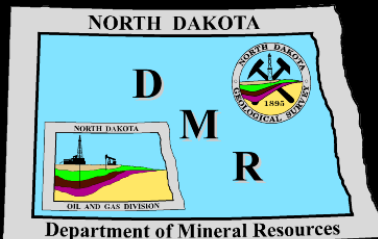


# ***OIL AND GAS UPDATE***

***Energy Development and  
Transmission Committee***



***Bismarck, ND  
August 1, 2017***



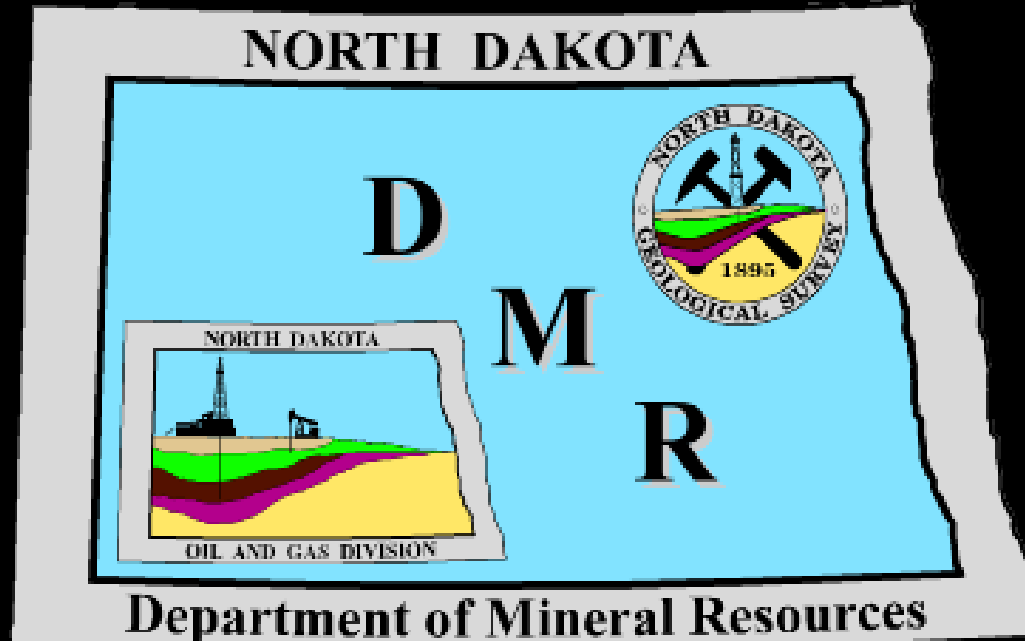
# Oil and Gas Update

- Bakken Development
- Bakken Performance
- Bakken Takeaways

*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***



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NDIC DMR

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

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NDIC DMR

dmr.nd.gov

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North Dakota

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North Dakota vs Vermont ...

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North Dakota vs Vermont ...

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County Info ▾

nd.gov

64th Legislative Assembly ...

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Bismarck News, Weather, ...

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North Dakota

nd.gov

Official Portal for  
North Dakota State Government

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NORTH DAKOTA

OIL AND GAS DIVISION

Welcome to the North Dakota Industrial Commission, Department of Mineral Resources, and Oil and Gas Division, home page.

Please check out the new [Information Center](#) and [Publications](#).

Proposed Rule Changes and Adoption of New Rules

[Rule Changes Full Notice](#)

[General Guidelines for Temporary Abandonment of Wells](#)

[Bakken and Three Forks Information!](#)

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

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  
Bismarck, ND 58505-0840  
**General Shipping:**  
NDIC Oil and Gas Division

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Activity

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https://www...

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NDIC DMR

Department ...

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35 Reminders

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Activity Upd...



# Oil and Gas Update

- **Bakken Development**

- **Uniform Spacing—orderly development**
- **Energy Corridors**

- **Bakken Performance**

- **Oil Production**
- **Well Count**
- **Gas-Oil Ratio**
- **Gas Capture**
- **Water-Oil Ratio**
- **Stimulations**

