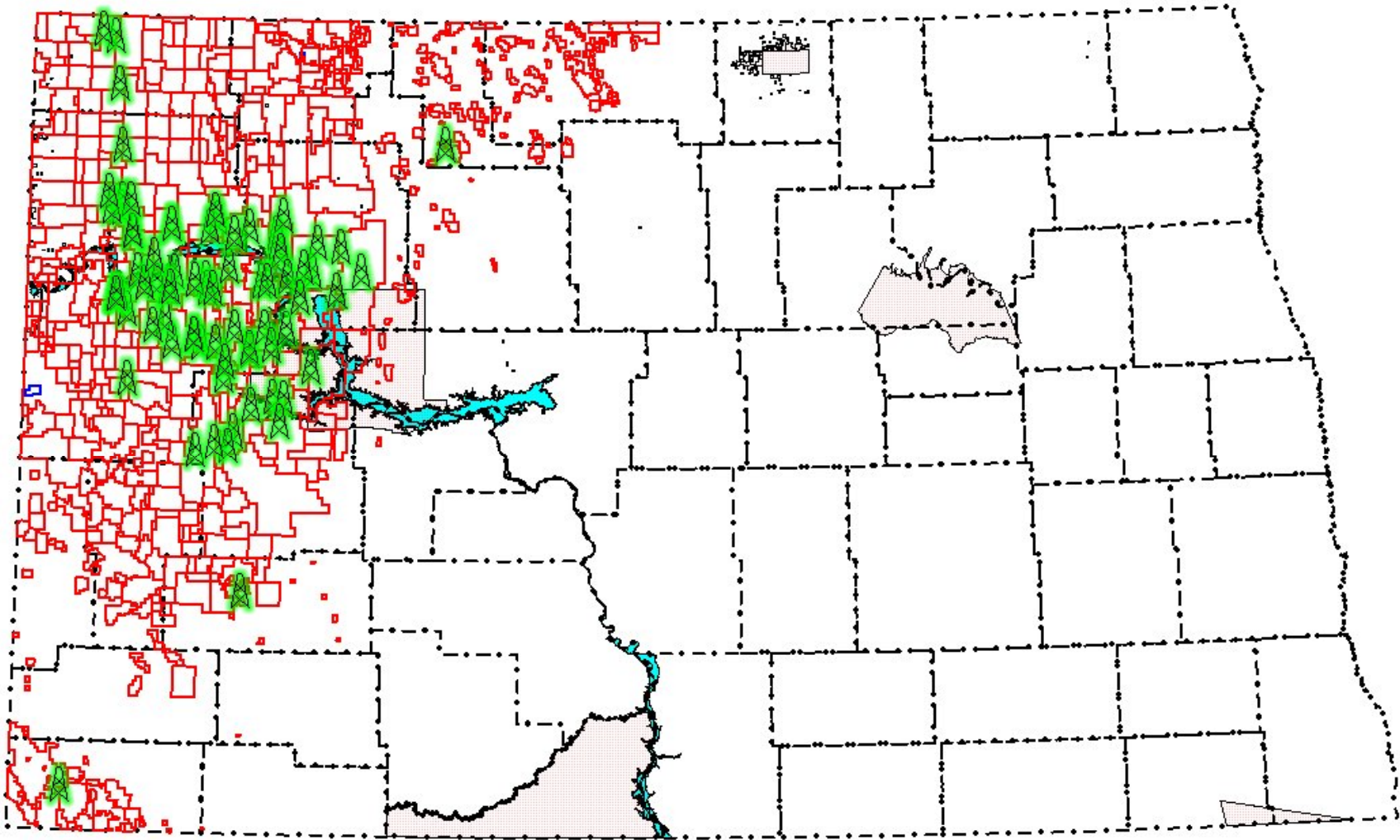


NORTH DAKOTA – 191 DRILLING RIGS – DECEMBER 2014



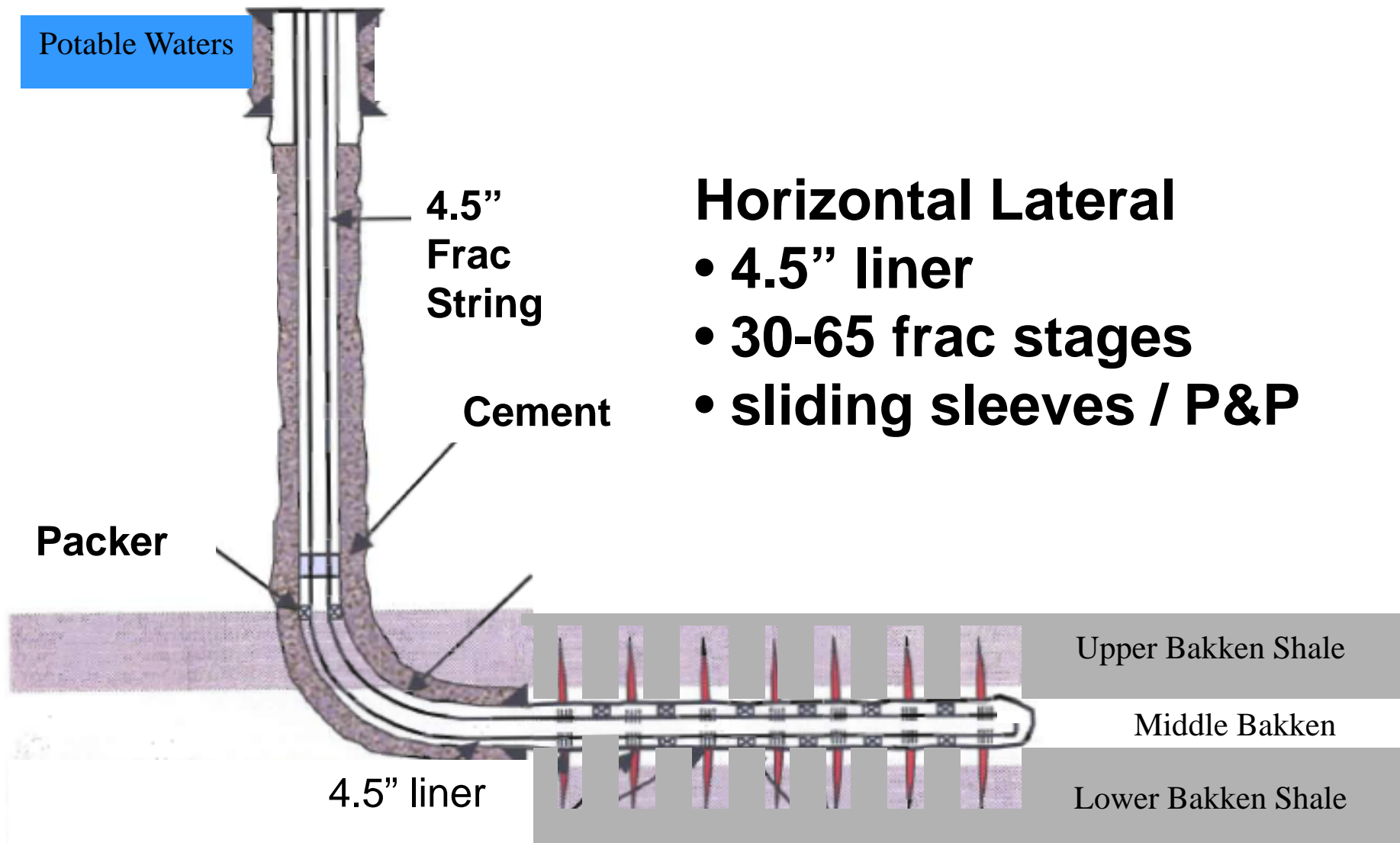
**Current drilling activity is focused
in Mountrail, Dunn, McKenzie, and Williams Counties.**

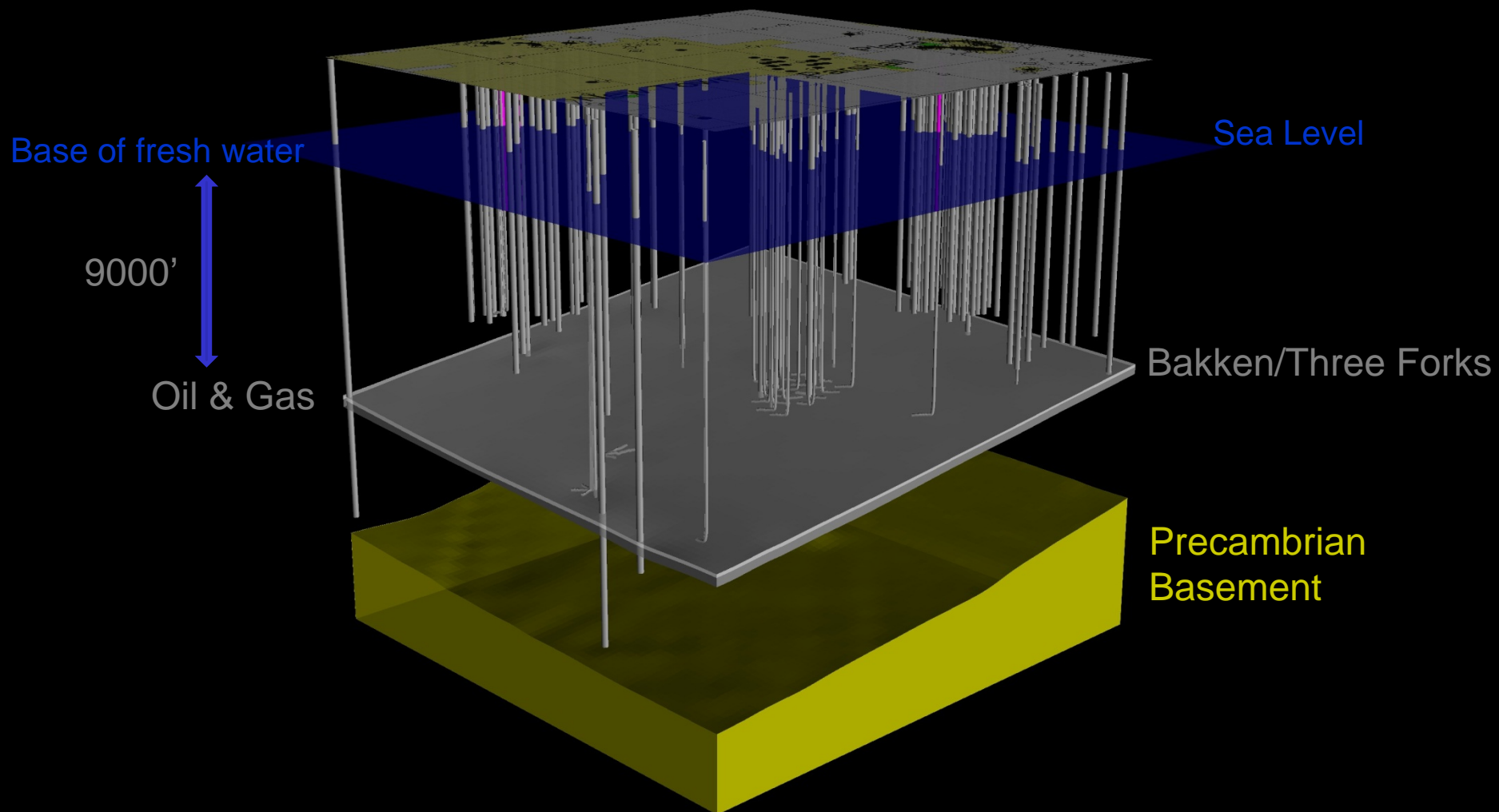
NORTH DAKOTA – 76 DRILLING RIGS – JUNE 2015



