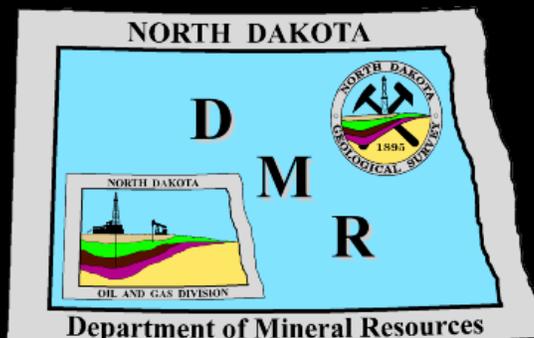


North Dakota Department of Mineral Resources

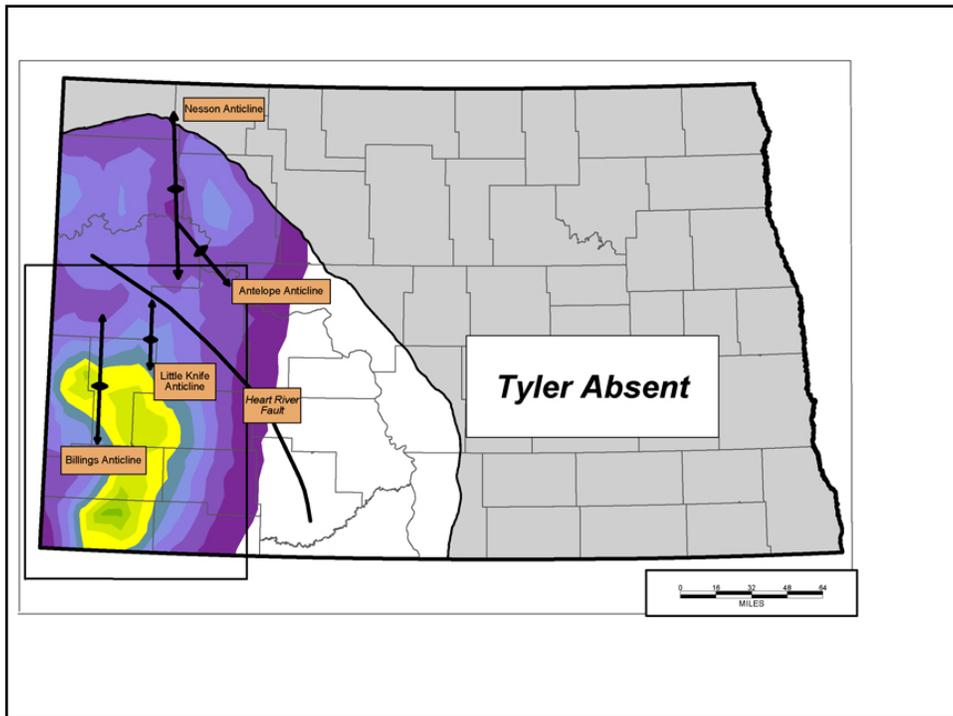
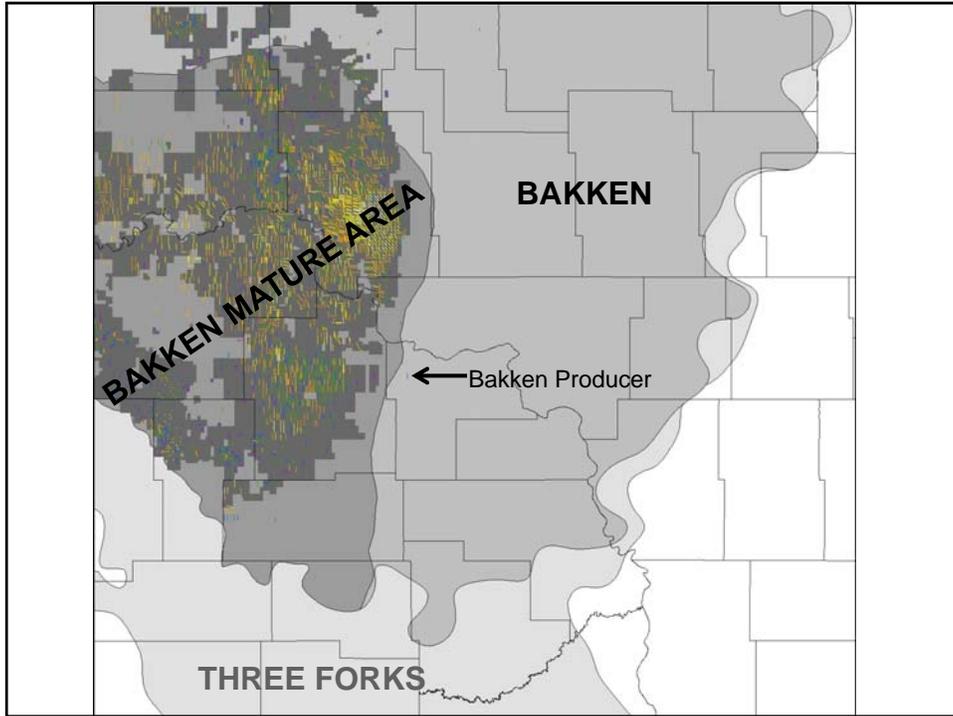