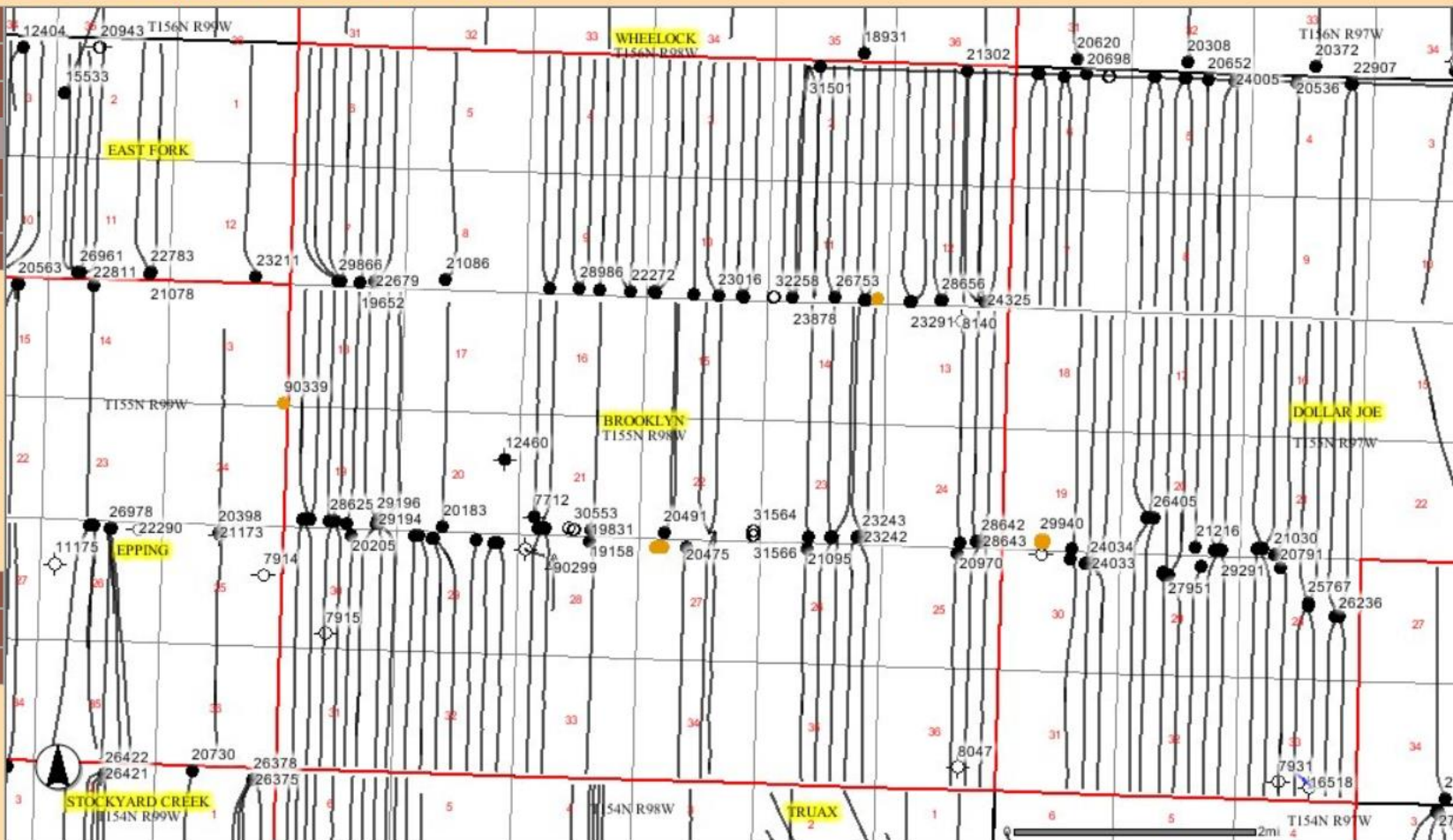
- **Pipelines**

- **Bakken Takeaways**



# 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



Zoom In



## Oil and Gas Subscription: ArcIMS Viewer

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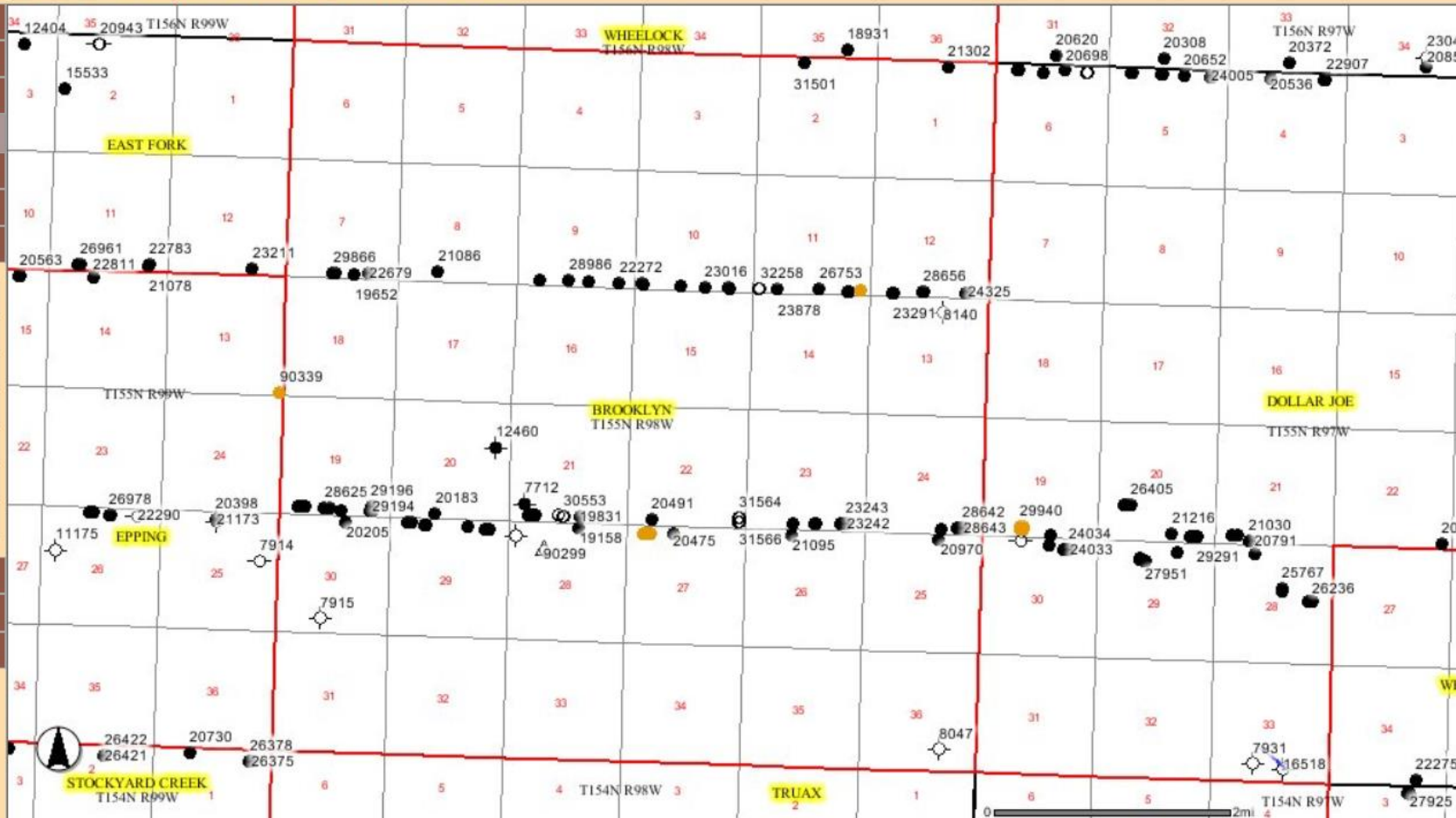
Buffer

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Zoom In



Performance...



Oil and Gas ...



Oil and Gas ...

NDIC  
DMR

Activity Upd...



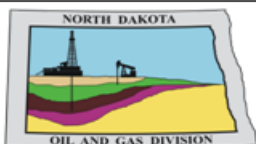
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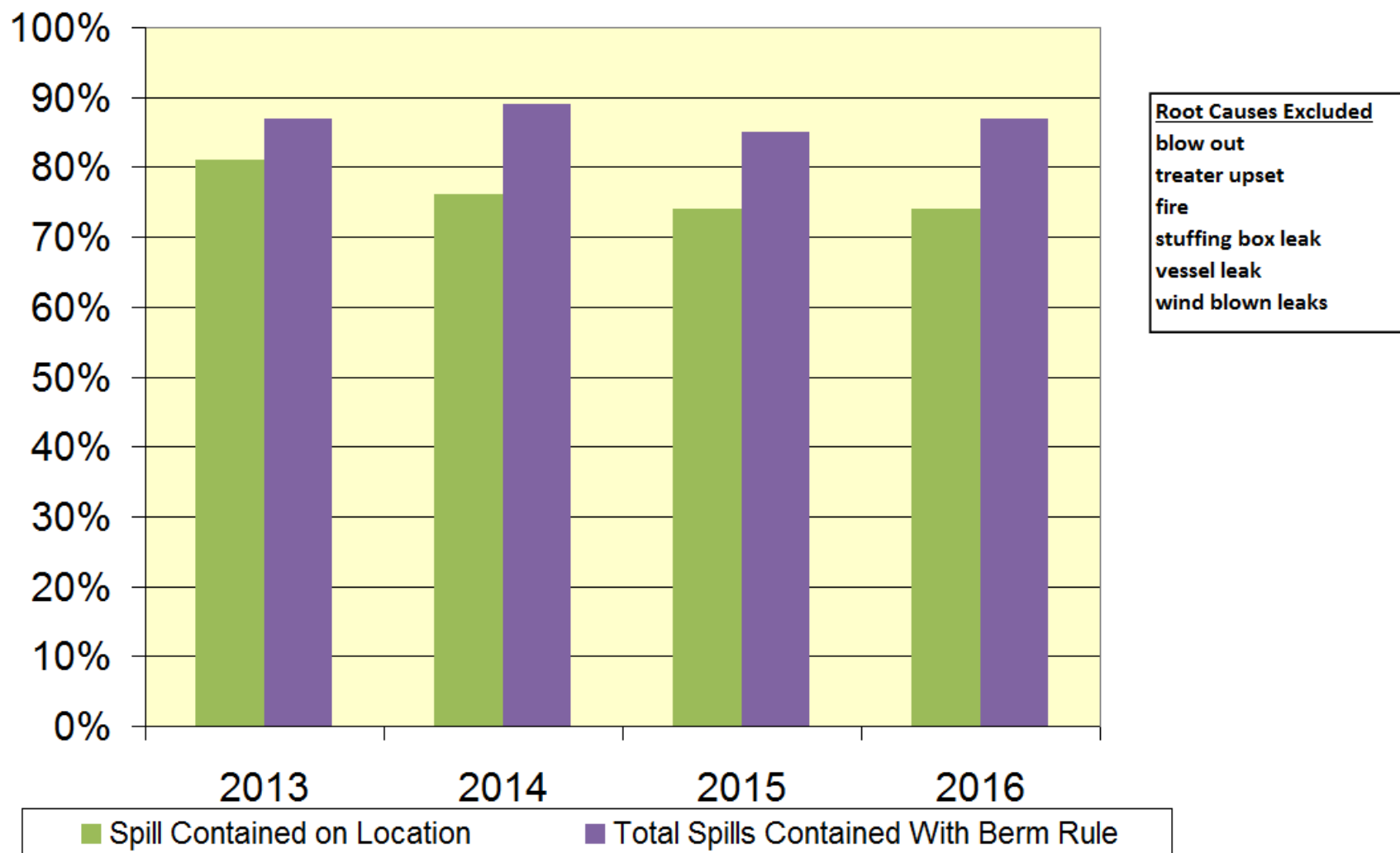
Vern Whitten Photography





## Contained Spills / Berm Effectiveness

More spills will be contained onsite due to Oil and Gas Division rule changes effective April 1, 2016 requiring perimeter berms on high volume production sites.