**Current drilling activity is focused
in Mountrail, Dunn, McKenzie, and Williams Counties.**

TYPICAL HORIZONTAL OIL WELL

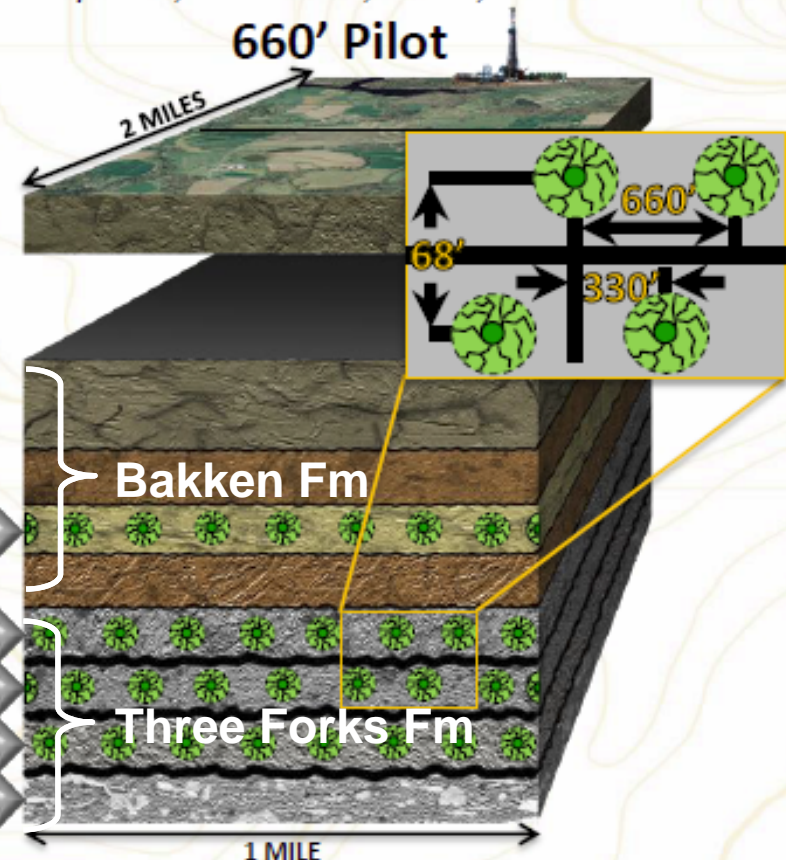
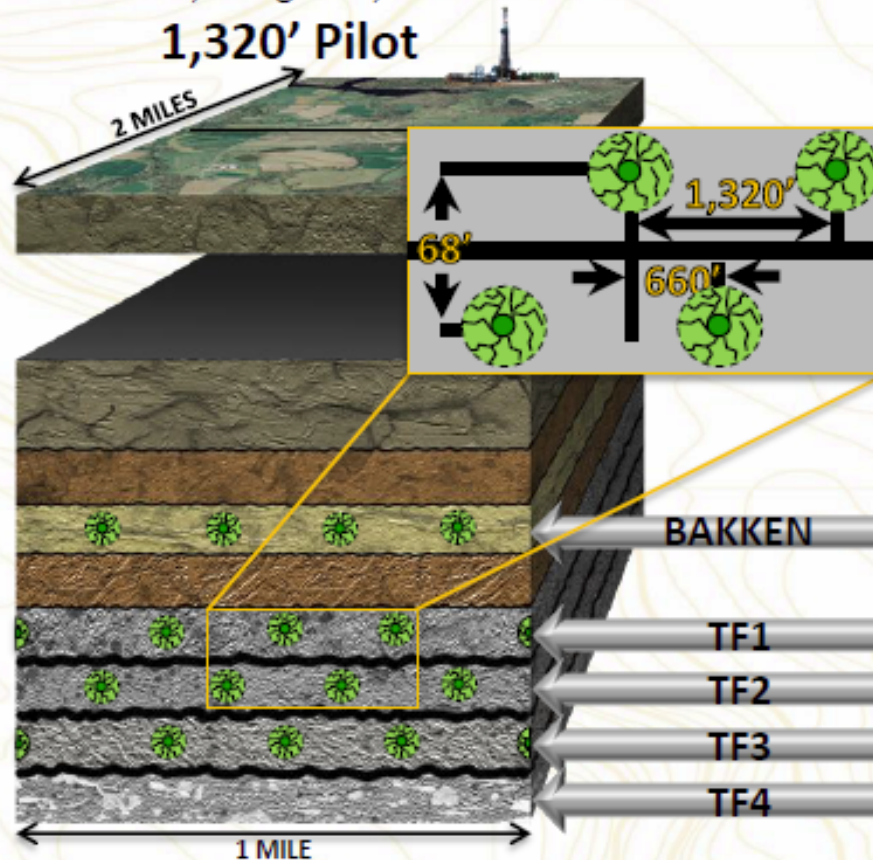




1,320' & 660' Pilot Density Projects: 2013-14

Hawkinson, Tangsrud, and Rollefstad

Wahpeton, Lawrence, Mack, and Hartman



- 3 project areas
- 1,320 ft. same-zone spacing
- 34 new wells (gross)

- 4 project areas
- 660 ft. same-zone spacing
- 31 new wells (gross)

North Dakota Development

- Resource Play
- **Development**
 - **Uniform Spacing—orderly development**
 - Multi-well locations—small footprint
 - Energy Corridors—industry & residents
- Bakken Results
- Gas Capture
- Hearing Testimony

ArcIMS Viewer



ND OIL

- ☒ Oil and Gas
- ☒ Well
- ☒ Pipeline
- ☒ Right of Way
- ☒ Directional
- ☒ Directional
- ☒ Horizontal
- ☒ Horizontal
- ☒ Casing
- ☒ Oil
- ☒ Unconsolidated
- ☒ Insulation
- ☒ Drilling
- ☒ Seismic
- ☒ Gas
- ☒ Other
- ☒ Re
- ☒ Co
- ☒ Riv
- ☒ Lai
- ☒ Imagery
- ☒ Topo
- ☒ Topo
- ☒ NAIP

R

Townships

Rec	Township	Tdir	Range	Rdir	TWPRNG	TWPTEXT	RNGTEXT
1	156	N	90	W	156090	T156N	R 90W

Power

Download Shape Files



ND OIL & GAS LAYERS

- ☒ Oil and Gas
 - ☒ Wells
 - ☐ Permit Status Before Spud
 - ☐ Rig Location
 - ☐ Directional Surveys
 - ☐ Directional Legs
 - ☐ Horizontal Surveys
 - ☐ Horizontal Legs
 - ☐ Cases Docketed
 - ☒ Oil Fields
 - ☐ Unit Boundaries
 - ☐ Inspector Areas
- ☒ Drilling / Spacing
- ☒ Seismic
- ☐ Gas Plants
- ☒ Other
- ☒ Imagery
 - ☐ Topo/DRG 250k
 - ☐ Topo/DRG 100k
 - ☐ NAIP 2009

Refresh Map

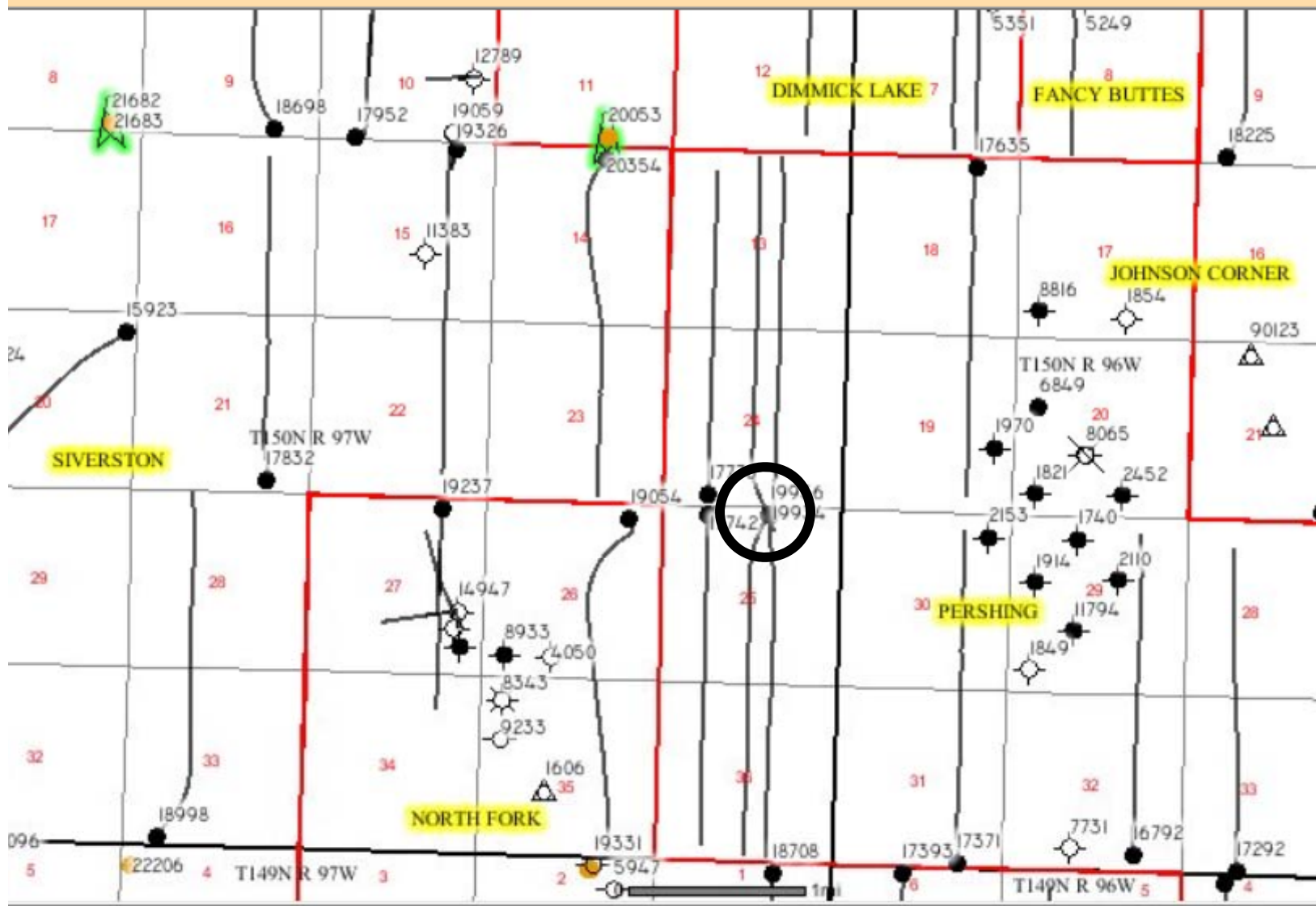
☒ Auto Refresh

Help:

- A closed group, click to open.
- An open group, click to close.
- A map layer.

North Dakota Development

- Resource Play
- **Development**
 - Uniform Spacing—orderly development
 - **Multi-well locations—small footprint**
 - Energy Corridors—industry & residents
- Bakken Results
- Gas Capture
- Hearing Testimony



ND OIL & GAS

- ☒ Oil and Gas
- ☒ Wells
- ☒ Rig Location
- ☒ Directional
- ☒ Directional
- ☒ Horizontal
- ☒ Horizontal
- ☒ Cases Drilled
- ☒ Oil Fields
- ☒ Unit Boundaries
- ☒ Inspector
- ☒ Drilling / Seismic
- ☒ Seismic
- ☒ Gas Plants
- ☒ Other
- ☒ Imagery
- ☒ Topo/DRG 2
- ☒ Topo/DRG 1
- ☒ NAIP 2009

Refresh

☒ Auto Refresh

Help:

- ☒ A closed group, click to open
- ☒ An open group, click to close
- ☒ A map layer.
- ☒ A hidden group/layer, click to show
- ☒ A visible group/layer, click to hide
- ☒ A visible layer, but not at the top
- ☒ A partially visible group/layer



Vern Whitten Photography

North Dakota Development

- Resource Play
- **Development**
 - Uniform Spacing—orderly development
 - Multi-well locations—small footprint
 - **Energy Corridors—industry & residents**
- Bakken Results
- Gas Capture
- Hearing Testimony

