SHALE GAS EXTRACTION, OIL, AND TRANSPORTATION SAFETY

Charlotte, NC-March 17, 2016



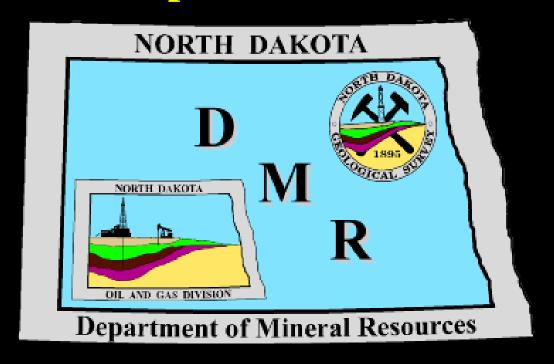


North Dakota Shale Oil Extraction and Transportation Safety

- Resource Play
- Development
- Bakken Results
- Oil Conditioning

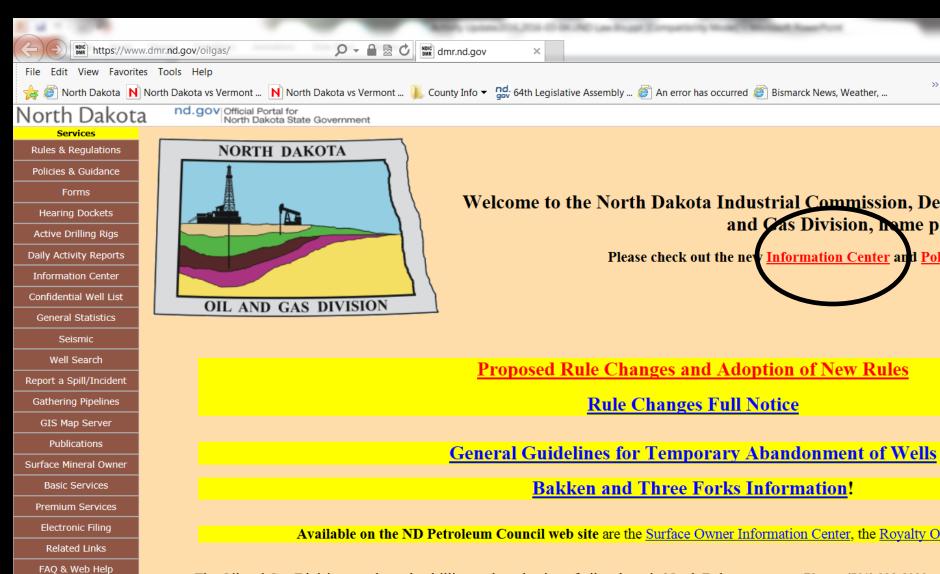
Bruce E. Hicks Assistant Director NDIC-DMR-OGD Bismarck, ND

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



Available on the ND Petroleum Council web site are the Surface Owner Information Center, the Royalty O

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.

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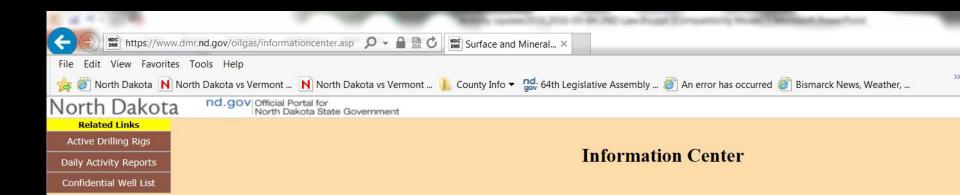












The Director's Cut is an update on current activity in the North Dakota oil patch from the Director of the Department of Mineral Resources.

ut Dates

Director's Cut - 02/17/2016 **Director's Cut Archive**

Director's Cut Webinars

Recent Presentations

View press releases from the Oil and Gas Division

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

[DMR Home] [Disclaimer] [Privacy] [Security] [Feedback]

