<http://www.oilgas.nd.gov>

<http://www.state.nd.us/ndgs>

**600 East Boulevard Ave. - Dept 405
Bismarck, ND 58505-0840
(701) 328-8020 (701) 328-8000**

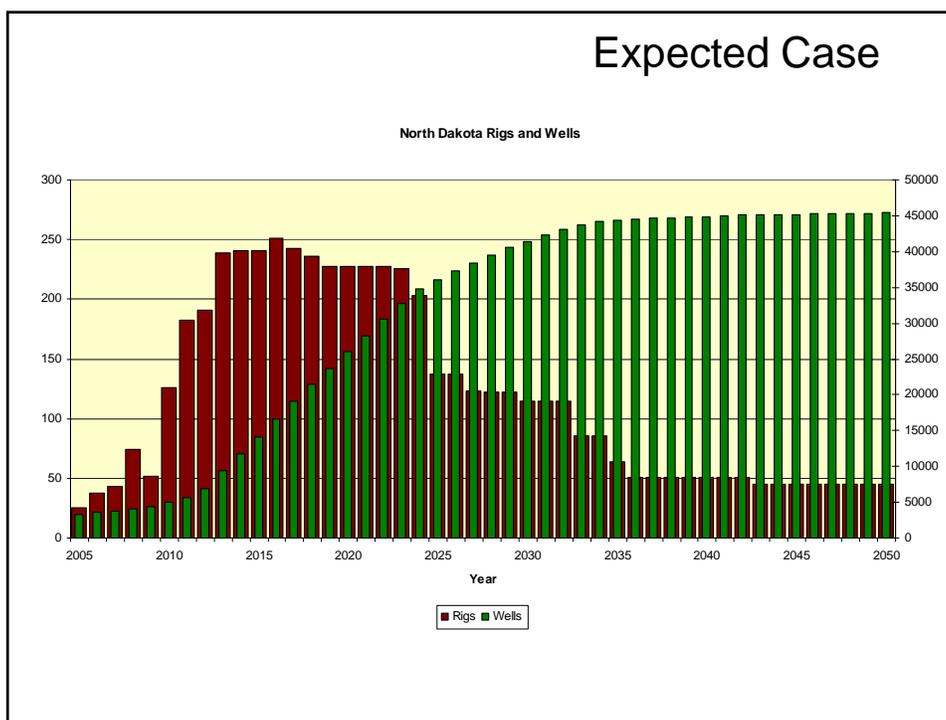


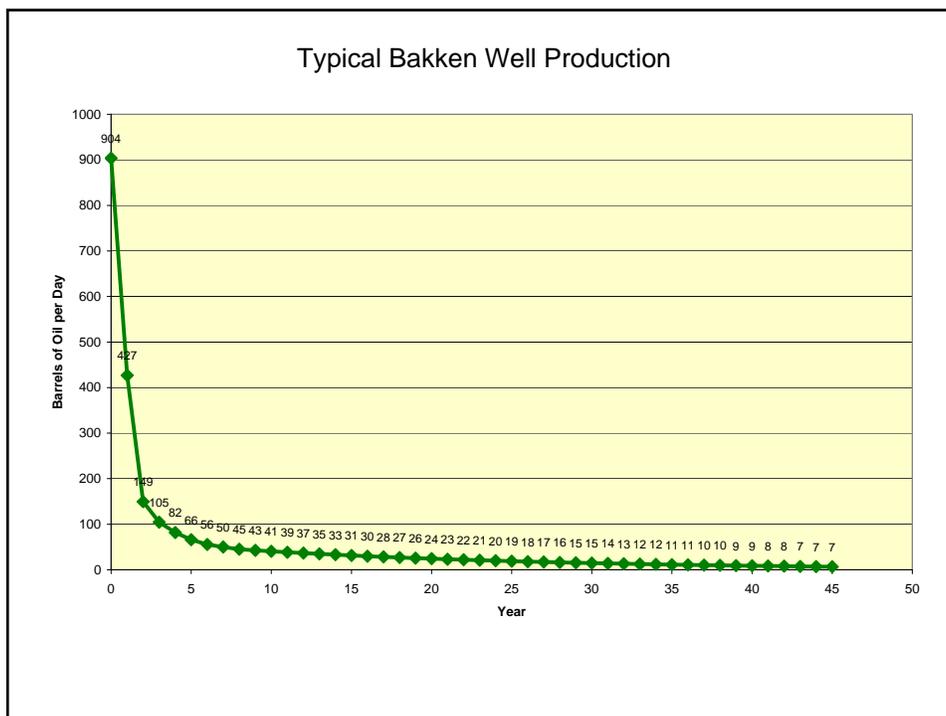


Western North Dakota

- 1,800 to 3,000 wells/year = 2,000 expected
 - 150-250 rigs = 12,000 – 30,000 jobs
 - Another 10,000-15,000 jobs building infrastructure
 - 200 rigs can drill the wells needed to secure leases in 1 year
 - 200 rigs can drill the wells needed to develop spacing units in 18 years
 - 35,000-40,000 more new wells

Expected Case





What Does Every New Bakken Well Mean to North Dakota

A typical 2012 North Dakota Bakken well will produce for 45 years

If economic, enhanced oil recovery efforts can extend the life of the well