Oil and Gas Subscription: ArcIMS Viewer

Legend / Layers

Overview Map

View Entire State

Previous View

Clear Selection

Search

Create PDF

Zoom In

Zoom Out

Pan

Rect Identify

Select Object

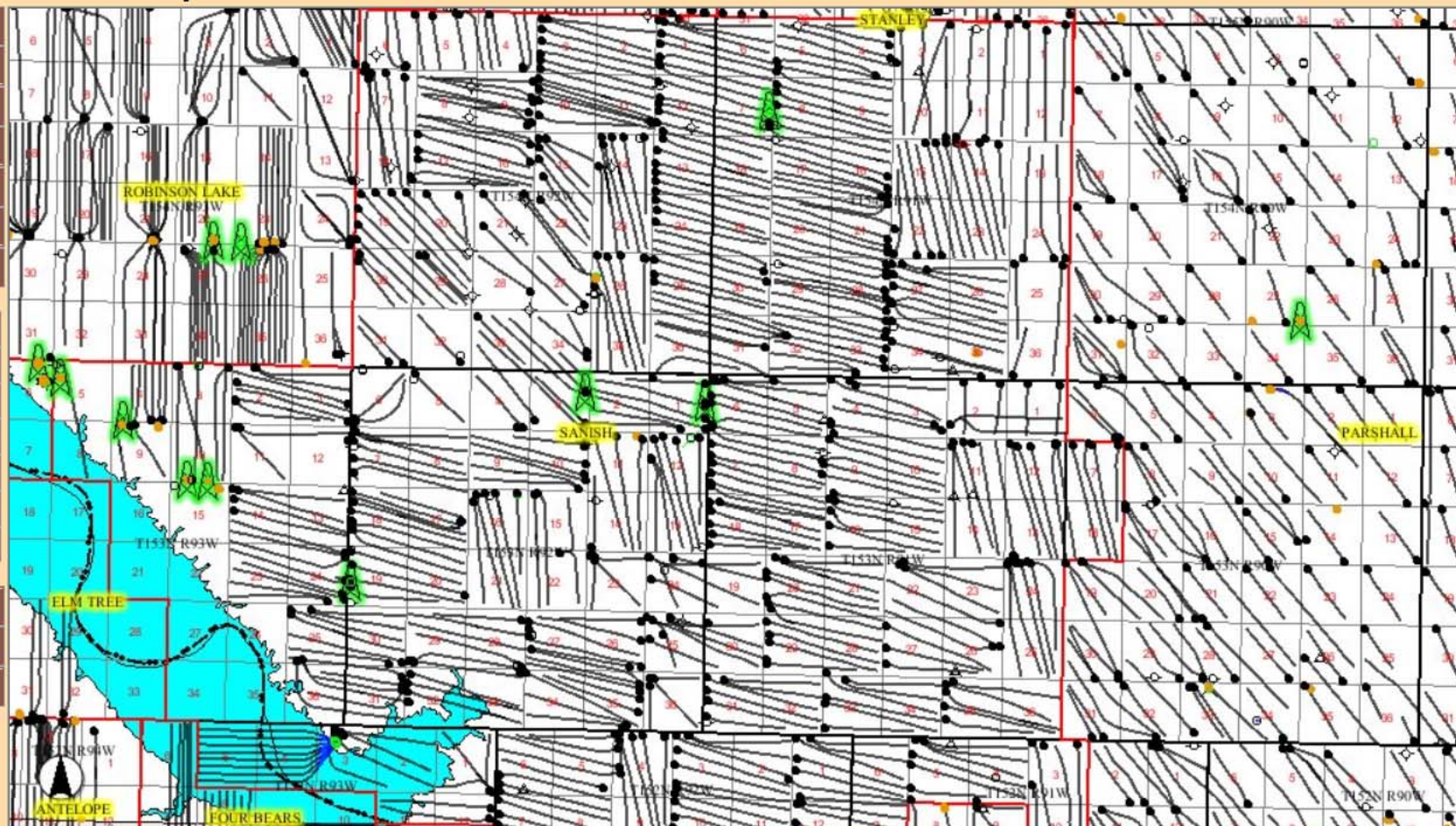
Buffer

Distance

Find Well

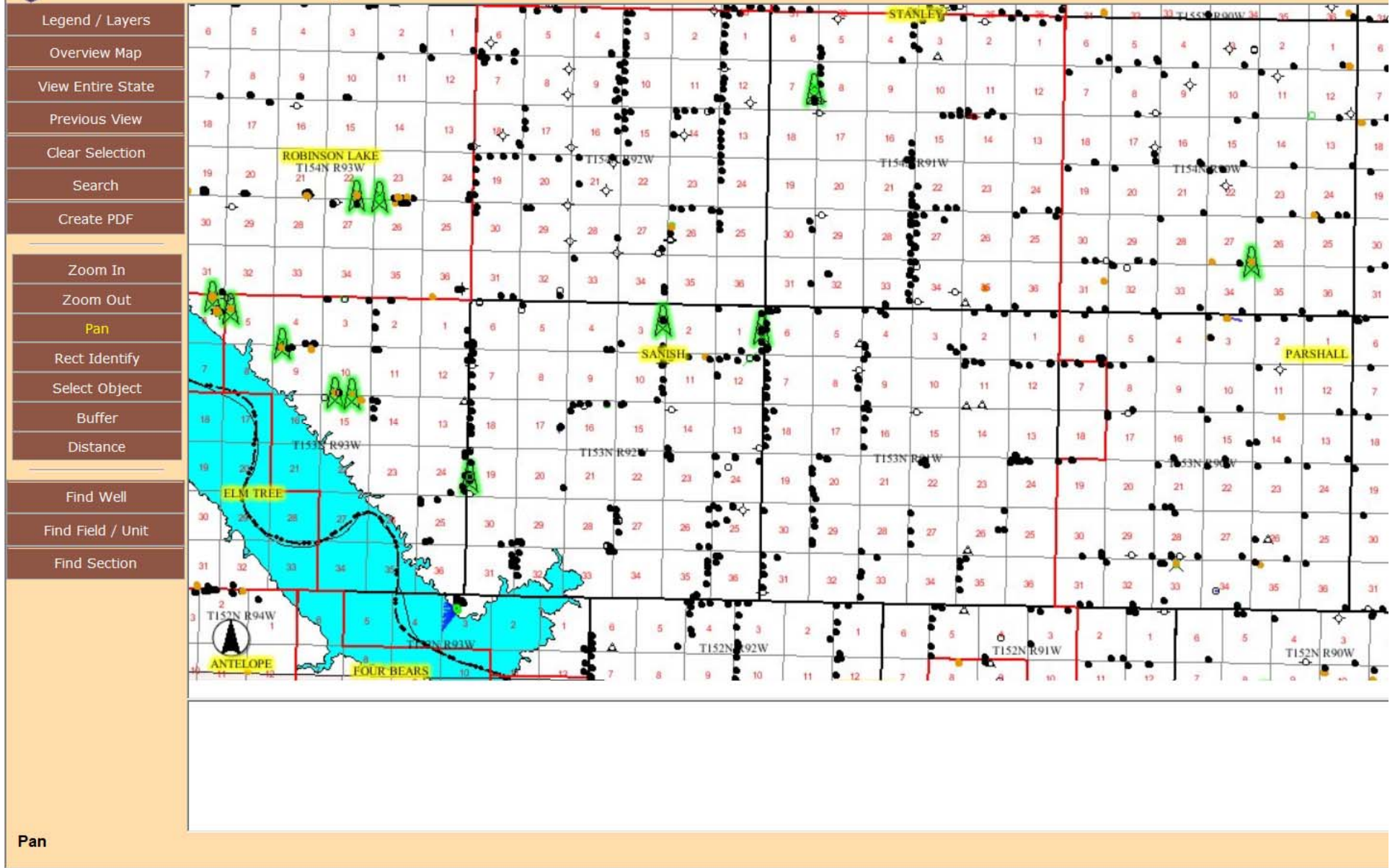
Find Field / Unit

Find Section

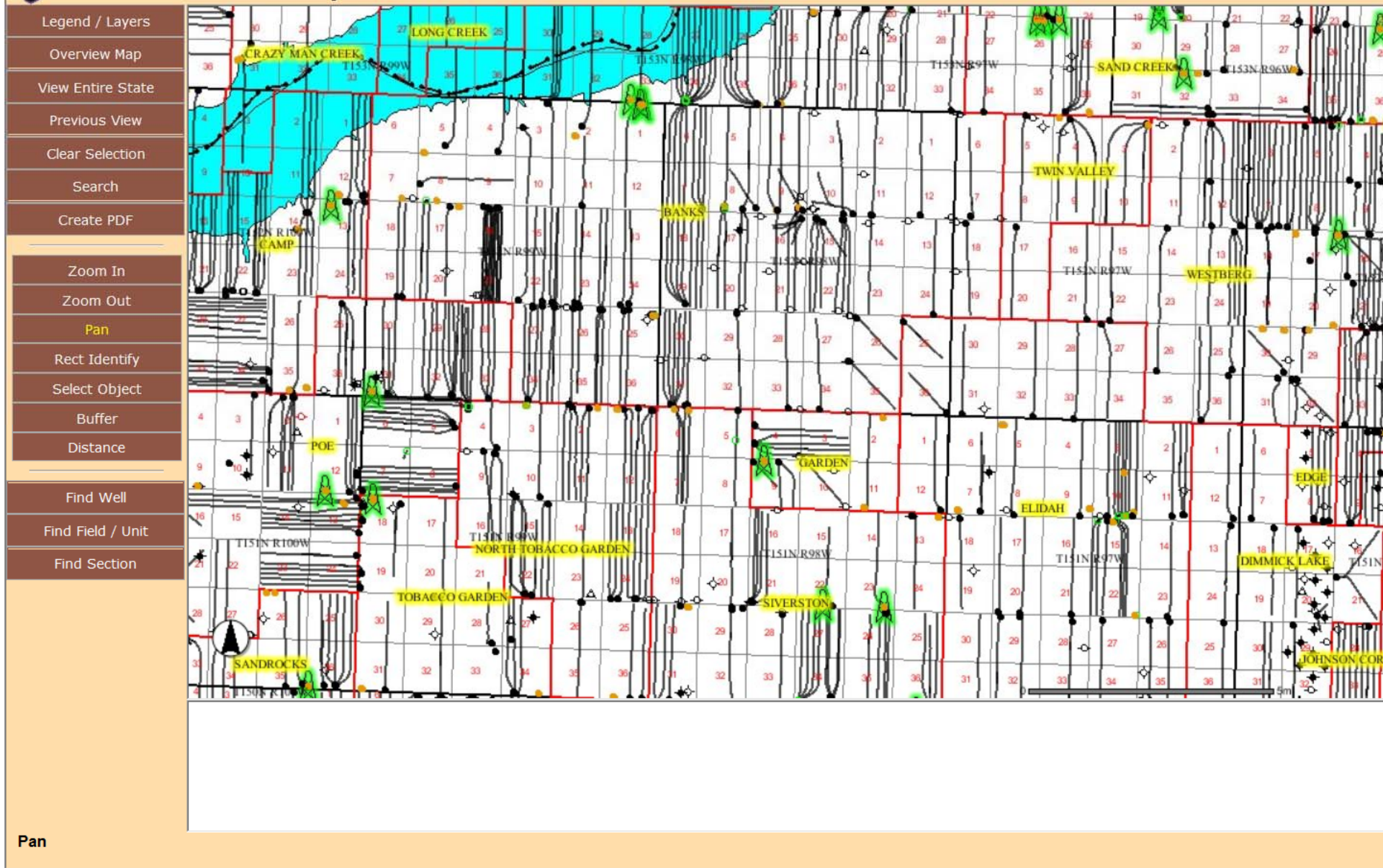


Pan

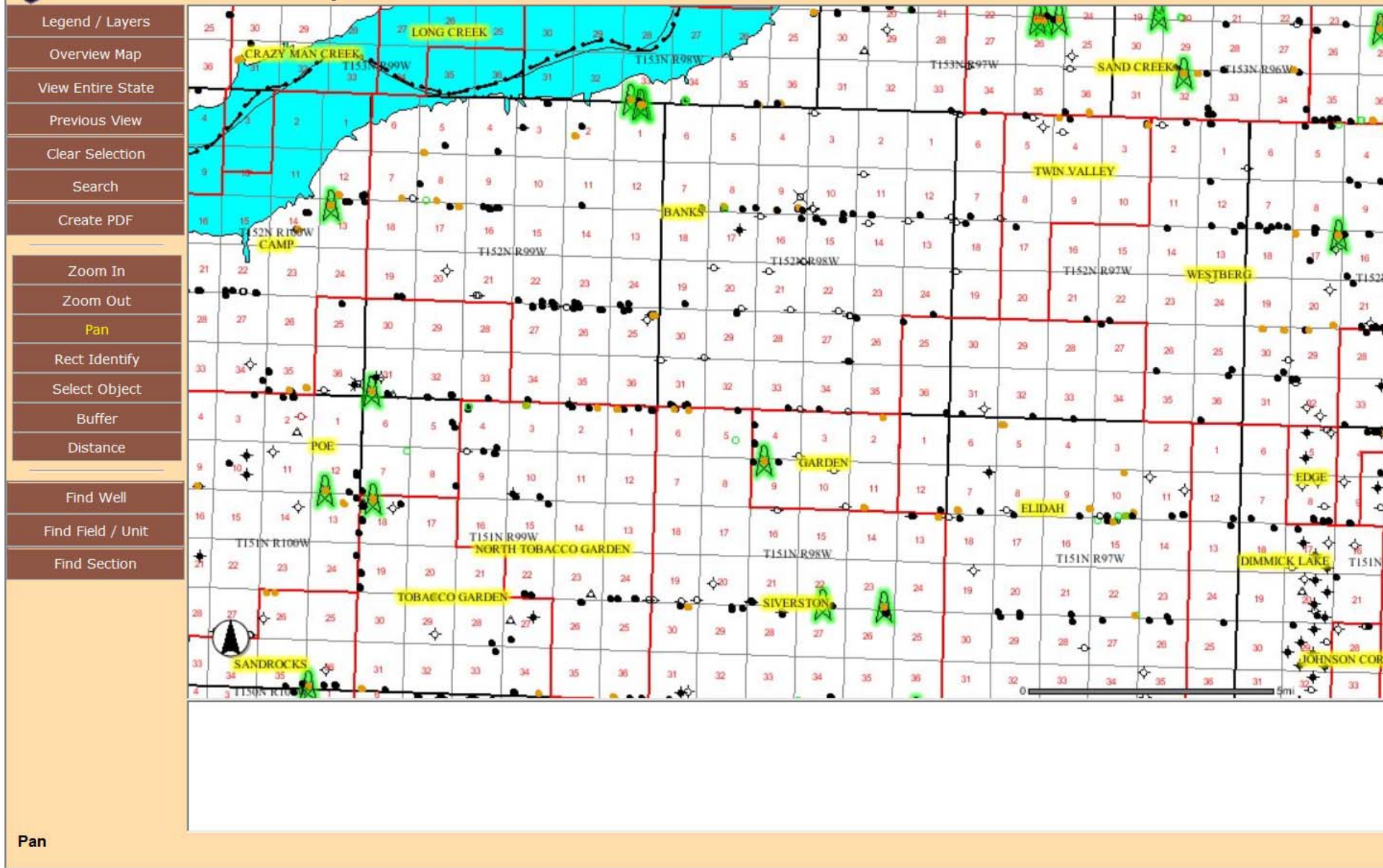
Oil and Gas Subscription: ArcIMS Viewer



Oil and Gas Subscription: ArcIMS Viewer



Oil and Gas Subscription: ArcIMS Viewer



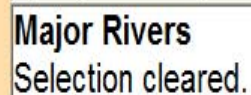






Energy Corridor

- uniform development
- pipelines, electrical, traffic
- less impact on adjacent roads