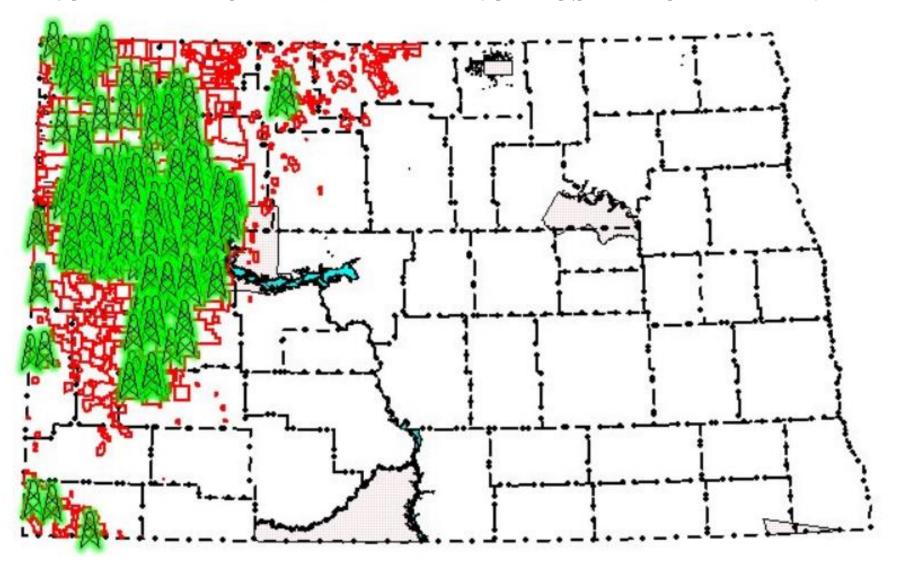






- Resource Play
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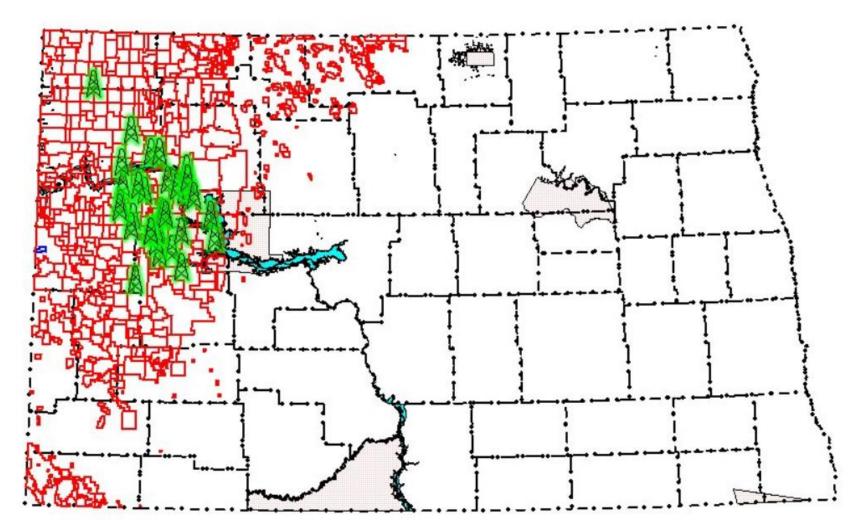
NORTH DAKOTA – 191 DRILLING RIGS – DECEMBER 2014



Current drilling activity is focused

in Mountrail, Dunn, McKenzie, and Williams Counties.

NORTH DAKOTA – 35 DRILLING RIGS – MARCH 2016



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 1,320' Pilot 660' Pilot Bakken Fm BAKKEN TF1 Three Forks Fm TF4 1 MILE 3 project areas 4 project areas