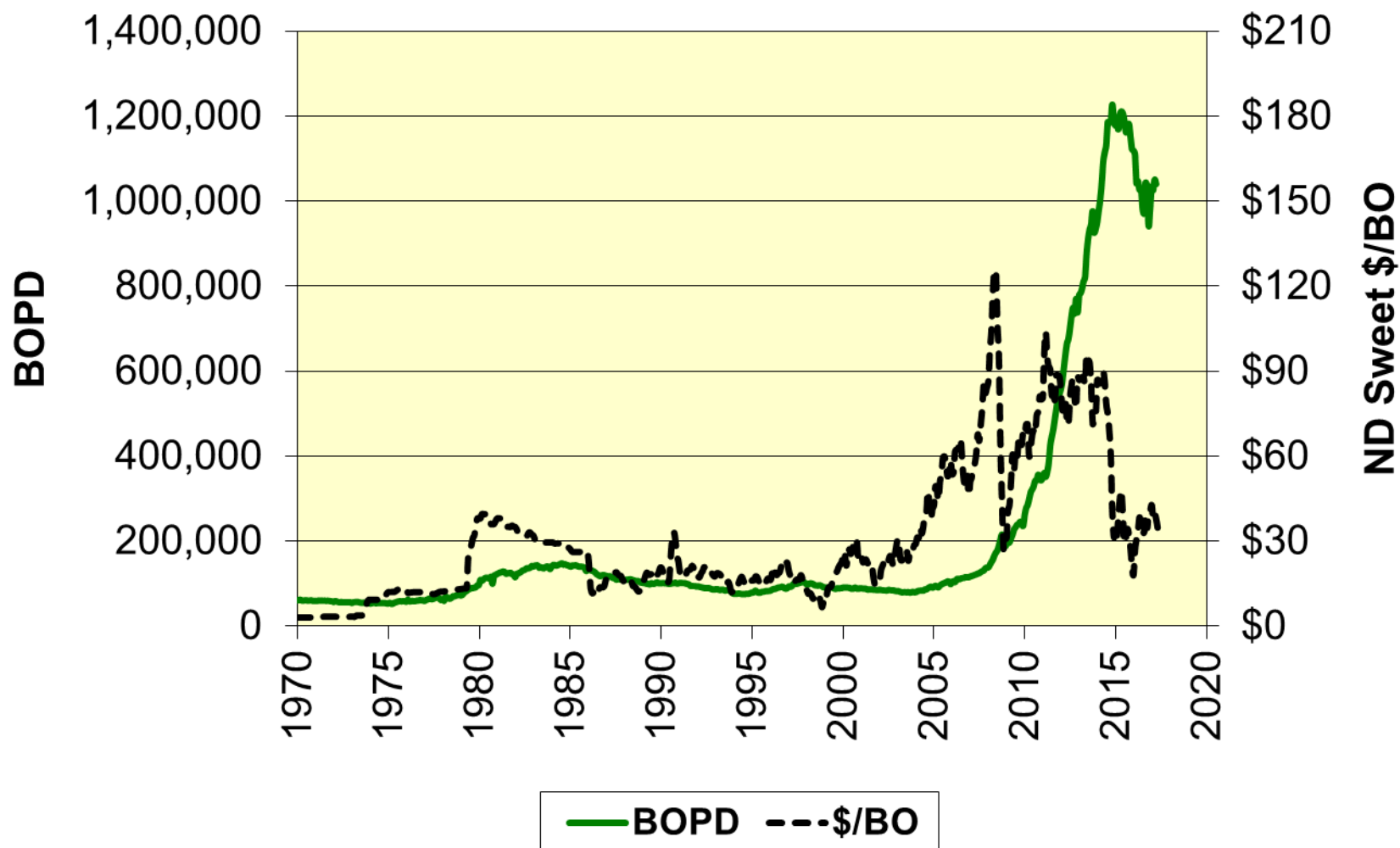
# Oil and Gas Update

- Bakken Development
- **Bakken Performance**
  - **Oil Production**
  - Well Count
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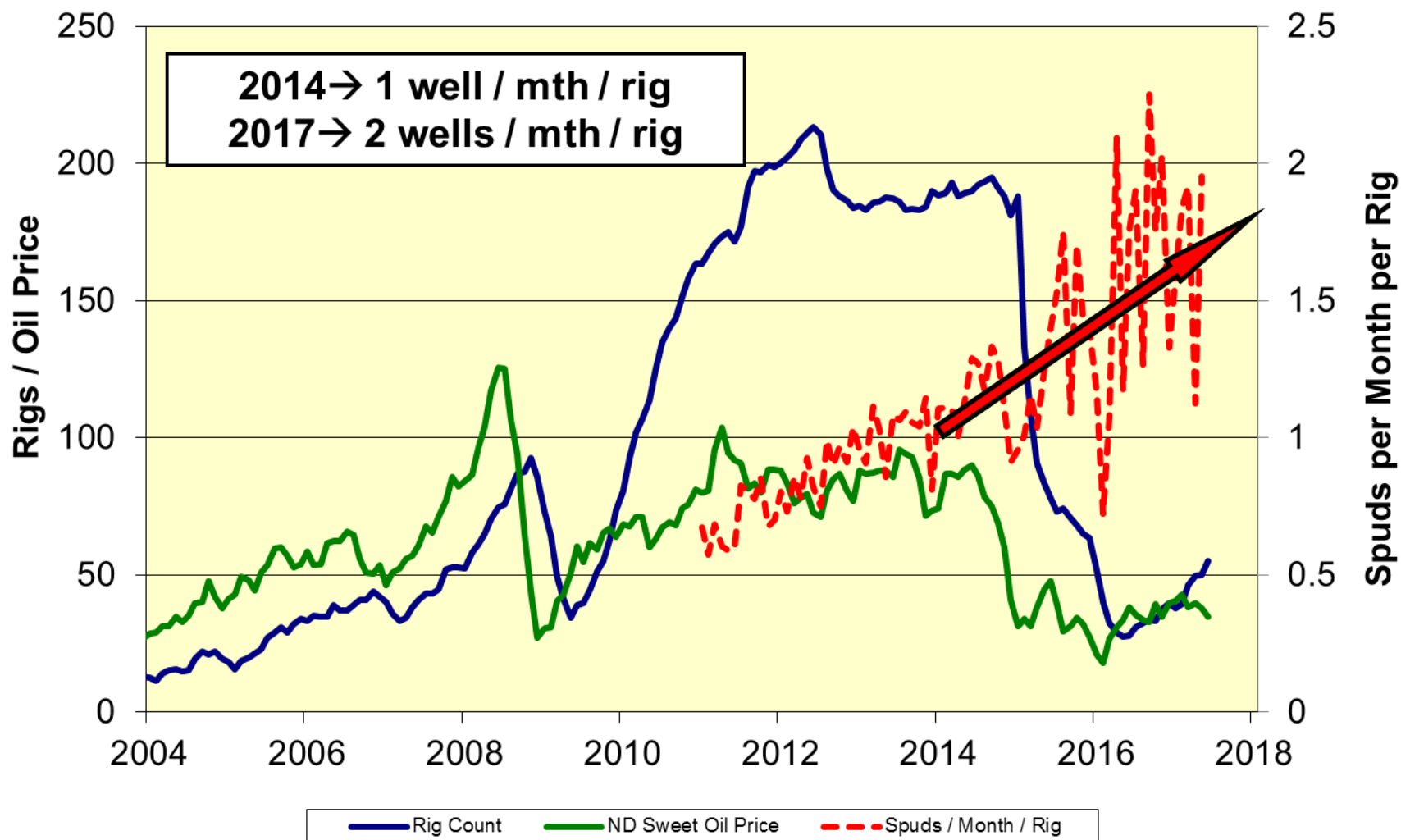
## North Dakota Daily Oil Produced and Price