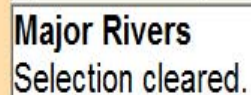
Vern Whitten Photography





- Zoom In
- Zoom Out
- Pan
- Rect Identify
- Select Object
- Buffer
- Distance
- Find Well
- Find Field/Unit
- Find Section



-  A closed group, click to open.
-  An open group, click to close.
-  A map layer.
-  A hidden group/layer, click to make visible.

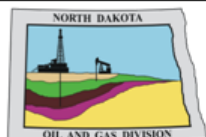
- Zoom In
- Zoom Out
- Pan
- Rect Identify
- Select Object
- Buffer
- Distance
- Find Well
- Find Field/Unit
- Find Section



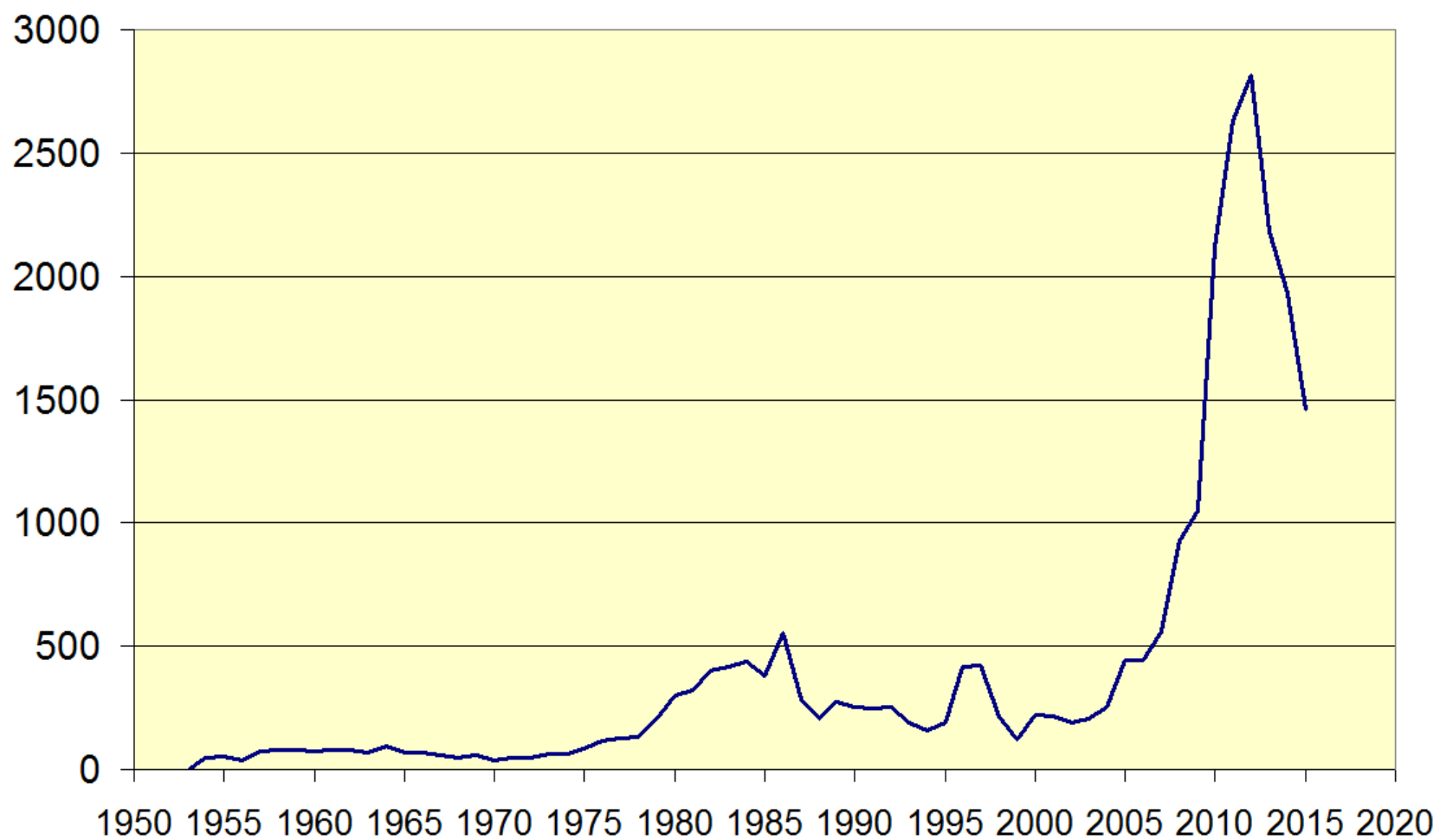
- Help:
-  A closed group, click to open.
 -  An open group, click to close.
 -  A map layer.
 -  A hidden group/layer, click to make visible.

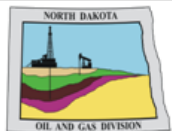
North Dakota Development

- Resource Play
- Development
- **Bakken Results**
- Gas Capture
- Hearing Testimony

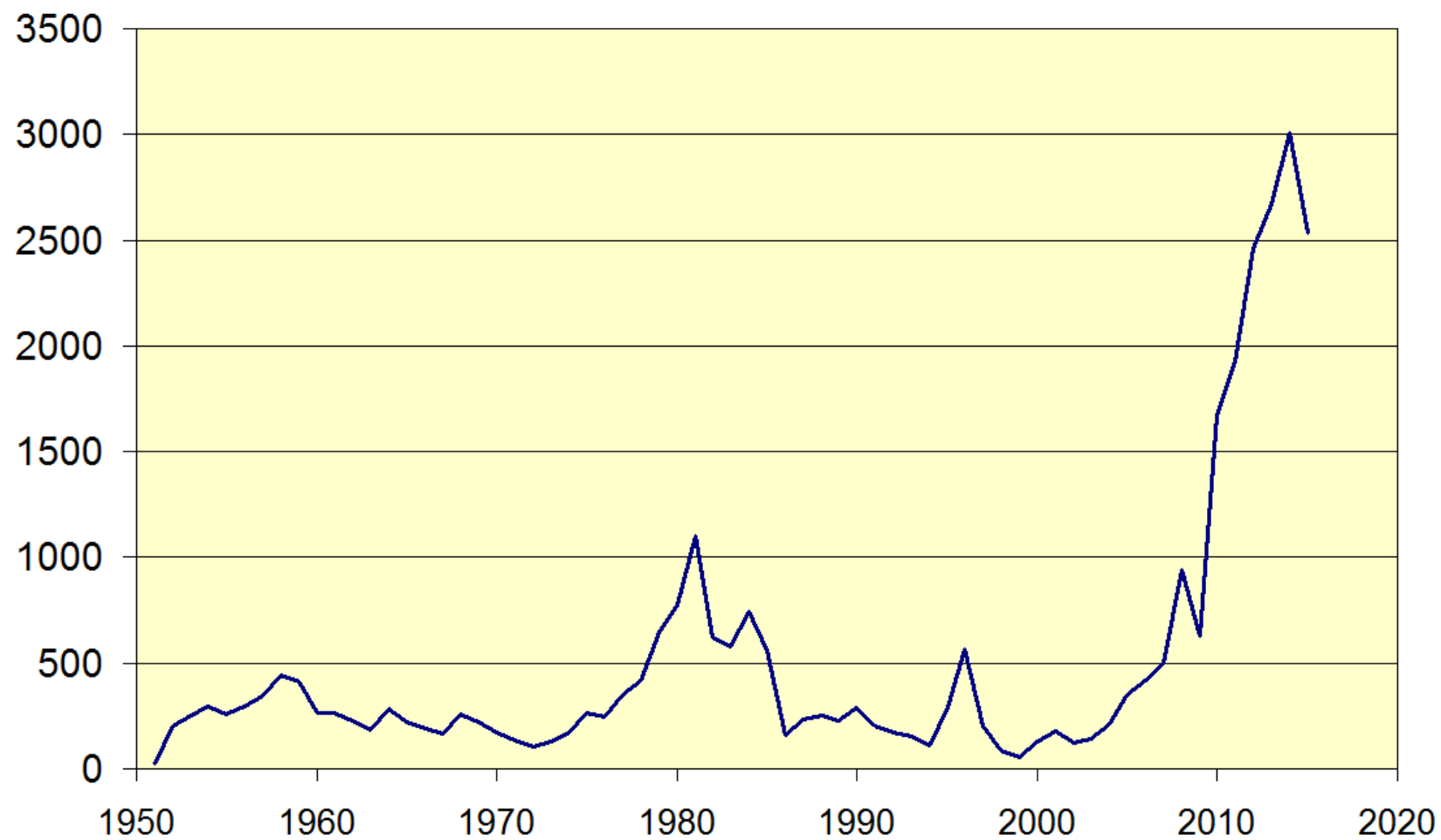


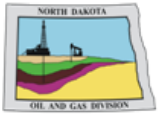
North Dakota Industrial Commission Cases Heard