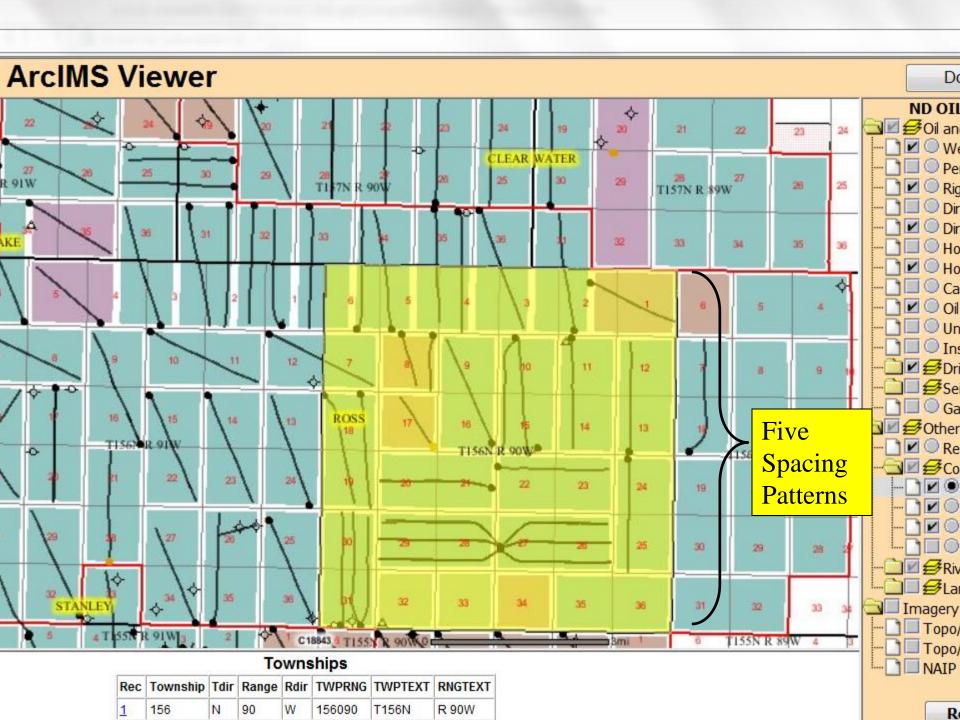
660 ft. same-zone spacing

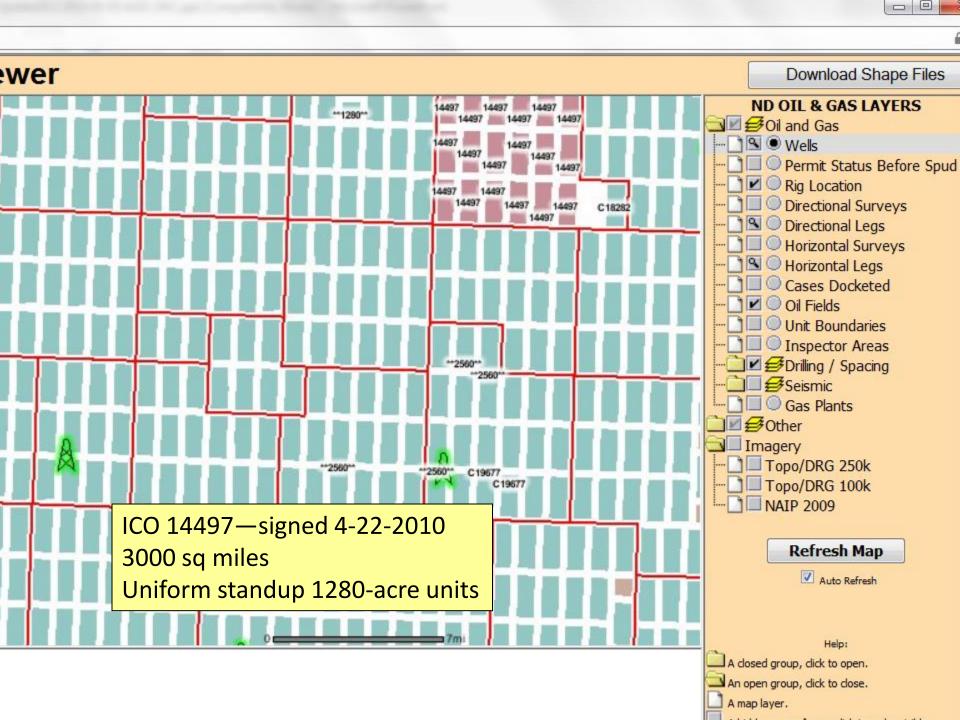