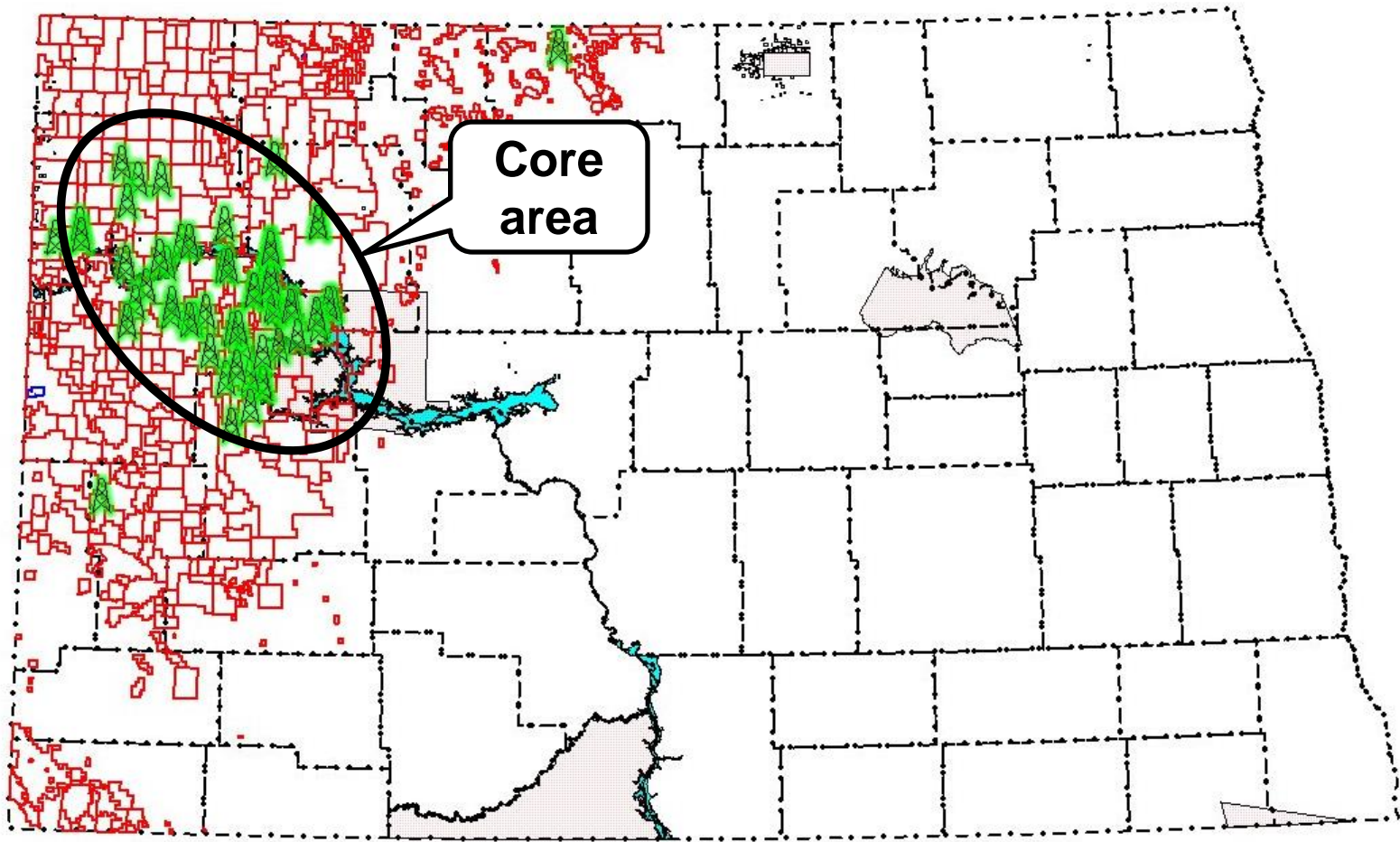


## North Dakota Average Monthly Rig Count





# **NORTH DAKOTA – 60 DRILLING RIGS – July 2017**



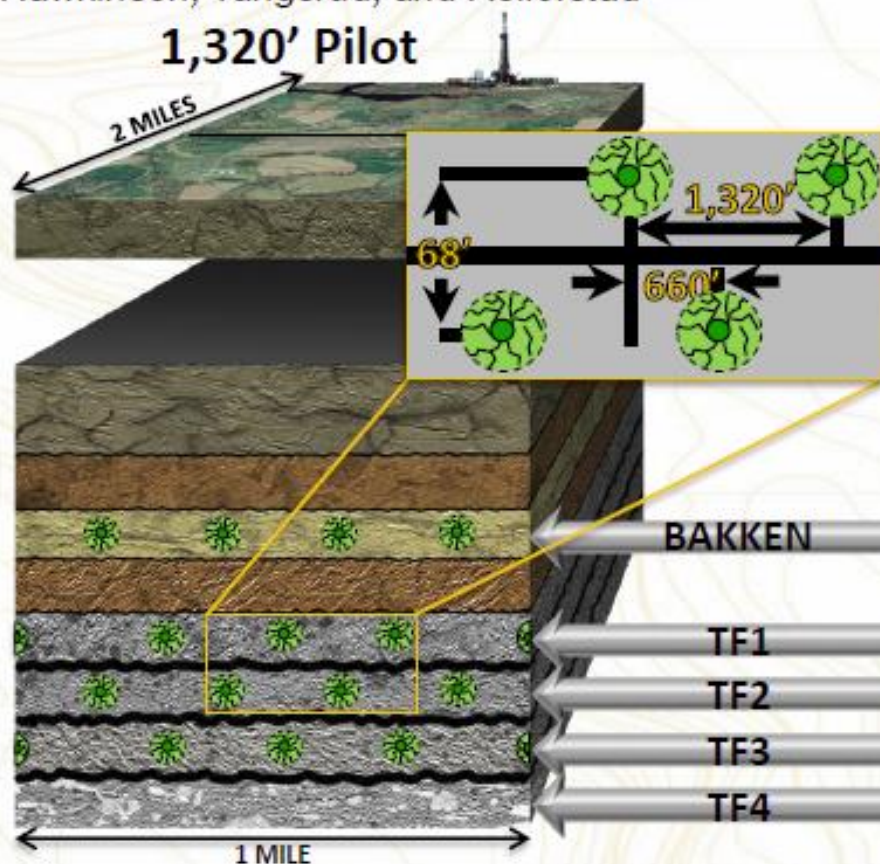
**Current drilling activity is focused  
in Mountrail, Dunn, McKenzie, and Williams Counties**



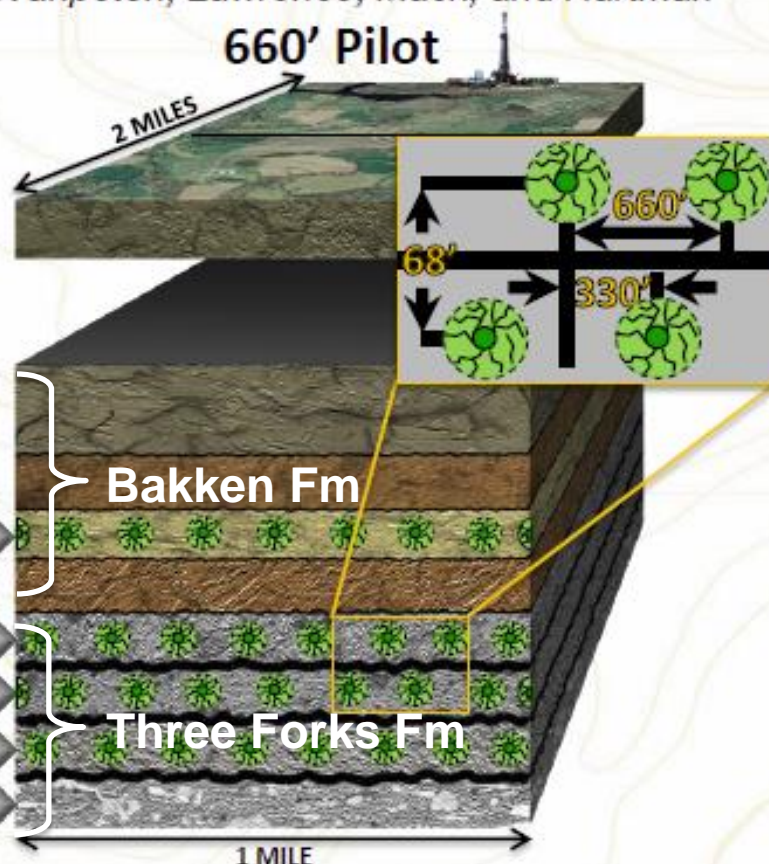
# 1,320' & 660' Pilot Density Projects: 2013-14

*Hawkinson, Tangsrud, and Rollefstad*

*Wahpeton, Lawrence, Mack, and Hartman*



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



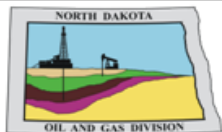
- 4 project areas
- 660 ft. same-zone spacing
- 31 new wells (gross)