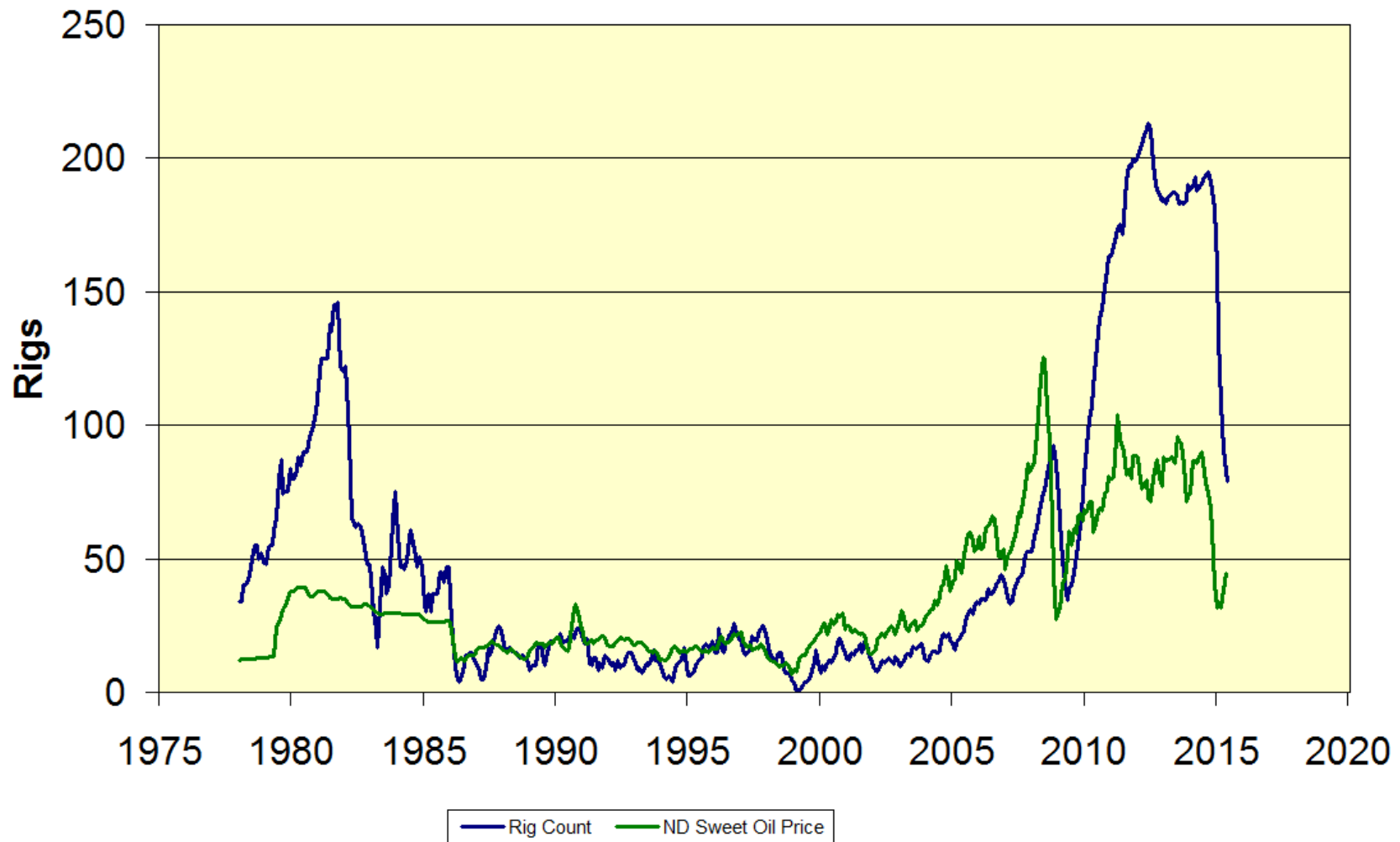


North Dakota New Well Permits Issued



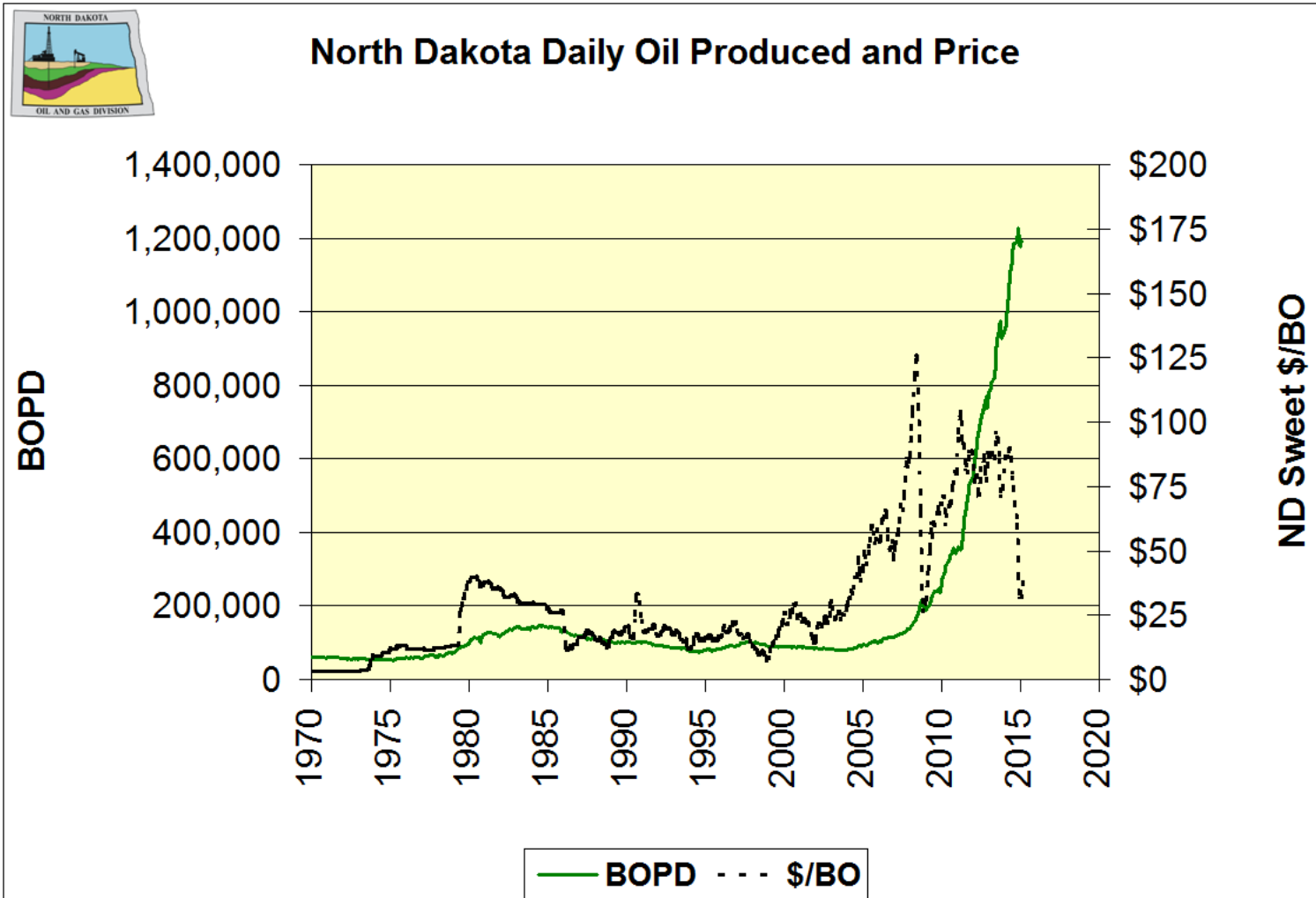


North Dakota Average Monthly Rig Count

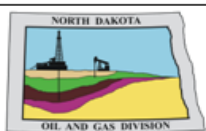


WELLS

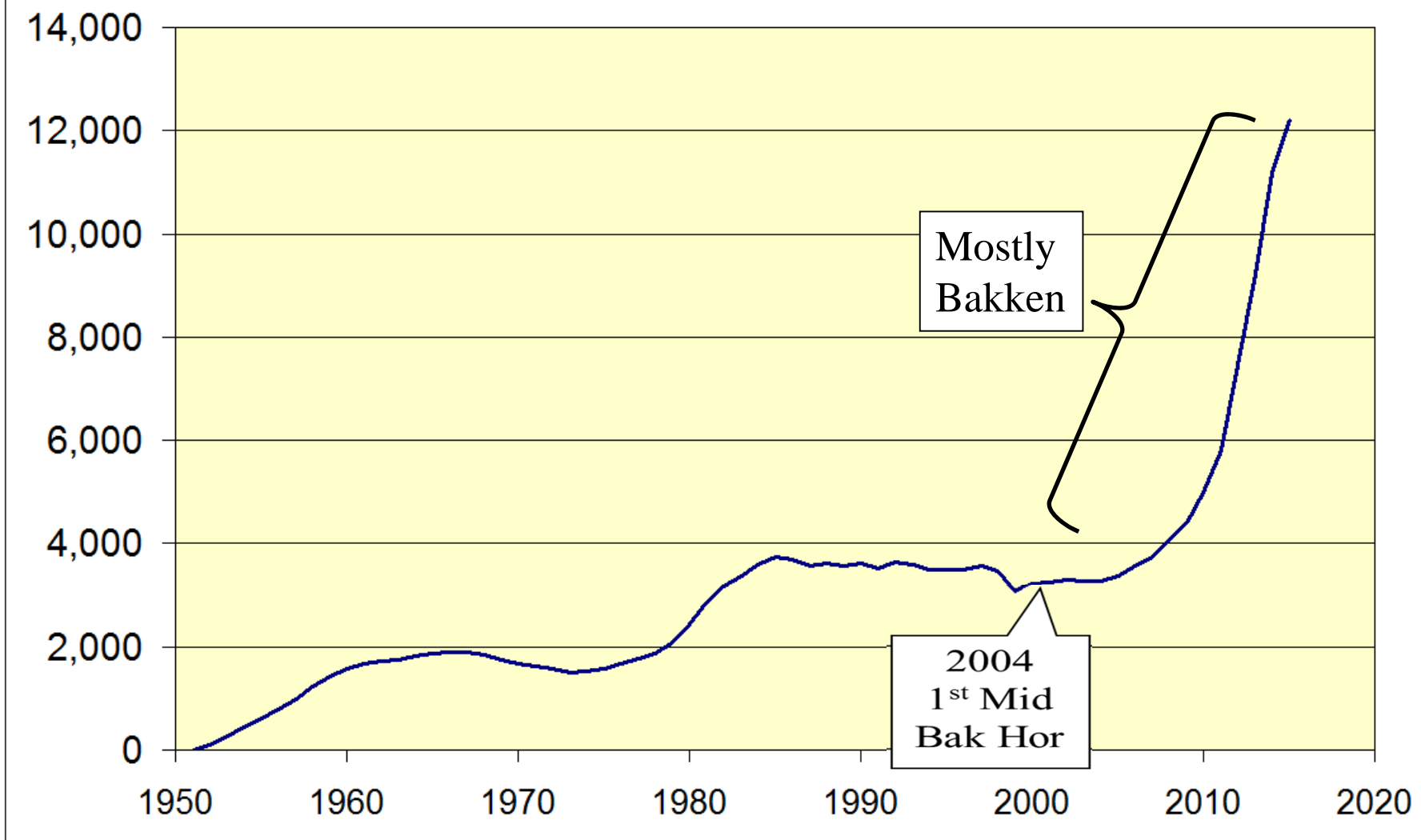
- **12,439 wells currently producing**
 - **9,397 Bakken**
- **< 1,000 to secure leases**
- **40,000 additional development wells**
 - **190 rigs – another 18 years**
- **Bakken Pool – 4 targets = more wells**



Production 1,190,583 bopd (appr 1,129,174 Bakken—95%)



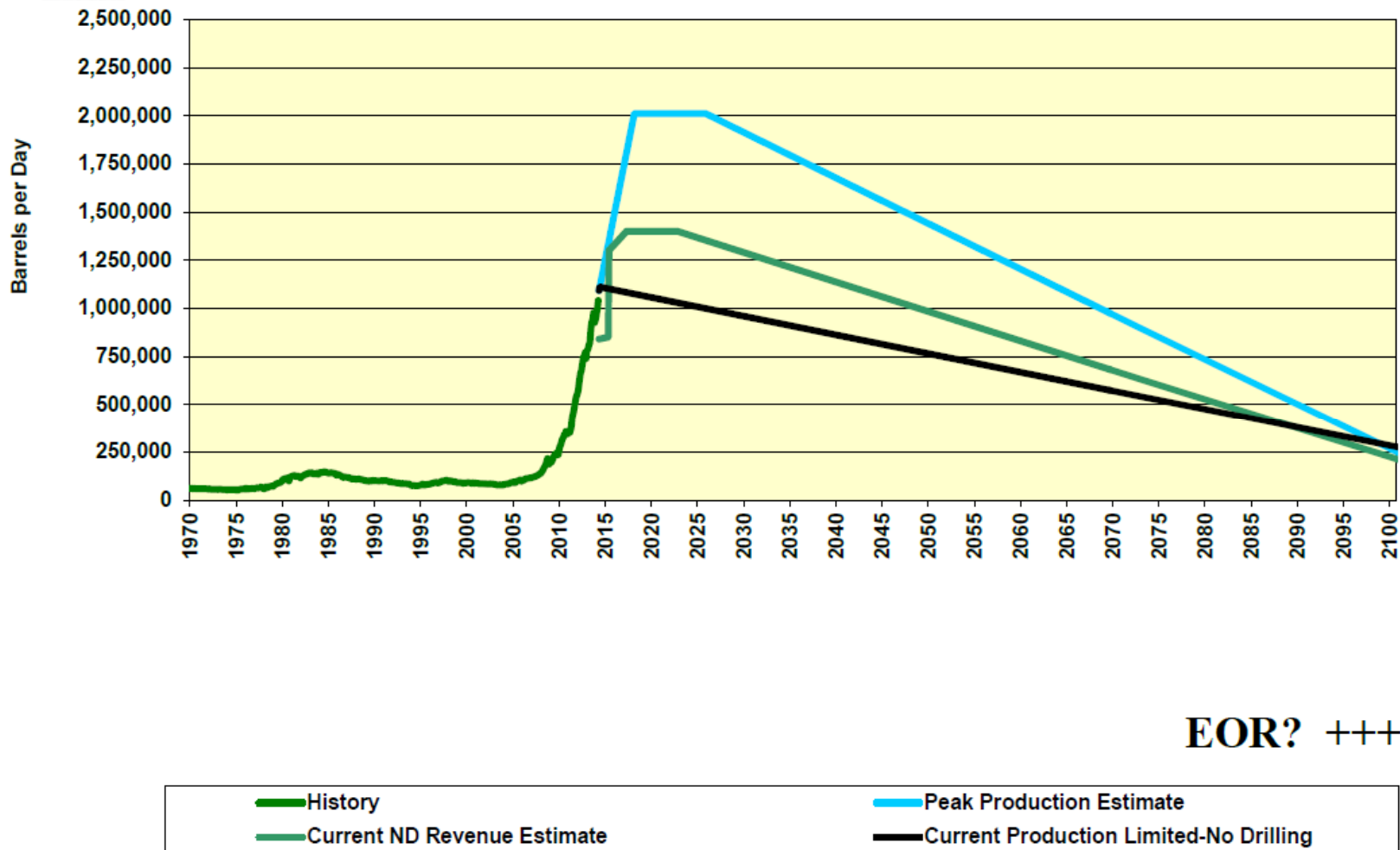
North Dakota Wells Producing



12,439 total wells – 9,397 Bakken horizontal (76%)