31 new wells (gross)

1,320 ft. same-zone spacing

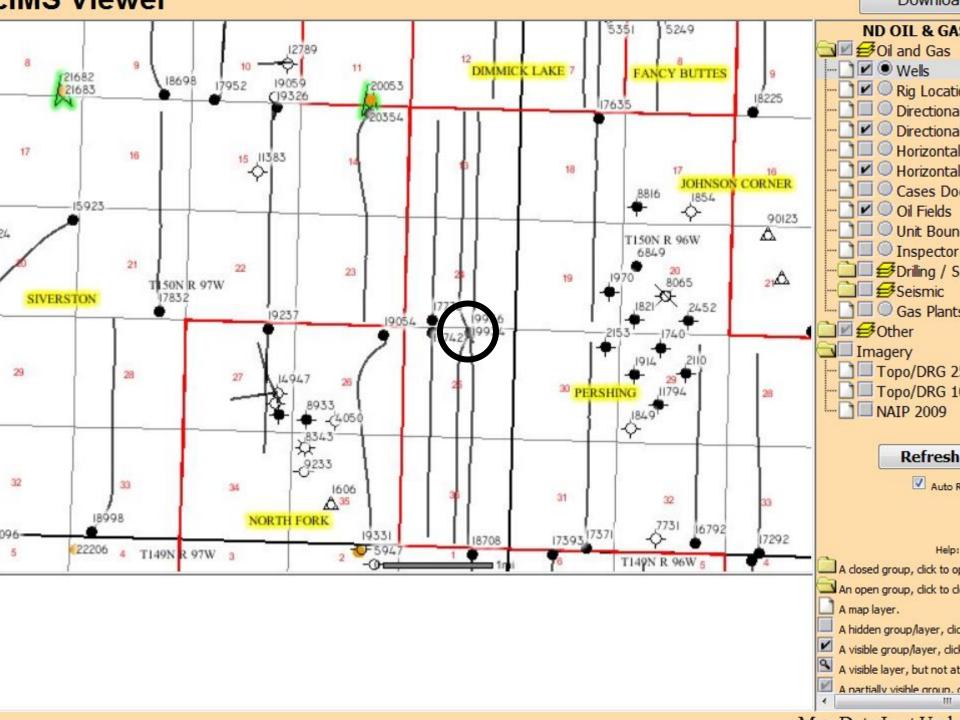
34 new wells (gross)