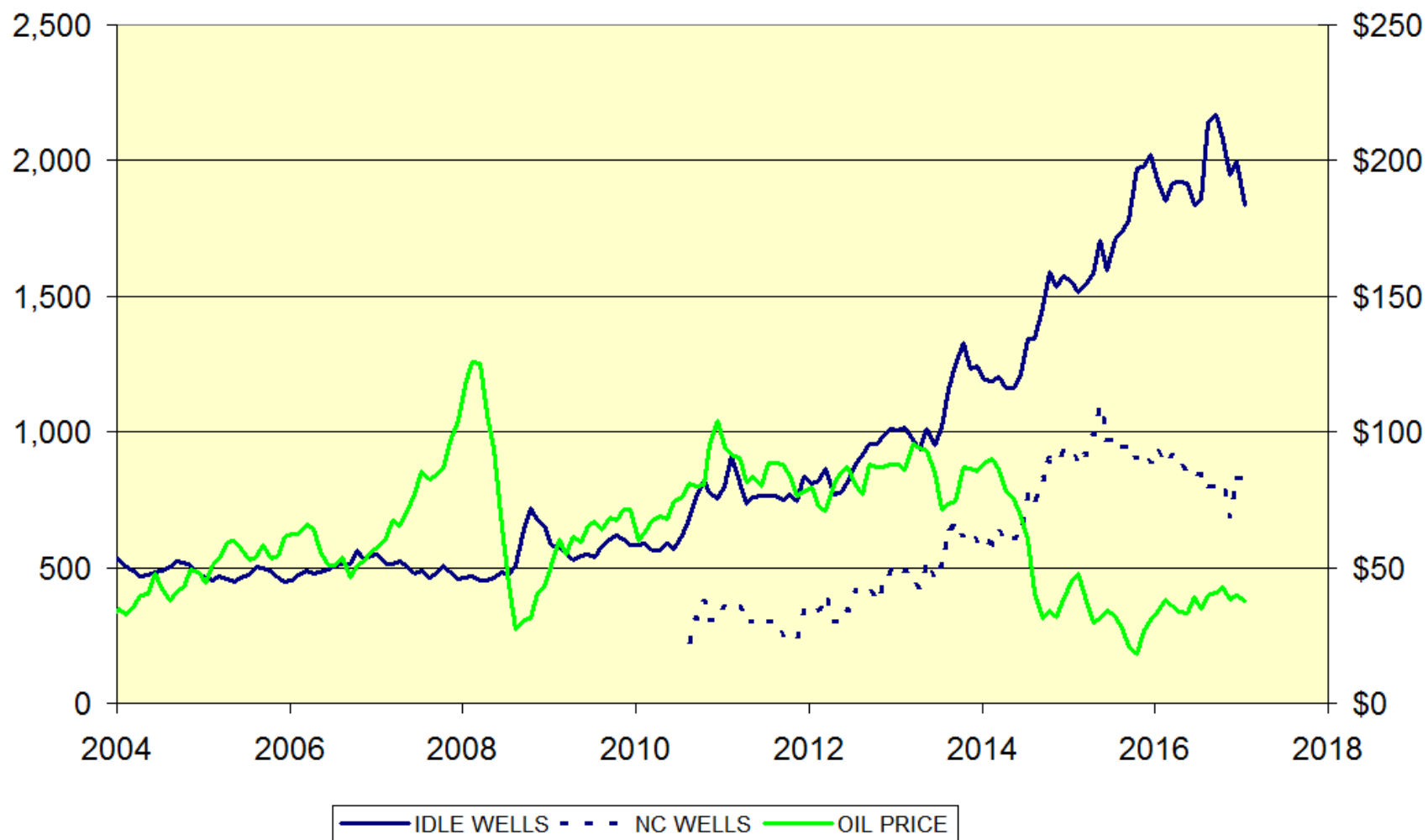
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- **Bakken Performance**
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## North Dakota Idle and Non-Completed Wells





**Wells**

**13,876 active**

**2,057 conventional**

**11,819 Bakken/Three Forks**

**1,772 inactive**

**+\$40 for 90 days**

**830 waiting on completion**

**+\$50 for 90 days**

**1,919 permitted**

**+\$60 for 90 days**

**NYMEX 2024+**

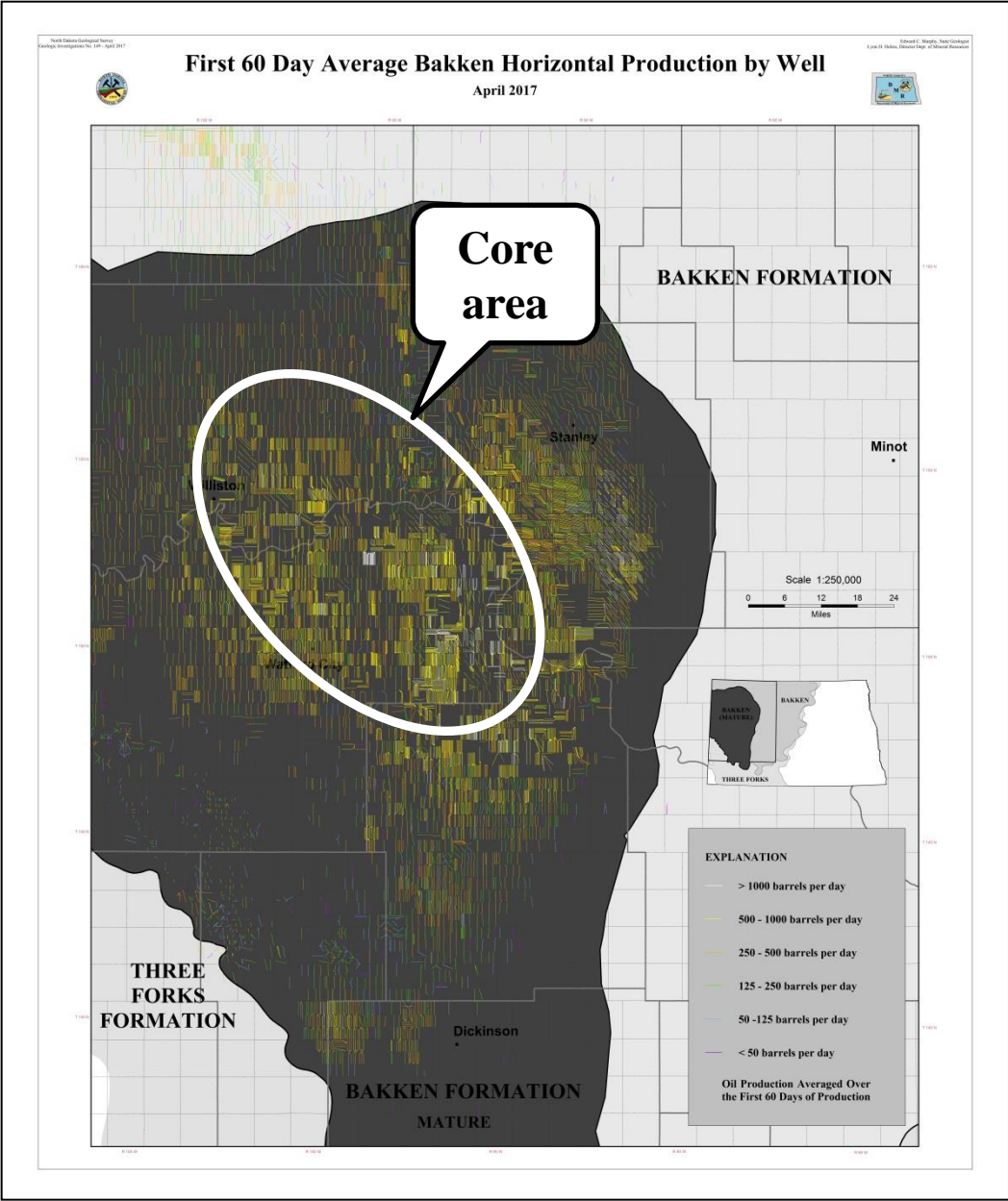
**13,141 increased density approved 6/27/17**