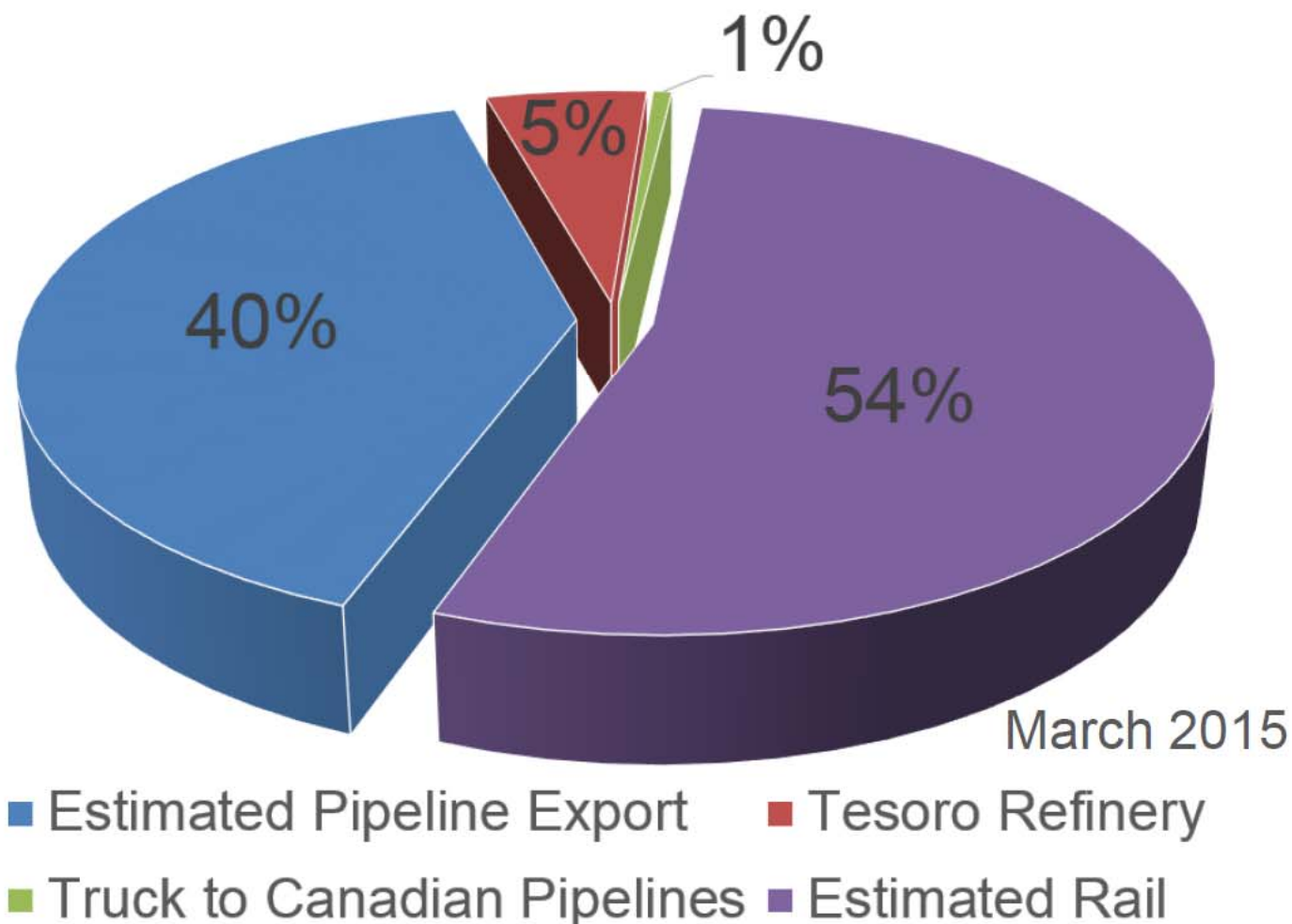


North Dakota Oil Production



EOR? +++

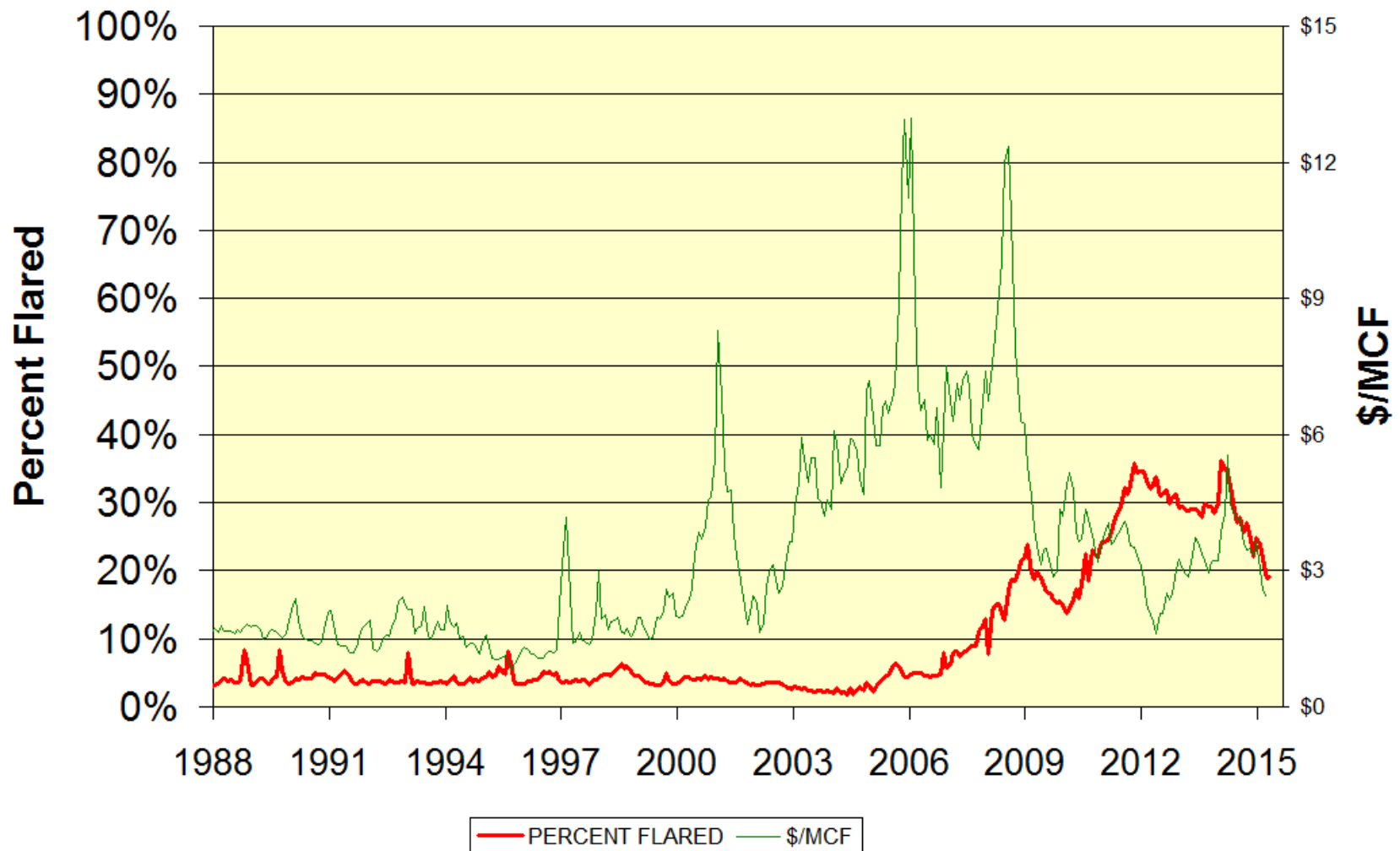
Estimated Williston Basin Oil Transportation



North Dakota Development

- Resource Play
- Development
- Bakken Results
- **Gas Capture**
- Hearing Testimony

North Dakota Monthly Gas Flared



GAS FLARING POLICY

- **ICO 24665—signed 7-1-2014**
 - **MER thru 9-30-2014**
 - **MER f/1st Hor on SU**
 - **MER 90 days initial prod**
 - **MER if exemption to NDCC 38-08-06.4**

GAS FLARING POLICY

- **ICO 24665**

- **Current Gas Capture appr 82% (Apr 2015)**
- **Commission's Gas Capture Goals**
 - ☺ **74% by 10-01-2014**
 - ☺ **77% by 1-01-2015**
 - **85% by 1-01-2016**
 - **90% by 10-01-2020**

GAS FLARING POLICY

- **ICO 24665**

- **Calc Gas Capture**

- **Percentage = (sold + lease use + beneficial use) / total prod**

- **Beneficial use**

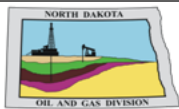
- » **Electrical generator**
 - » **Compressed liquid f/fuel, to plant, fertilizer**
 - » **Strip propanes + (369 wells connected—Jun'15)**
 - » **Reducing intensity of flare by 60% (lower BTU)**