- Resource Play
- Development
 - Uniform Spacing—orderly development
 - Multi-well locations—small footprint
 - Energy Corridors—industry & residents
- Bakken Results
- Oil Conditioning



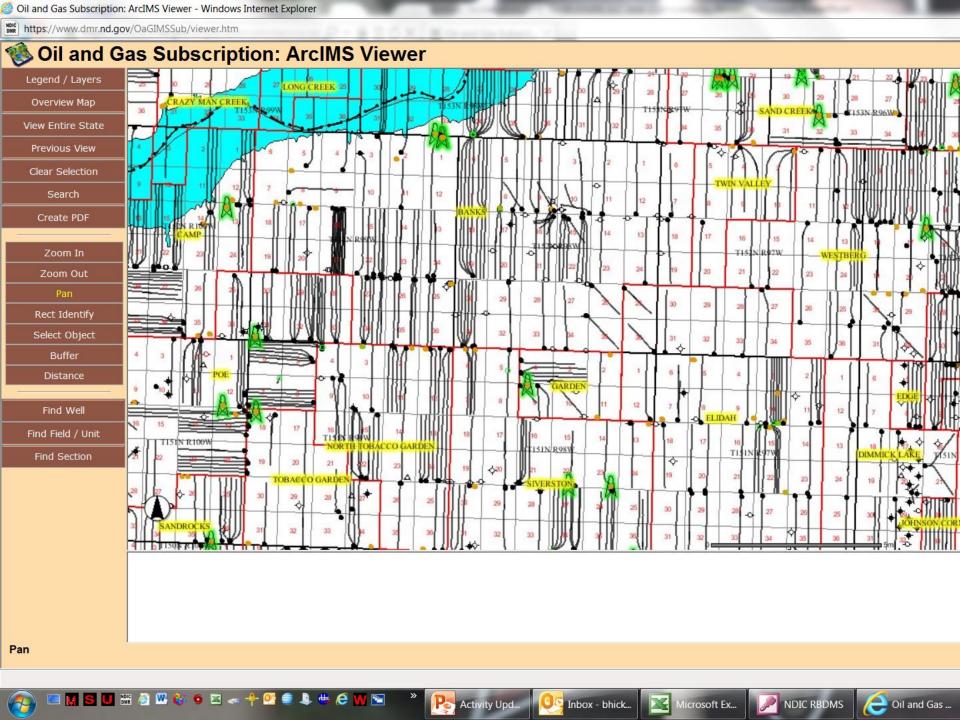


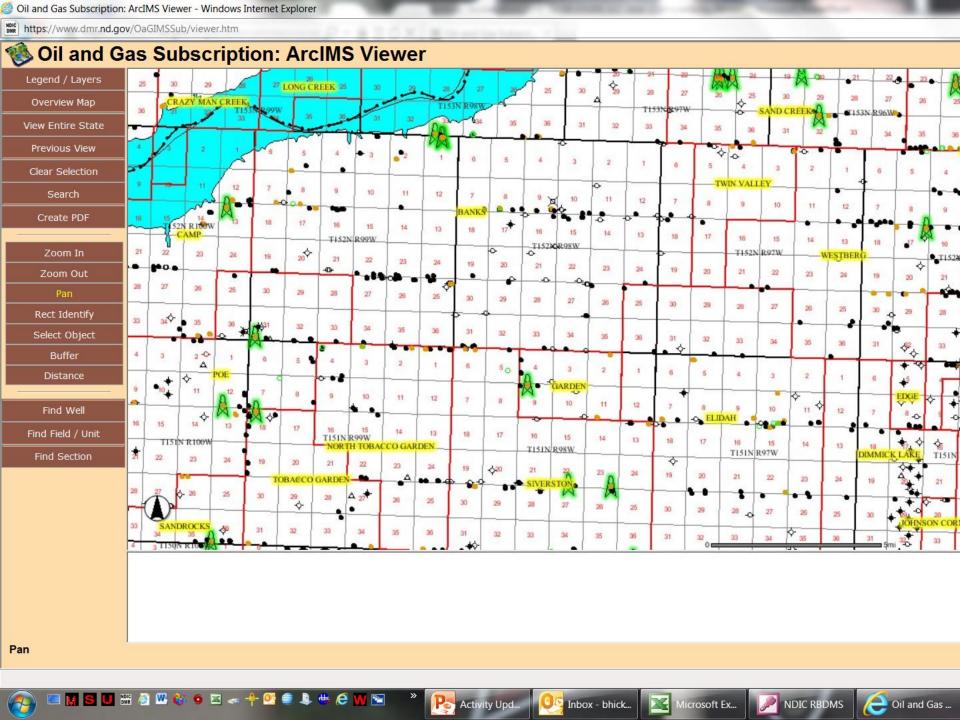
- Resource Play
- Development
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 - Multi-well locations—small footprint
 - Energy Corridors—industry & residents
- Bakken Results
- Economic & Fiscal Impact