**31,538 total**

**55,000-65,000 estimated final**

**9,782 reclaimed and bond released**

**1,017 reclamation in progress**

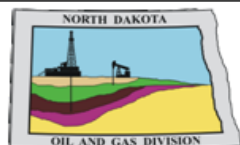




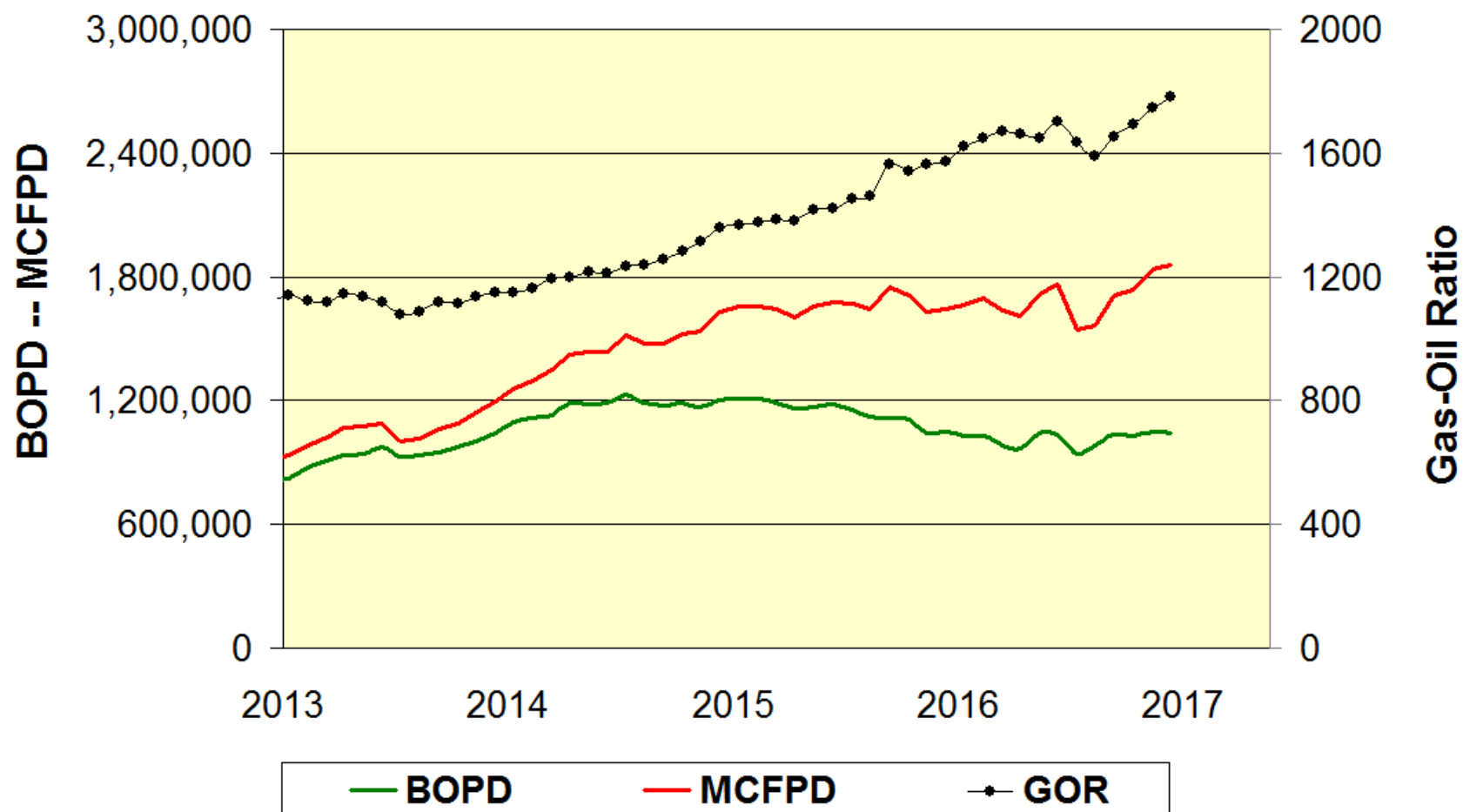
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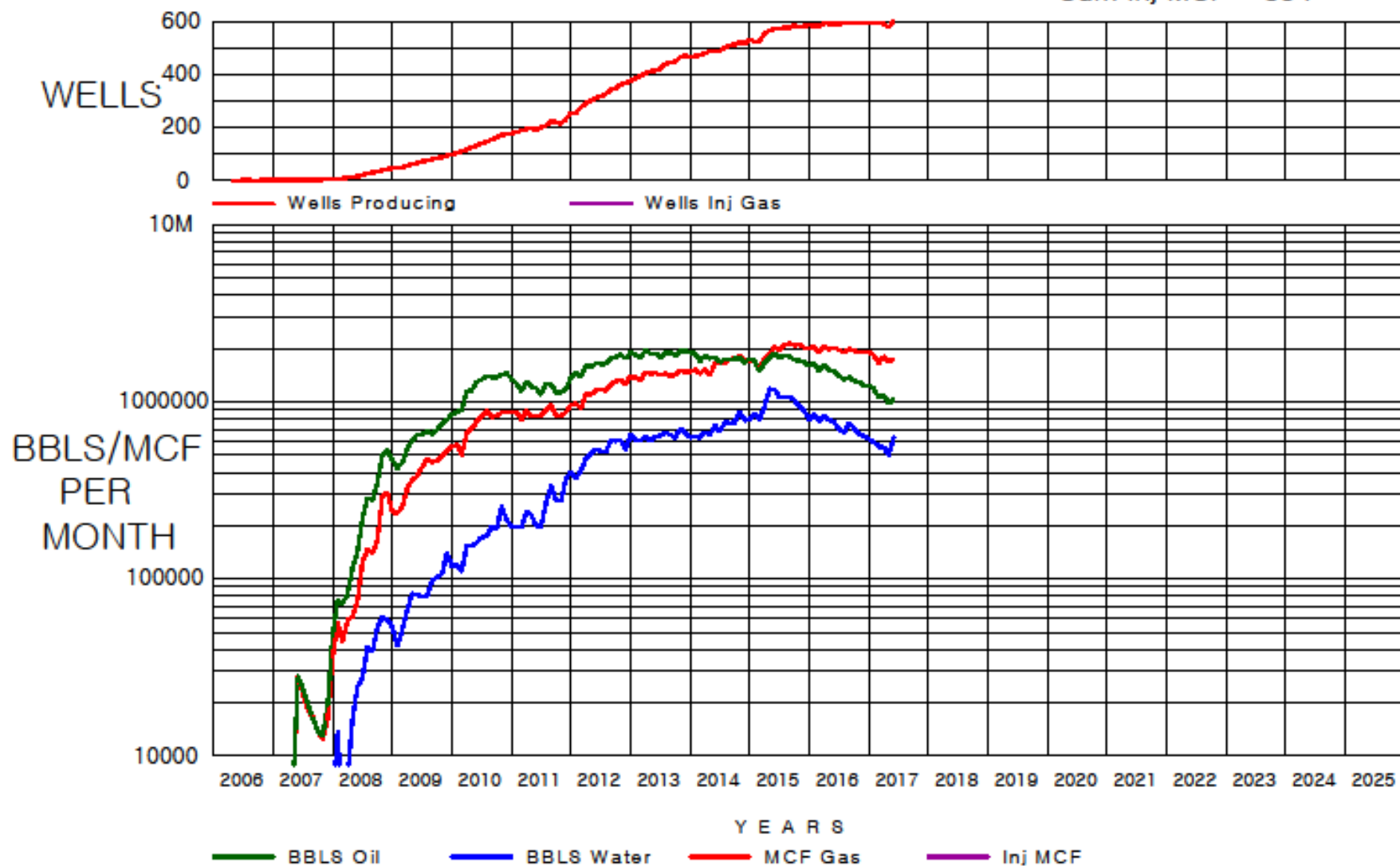
## North Dakota Gas-Oil Ratio





## S A N I S H - B A K K E N

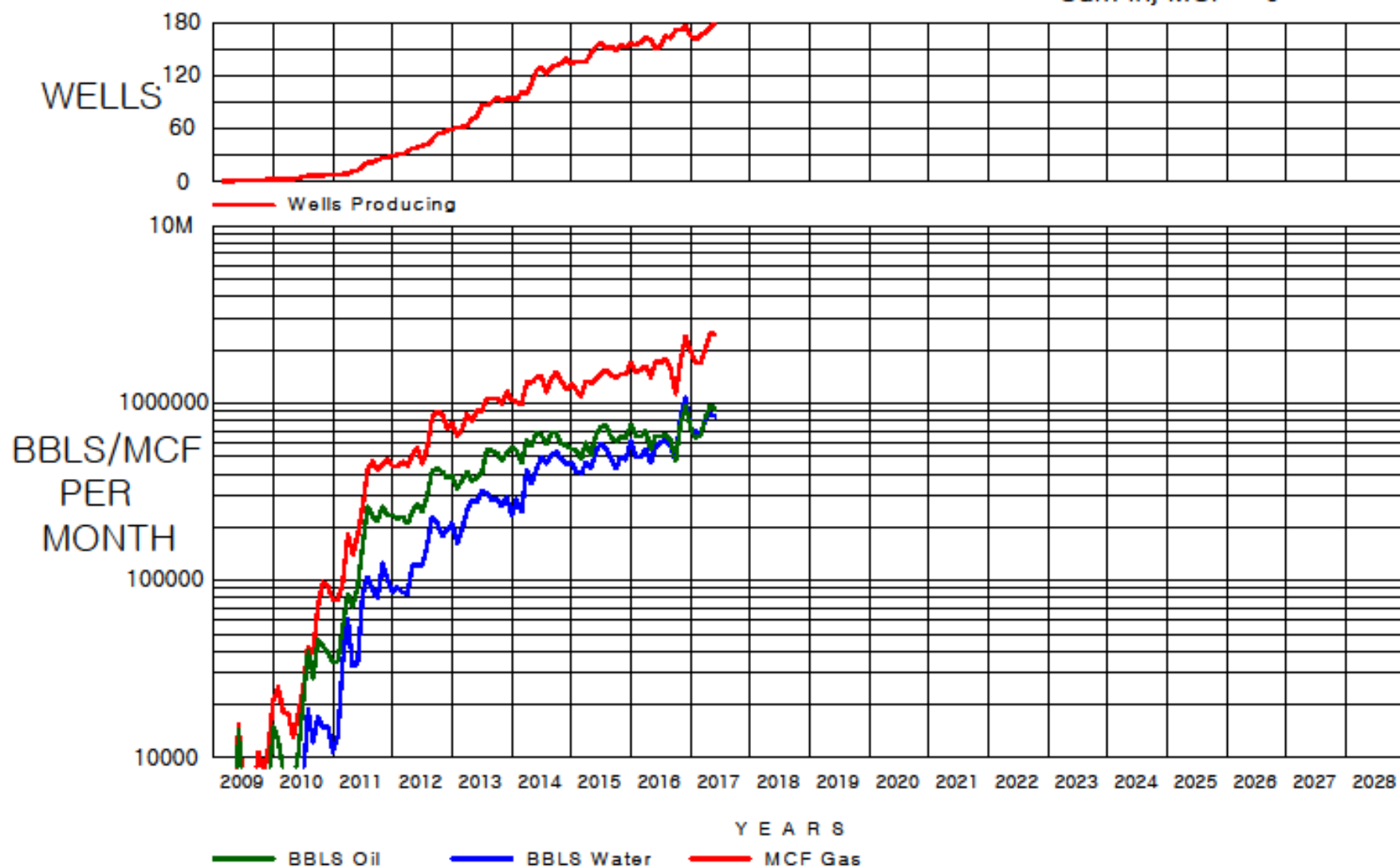
Cum Oil = 147307688  
Cum Water = 53054111  
Cum Gas = 133126306  
Cum Inj BBLS = 0  
Cum Inj MCF = 894