GAS FLARING POLICY

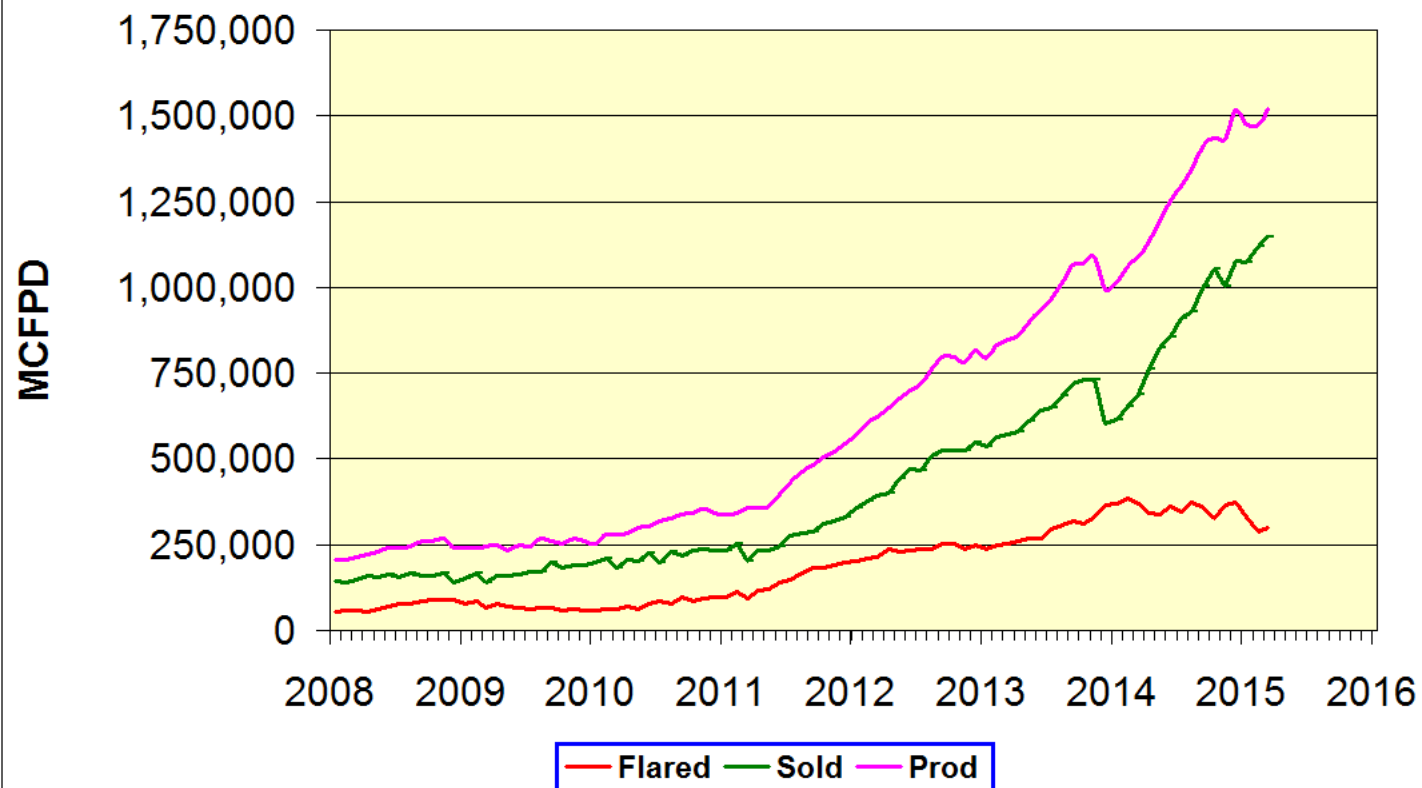
- **ICO 24665**

- **Calc Gas Capture**

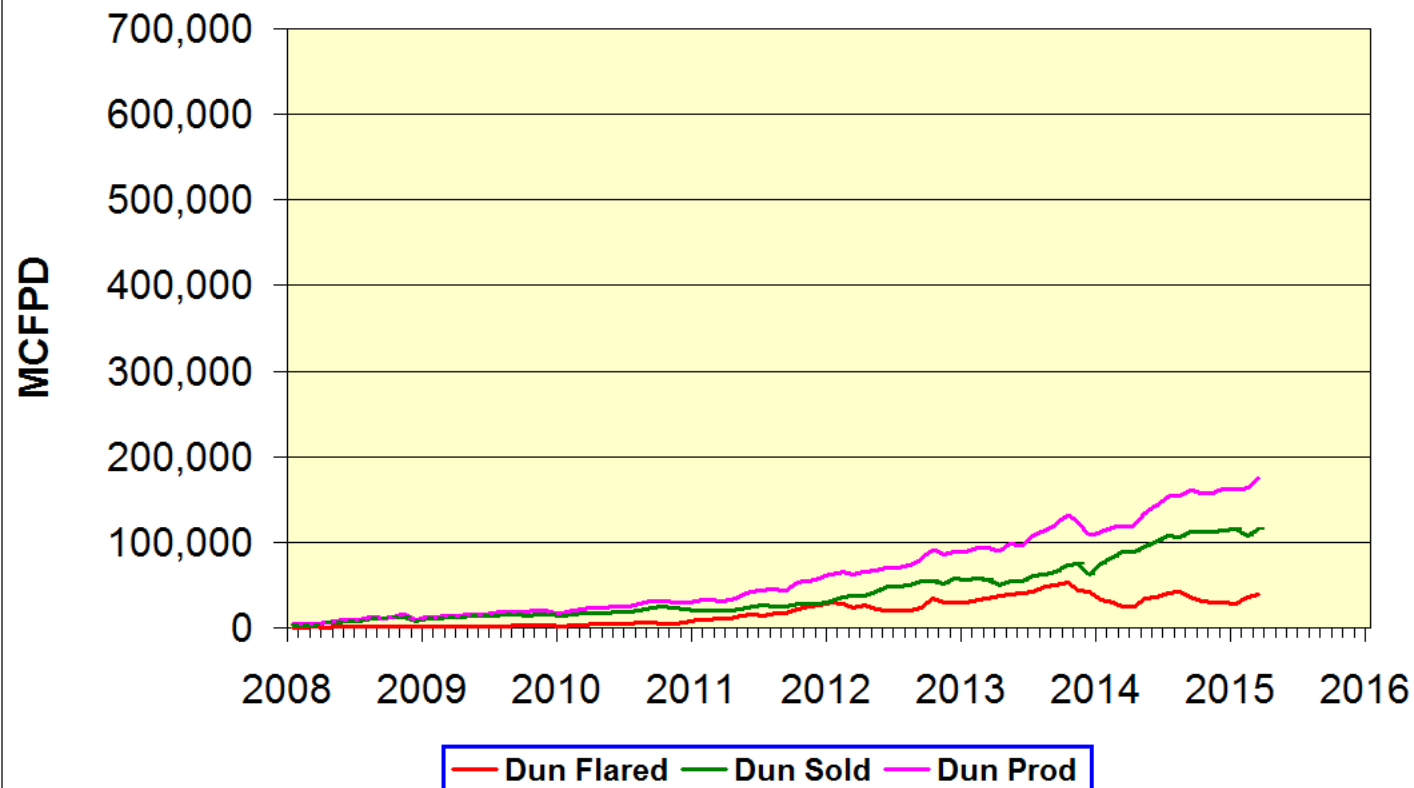
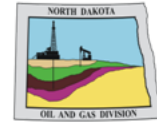
- **State-wide calc 77%+, Statewide MER allowed**
 - **County-wide calc 77%+, Countywide MER allowed**
 - **Field-wide calc 77%+, Fieldwide MER allowed**
 - **Well calc 77%+, Well MER allowed**
 - **Less than 77%, calc on Cty, Field, or Well level**
 - **60%+, restrict well to 200 bopd**
 - **Less than 60%, restrict well to 100 bopd**



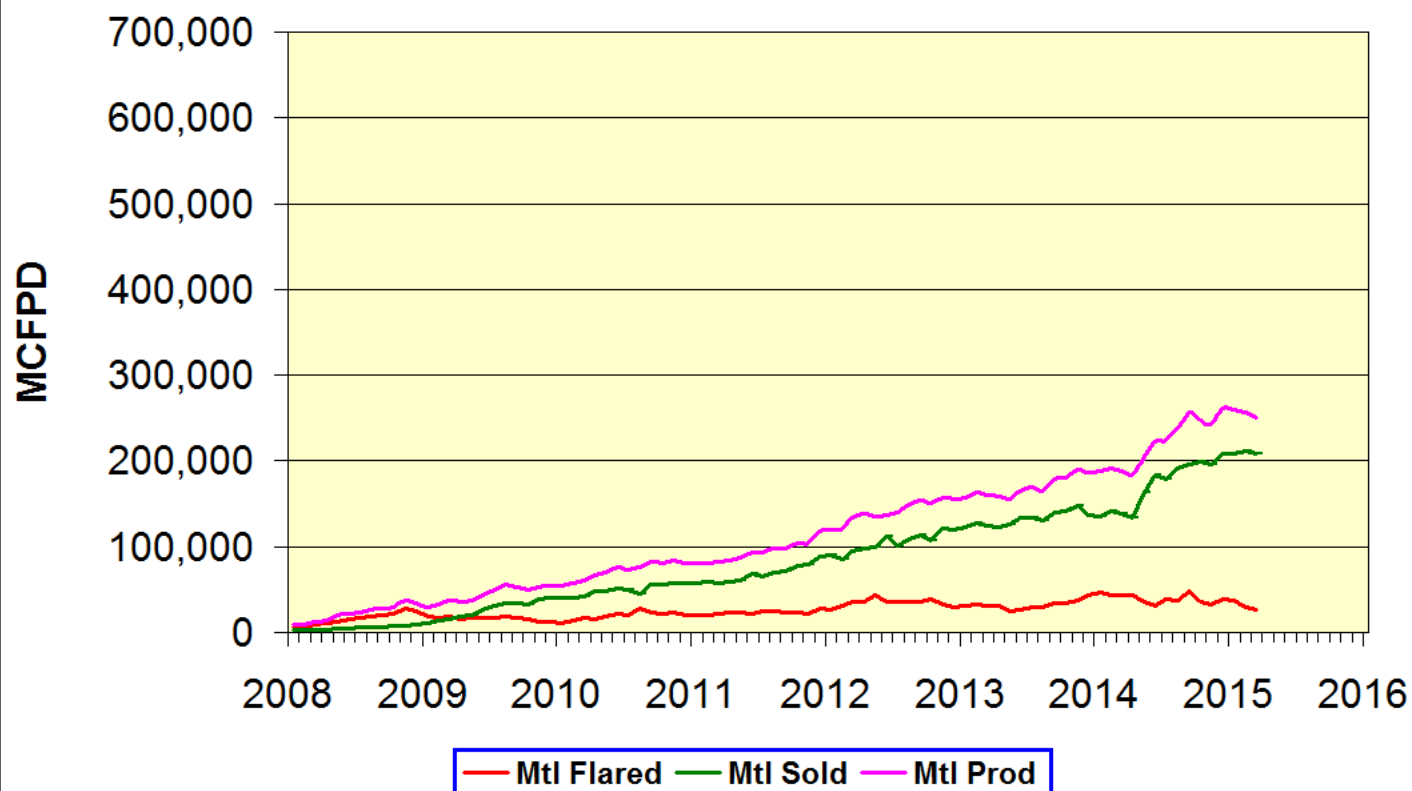
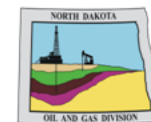
North Dakota Daily Gas Volumes



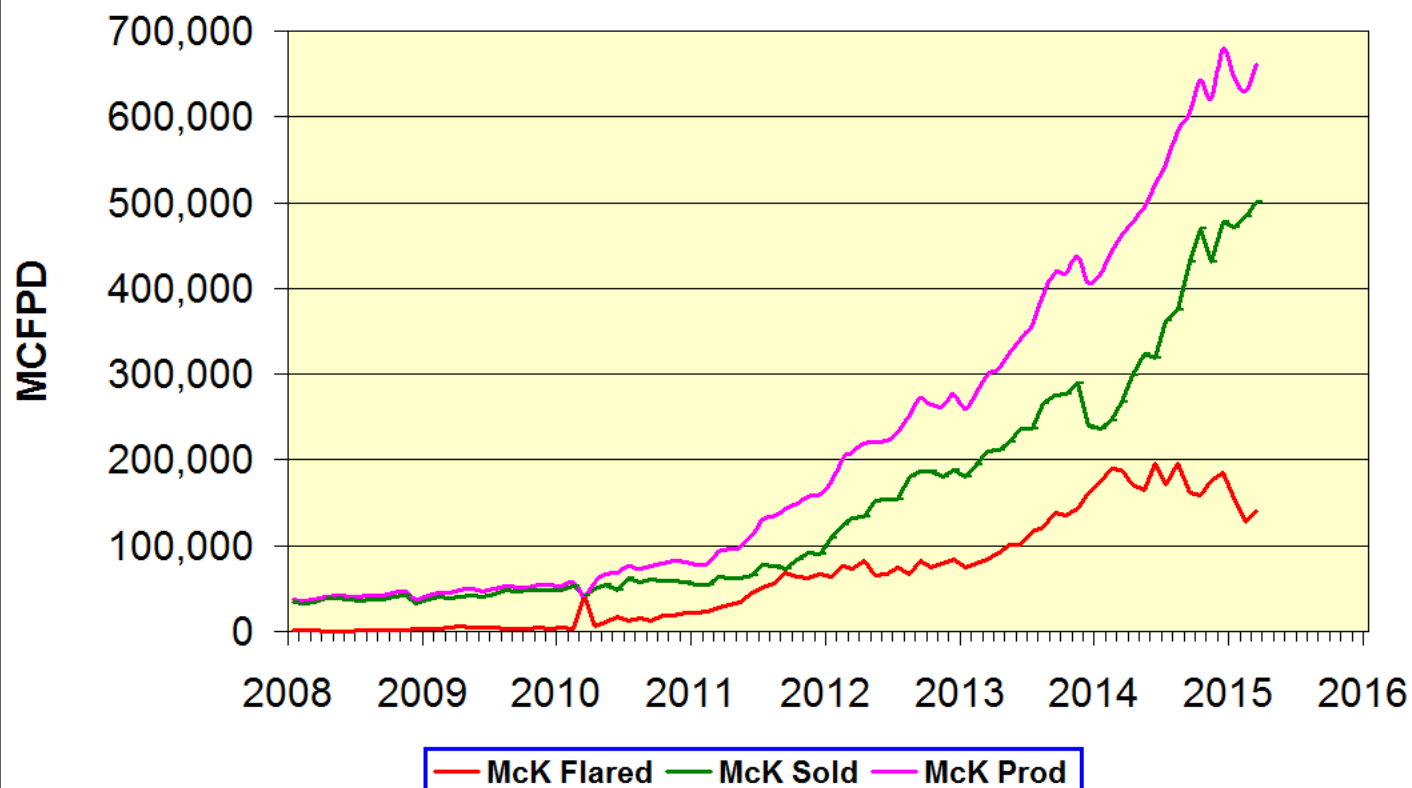
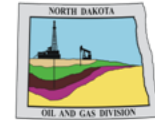
Dunn County Daily Gas Volumes