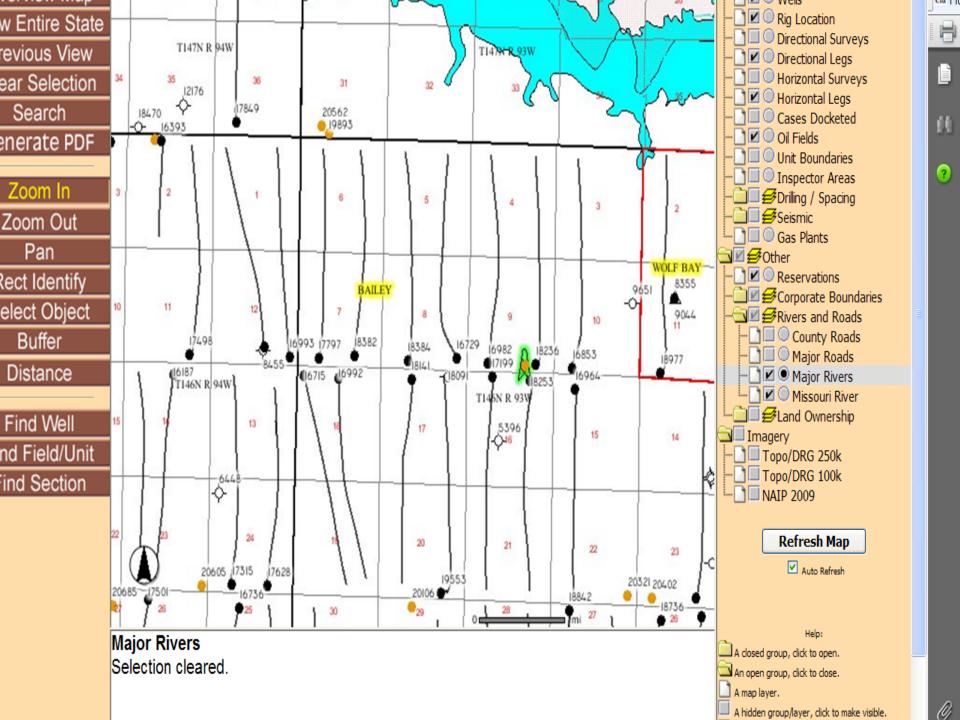


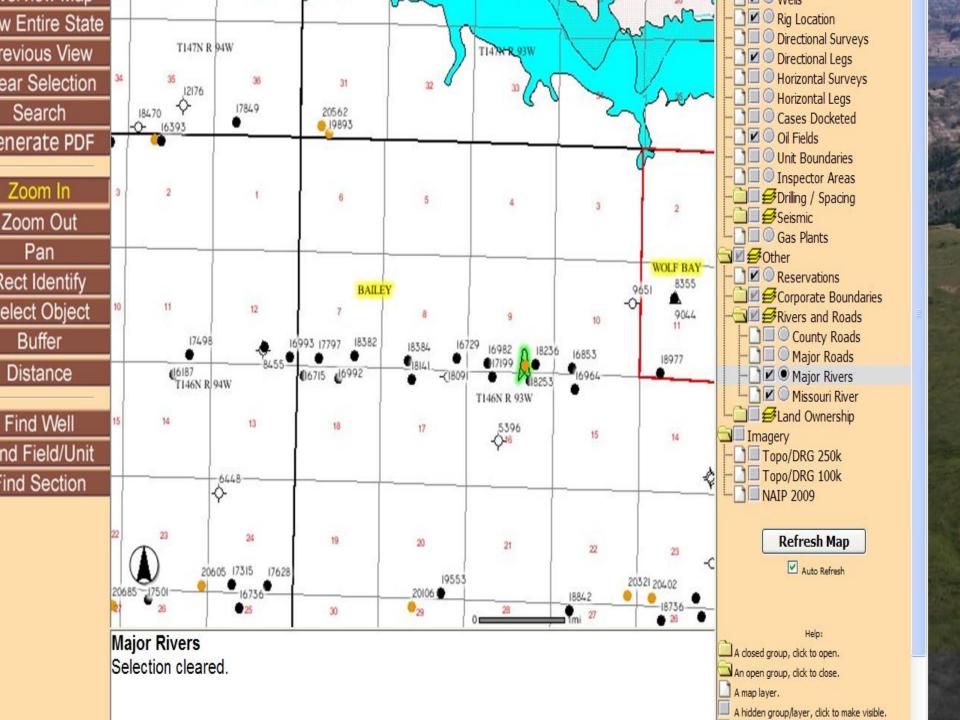


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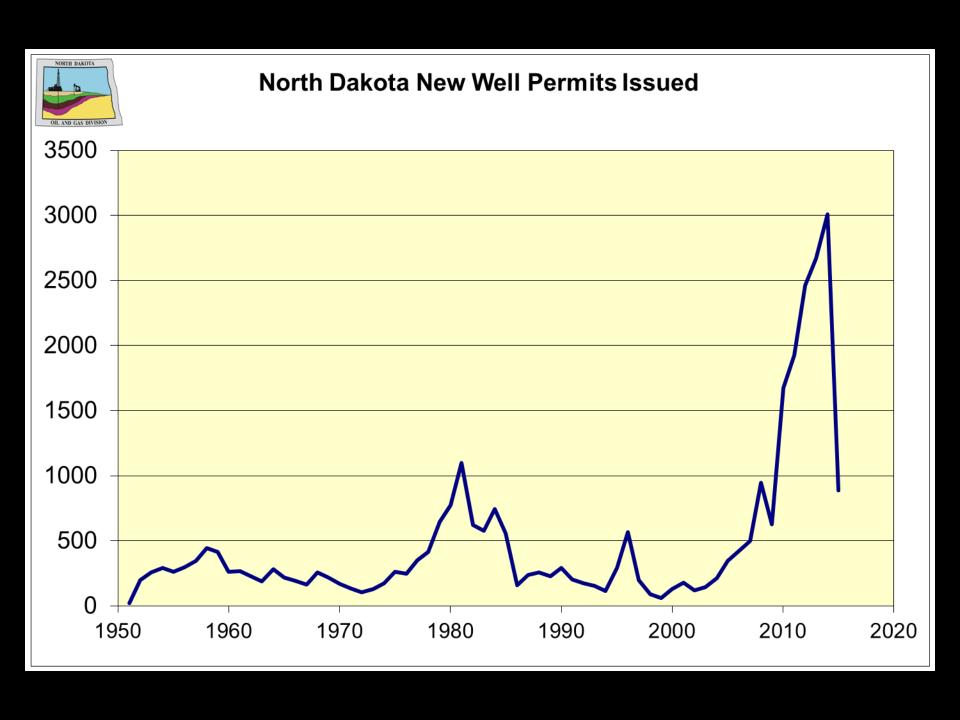




- Resource Play
- Development
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- Oil Conditioning