## BANKS - BAKKEN

Cum Oil = 38422430  
Cum Water = 28403534  
Cum Gas = 85587932  
Cum Inj BBLS = 0  
Cum Inj MCF = 0





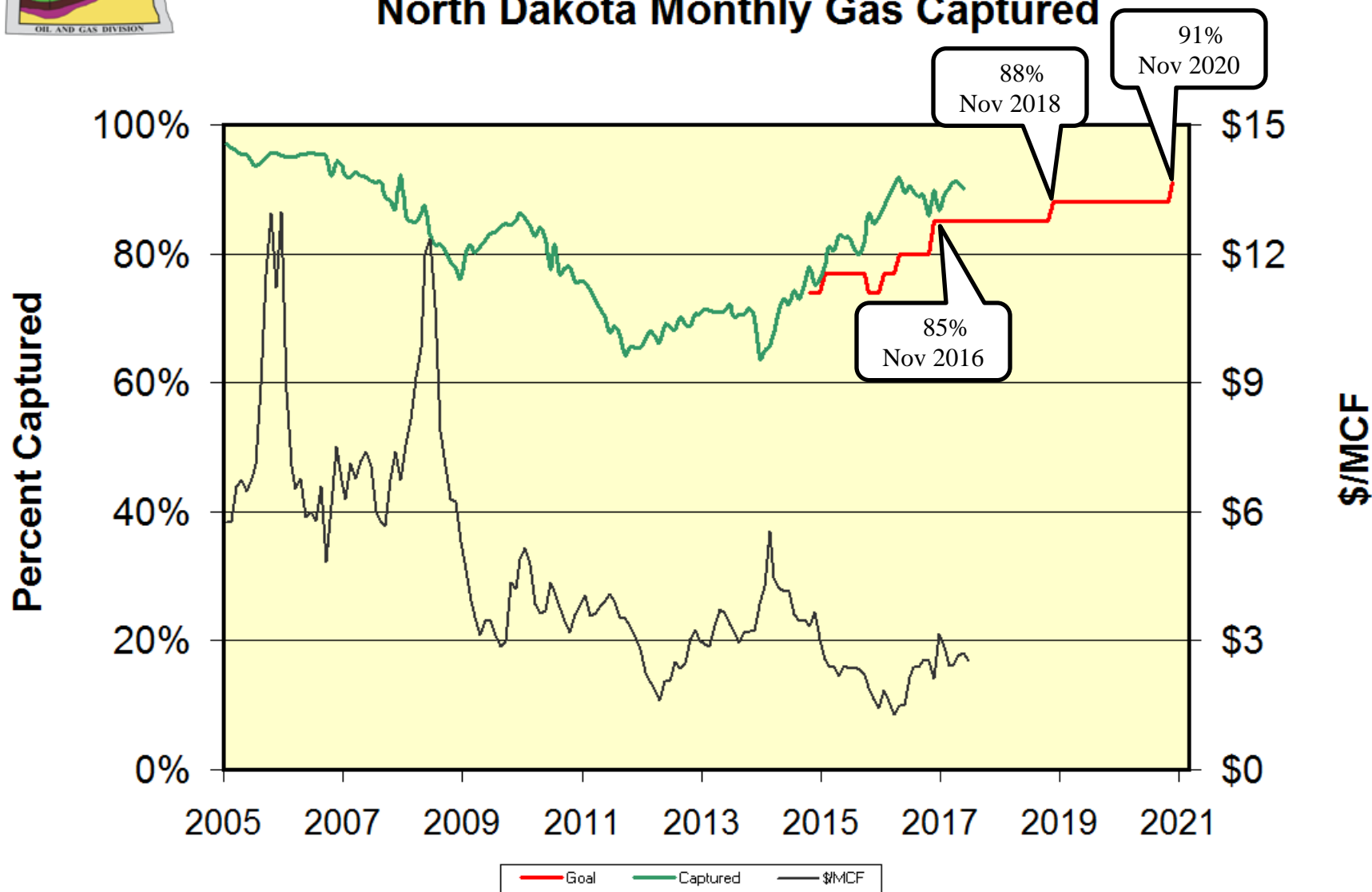
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## North Dakota Monthly Gas Captured

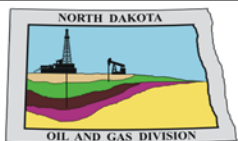




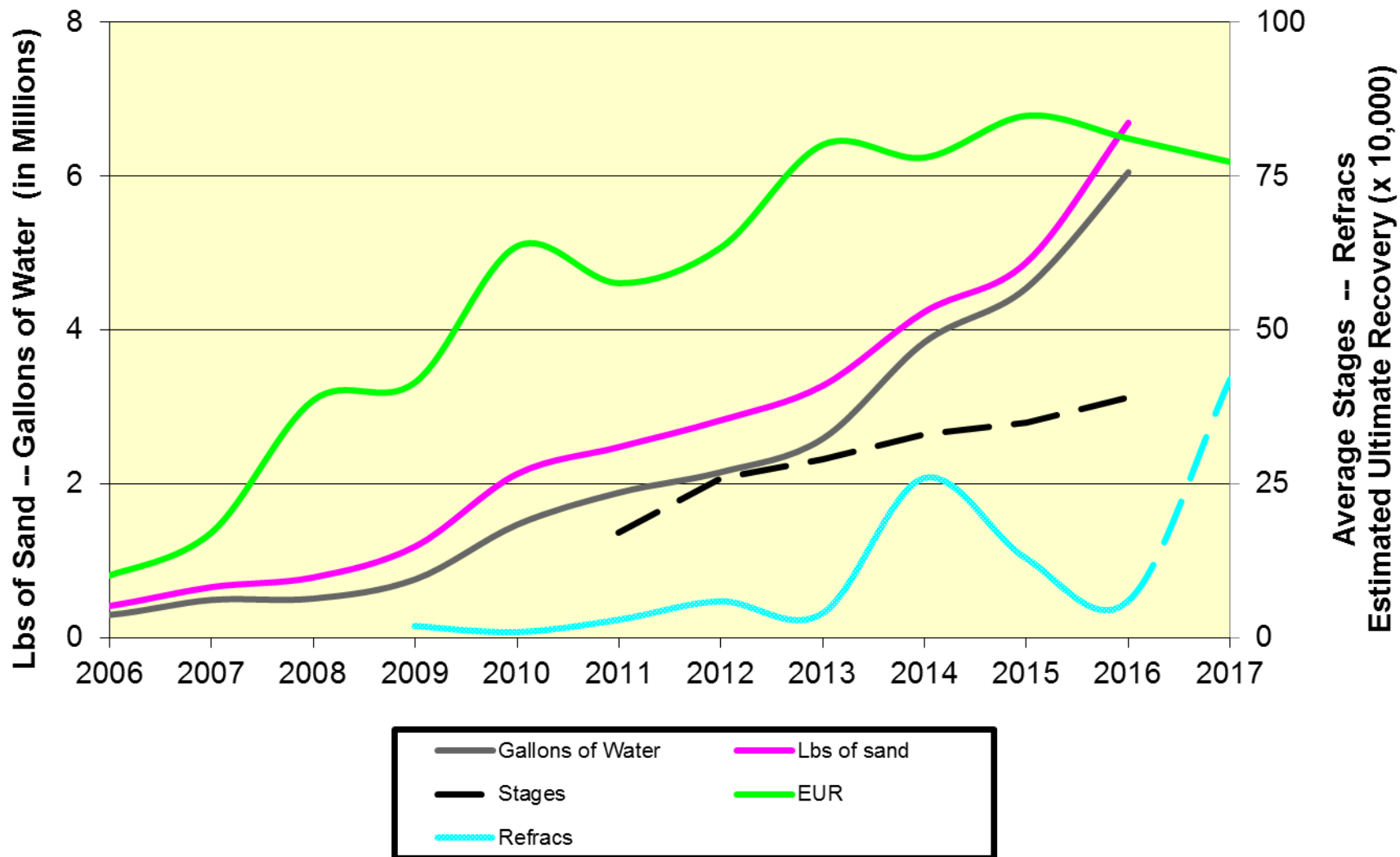
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## North Dakota Stimulations