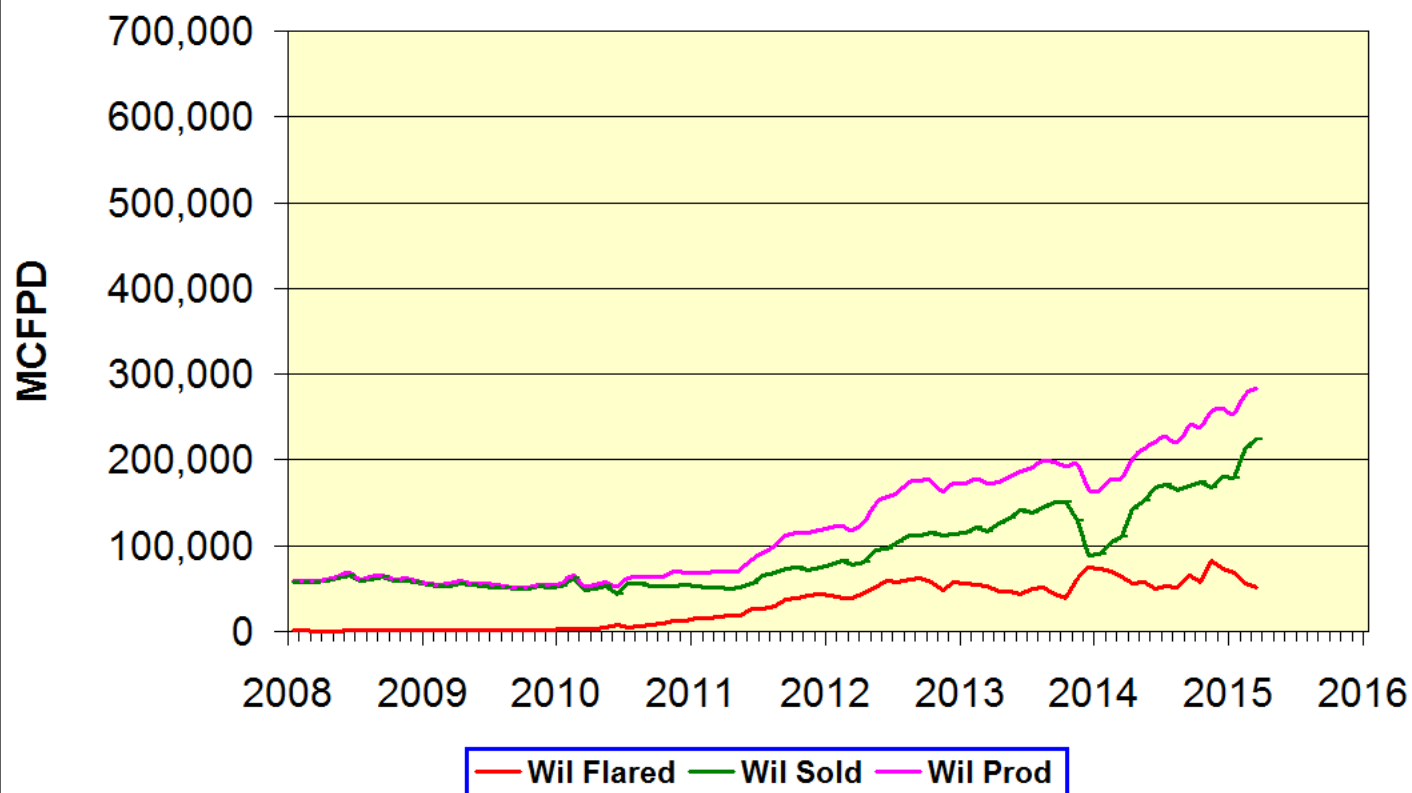
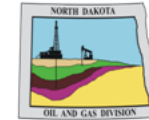
Mountrail County Daily Gas Volumes

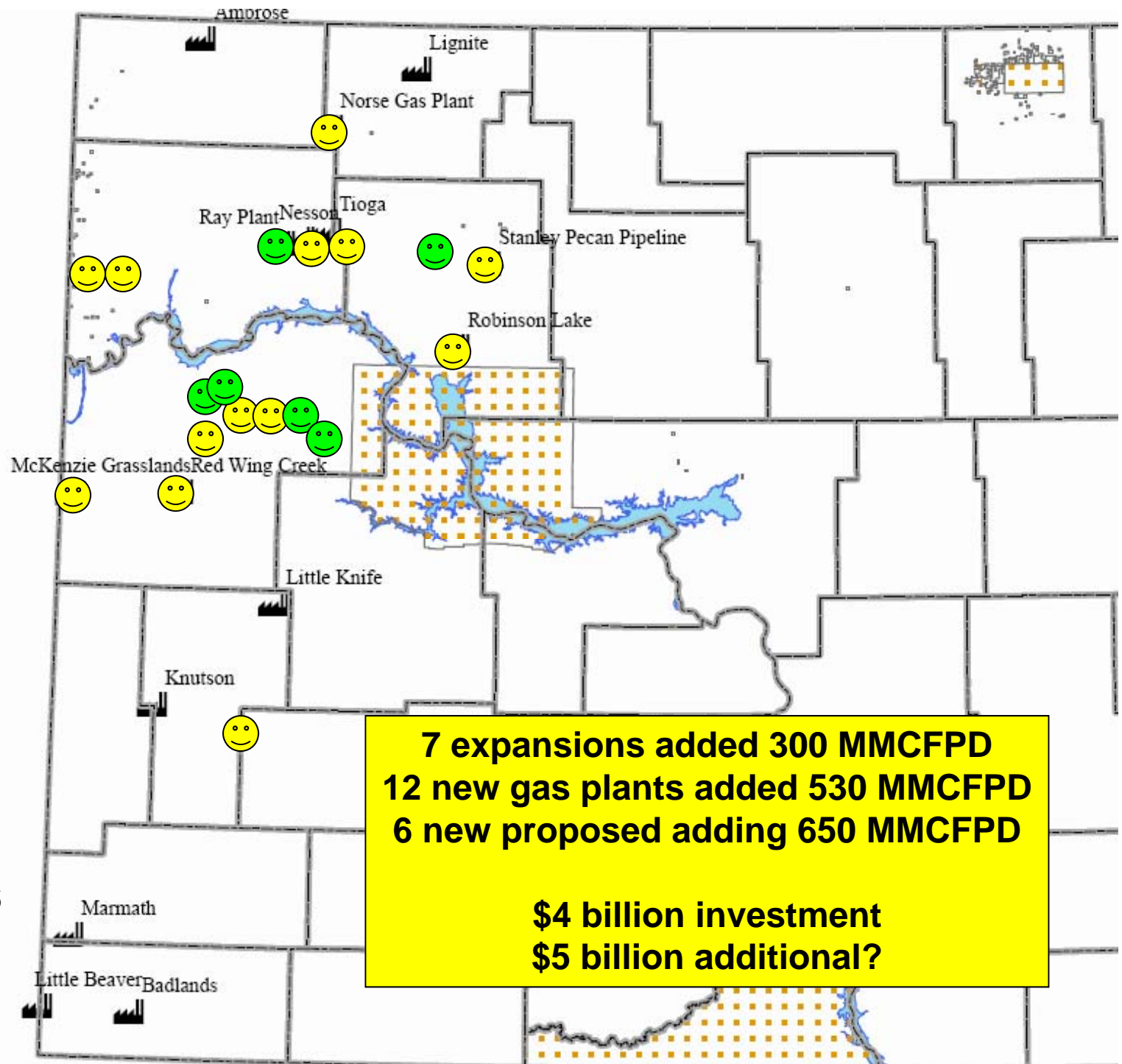


McKenzie County Daily Gas Volumes



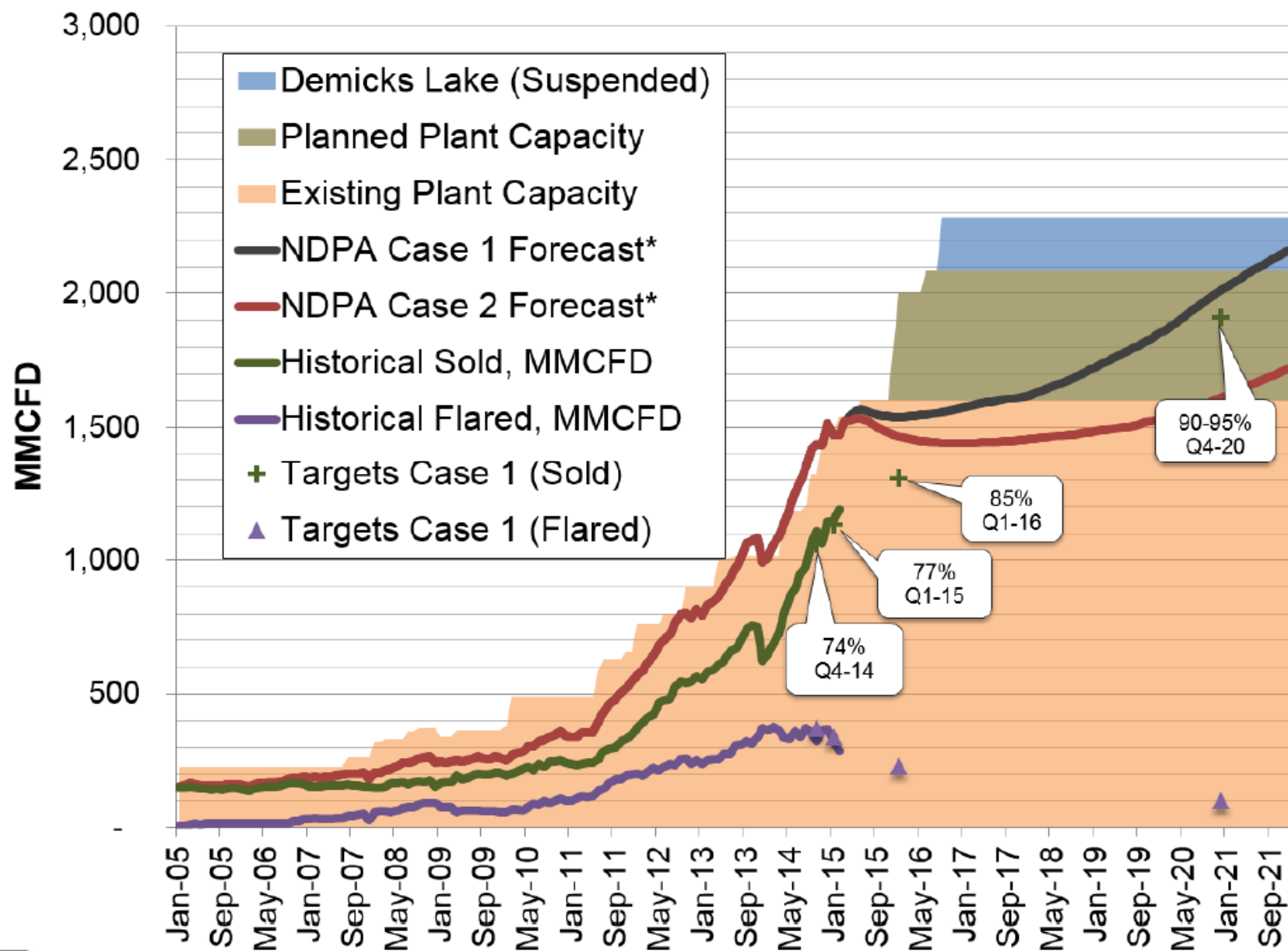
Williams County Daily Gas Volumes





- 😊 New since 2006
- 😄 Planned 2015/2016

Solving the Flaring Challenge



North Dakota Development

- Resource Play
- Development
- Bakken Results
- Gas Capture
- **Hearing Testimony**

HEARING TESTIMONY / EVIDENCE

- **Letter Testimony**
 - Legal counsel says can't cross examine witness
 - Many objections not under IC jurisdiction
- **Telephonic Testimony**
 - NDAC Section 43-02-03-88.2
 - Request 3 business days prior to hearing
 - Hearing officer can deny or require "in-person" hearing
 - Must have atty or representative at hearing
 - Submit affidavit of telephonic communication
- **In-Person Testimony**
 - Preferred
 - No formal registration

WHAT'S AHEAD

- **Spearfish horizontal play**
- **Tyler horizontal play**
- **Three Forks—testing lower benches**
- **Enhanced Recovery in Bakken**

Reclaimed Location