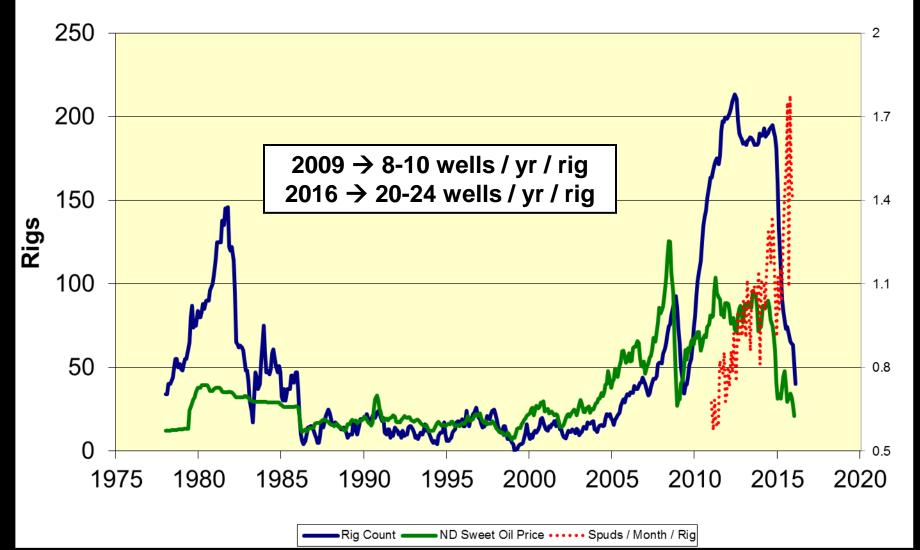
WELLS

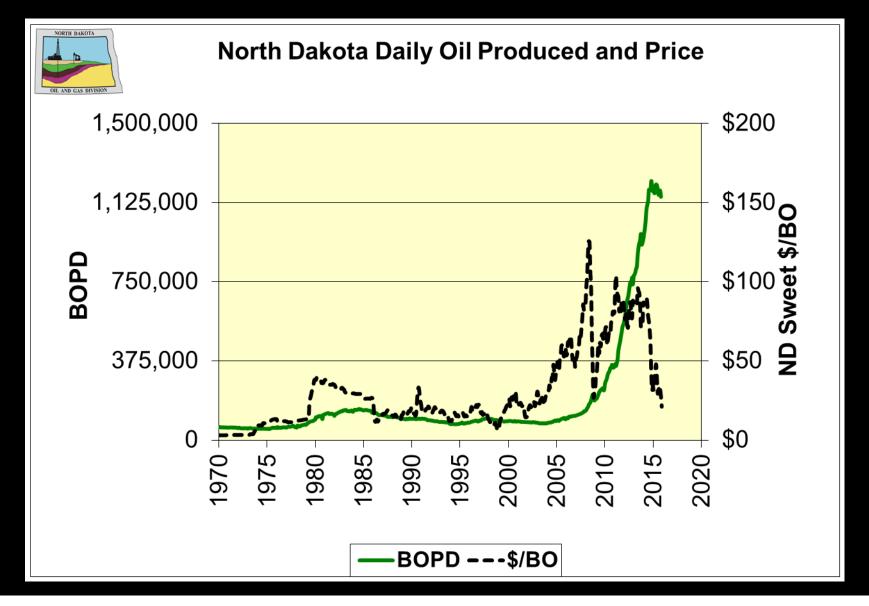
- 13,119 wells currently producing
 - 10,756 Bakken
- •40,000 additional development wells
 - 100 rigs another 20 years
- Bakken Pool: 4 targets = more wells