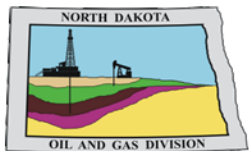




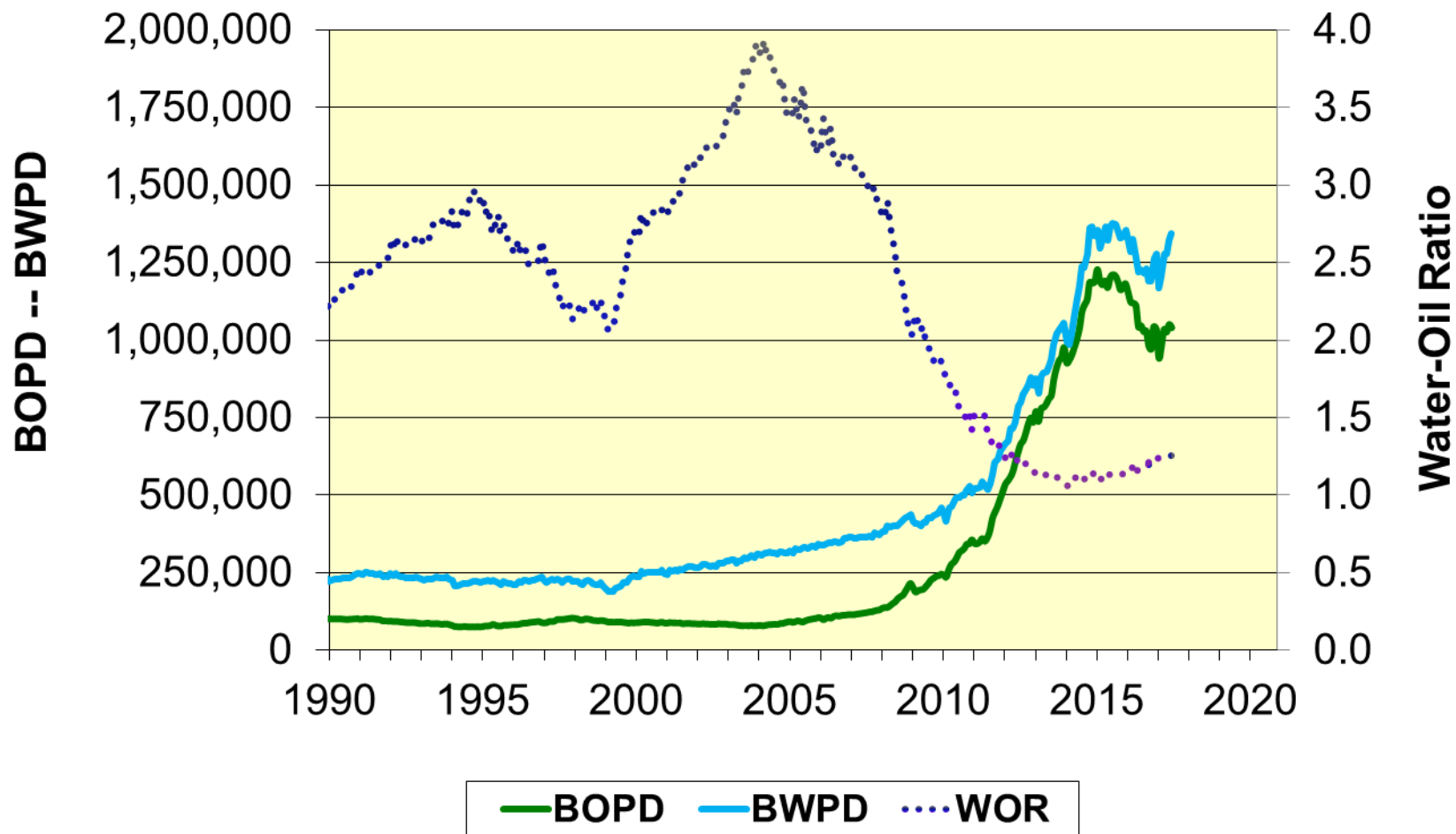
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## North Dakota Daily Oil and Water Production





# Oil and Gas Update

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# EERC—Phase I Study

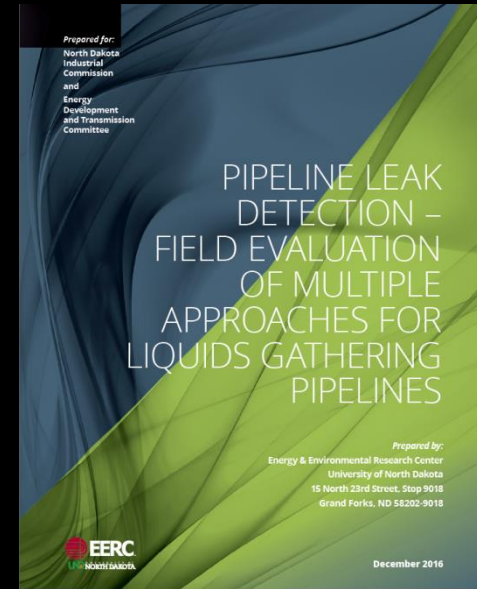
- HB 1358—Effective April 20, 2015
- Recommendations to NDIC
- December 1, 2015—EERC report published
- NDIC promulgated rules—effective January 1, 2017





# EERC—Phase II Study

- **HB 1358—Effective April 20, 2015**
- **Pipeline Leak Detection**
- **Field Evaluation of Liquid Gathering Pipelines**
- **December 30, 2016—EERC report published**





# **EERC—Phase III Study**

- **HB 1347—Effective July 1, 2017**
- **Leak detection and monitoring technology analysis**
- **Risk assessment of new + existing pipeline systems**
- **September 30, 2018—EERC report due**



# Western North Dakota Gathering Pipelines

Estimate 12,700 miles pre August 2011

+ 4,900 miles August 2011-December 2013

+ 2,650 miles per year 2014-mid 2017

= 26,875 miles thru mid 2017

= 36,000 miles projected to 2020



14,000+ miles within OGD database



# Bakken/Three Forks EOR Potential

- **Pilot projects**
  - CO<sub>2</sub> injection
  - water injection
  - projects small-scale and usually inconclusive
  - ethane injection encouraging in lab
  - further testing must be conducted
- **> 300 billion barrels OOIP**
  - every 1% of EOR = 3 billion barrels

(note: cum oil prod from 1951-2016 = 3.8 bil bo)

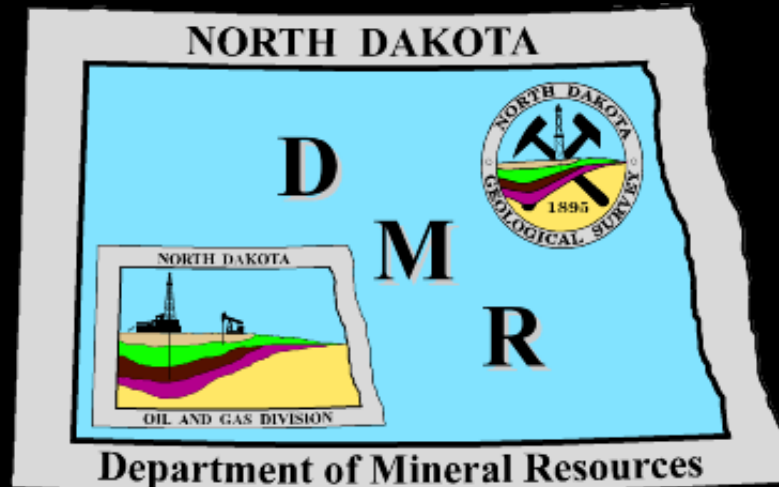


# **Bakken Takeaways**

- **Multi-well pads allow batch drilling**
- **Rig efficiency = more wells / rig**
- **SI + NC wells = near term prod increase**
- **GOR increasing = more gas issues**
- **Stimulation improvements = higher EUR**
- **WOR increase = disposal + pipeline needs**
- **Bakken EOR Potential**



# North Dakota Department of Mineral Resources



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

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