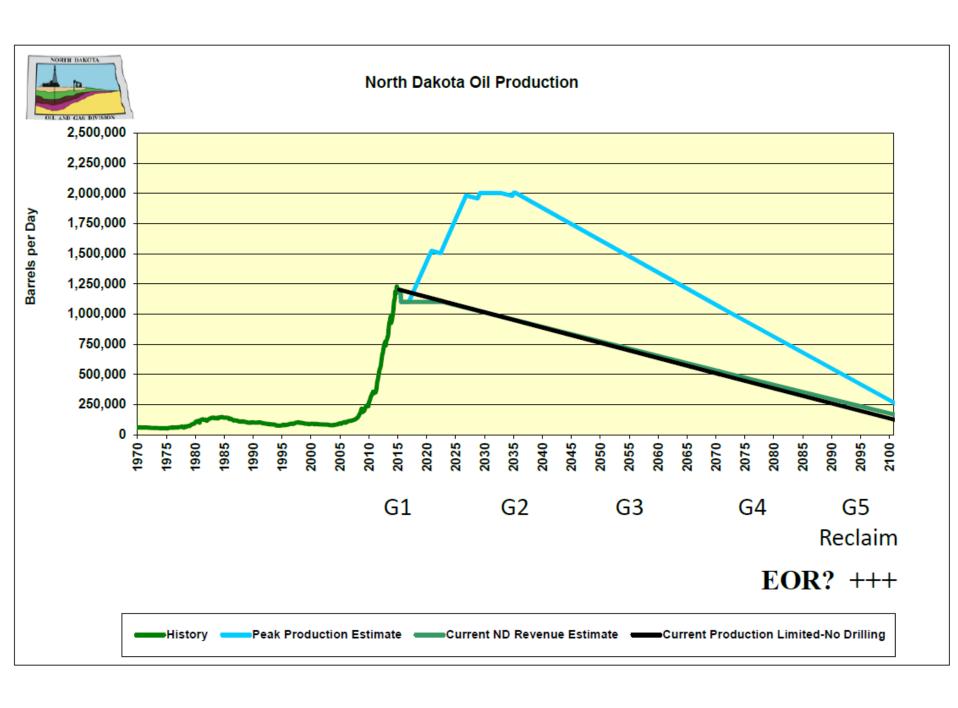


North Dakota Average Monthly Rig Count

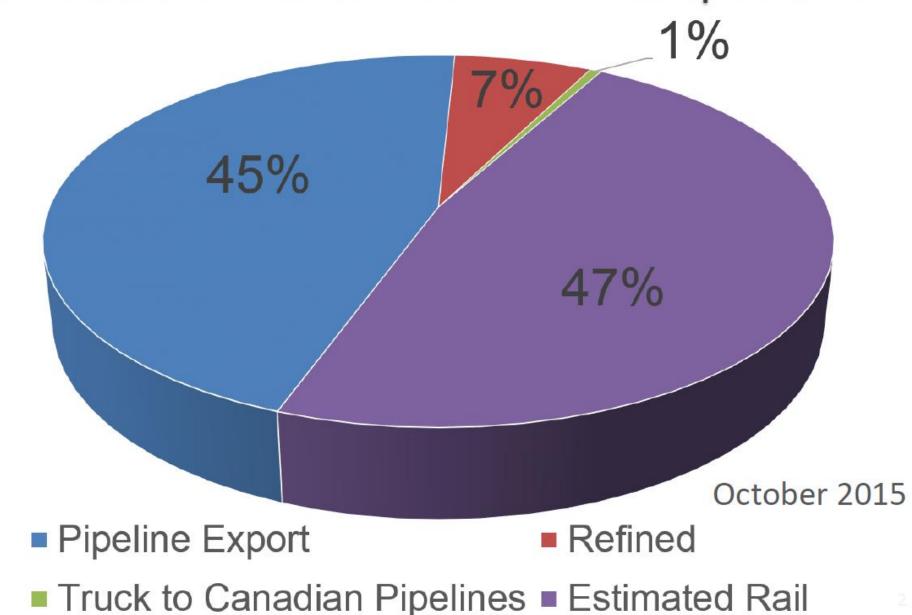




Dec Production 1,152,280 bopd (appr 1,096,044 Bakken—95%)



Estimated Williston Basin Oil Transportation





- Resource Play
- Development
- Bakken Results
- Oil Conditioning

- Case 23084
 - Heard 9-23-2014
 - Called on IC motion
 - Bakken Petroleum System crude oil
 - Conditioning Standards
 - Improve Transportation Safety
 - Improve Marketability of oil
 - Noticed in all Counties w/BPS crude

- Case 23084
 - Hearing 9-23-2014
 - Written comments from 8 organizations/companies
 - Written comments from 6 concerned citizens
 - Oral comments from 16 organizations/companies
 - 4.5 hrs of testimony
 - Working draft order posted 11-13-2014
 - IC allowed comments thru 11-19-2014
 - Written comments from 19 organizations/companies
 - Written comments from 5 concerned citizens

- ICO 25417—effective 4-1-2015
 - Utilize separator and/or heater treater
 - $\leq 50 \text{ psi} + \geq 110^{\circ} \text{F}$
 - > 50 psi + \geq 110°F \rightarrow vapor recovery system
 - VRS must remove tank vapors + positive tank press
 - Other psi / temp \rightarrow quarterly VPCR₄ \leq 13.7 psi
 - No separator / heater treater
 - IC hearing
 - Deliver oil with VPCR₄ ≤ 13.7 psi @ custody transfer (or)
 - Safe transport to oil conditioning or stabilization plant
 - Prohibit blending w/liquids prior to CT
 - Rail facility notify IC of fed oil safety violations

- VPCR₄ Testing
 - Oil samples per ASTM D3700 or ASTM D5842
 - Testing per ASTM D6377
 - Quarterly
 - Sundry Notice followup
 - Due 15 days after test
 - Screen shot or printout of VPCR₄ test
 - Operating capacities, press, and temp of equip

• VPCR₄ Testing

- Rec'd 11,566 test results to date
 - 99.6% in compliance
 - 43 not in compliance—further conditioning necessary
 - Can not transport oil
 - Bring into compliance within 48 hrs
 - » Recondition thru equip and retest VPCR₄
 - » Recondition thru equip set to correct temp/press
- NDIC inspections
 - Separator and heater treaters
 - Oil sampling
 - Processing Sundries