In those 45 years the average Bakken well:

Produces approximately 615,000 barrels of oil

Generates about \$20 million net profit

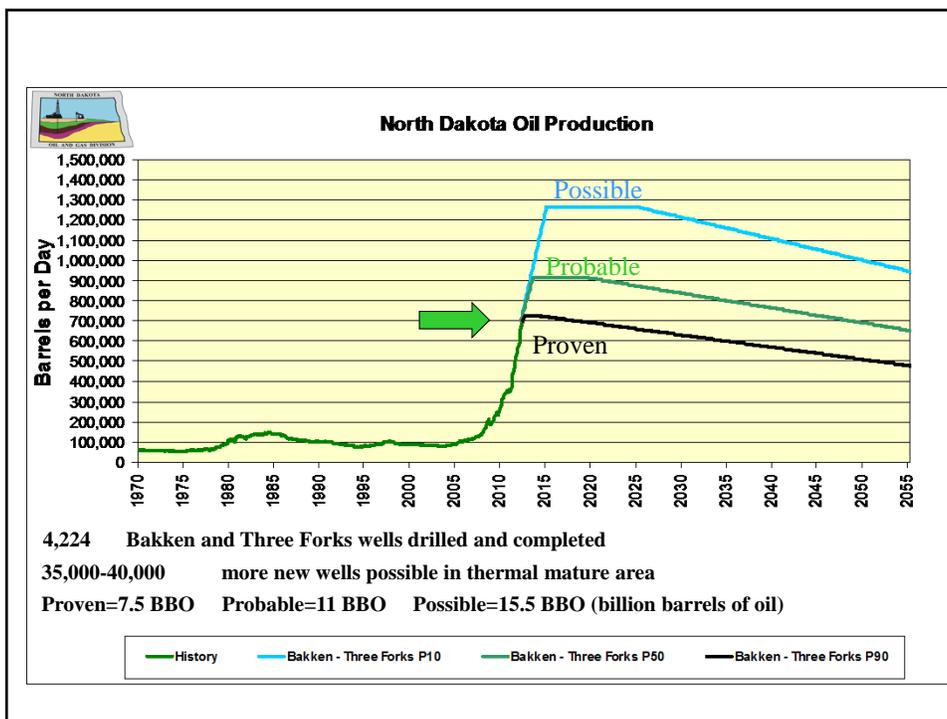
Pays approximately \$4,325,000 in taxes
 \$2,100,000 gross production taxes
 \$1,800,000 extraction tax
 \$425,000 sales tax

Pays royalties of \$7,300,000 to mineral owners

Pays salaries and wages of \$2,125,000

Pays operating expenses of \$2,300,000

Cost \$9,000,000 to drill and complete



PROPPANT PROJECT



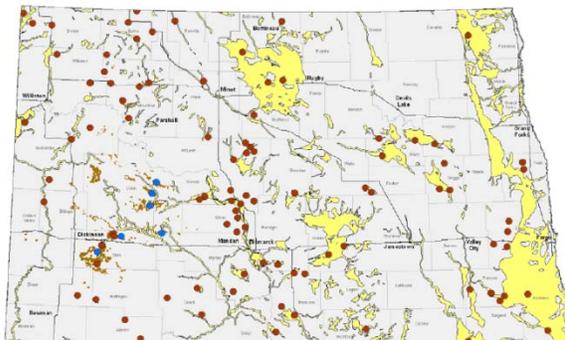
Photomicrograph of sand grains collected in McHenry County.



Photomicrograph of ceramic proppant from a batch that was used in a Bakken well in North Dakota. This proppant was manufactured in China.

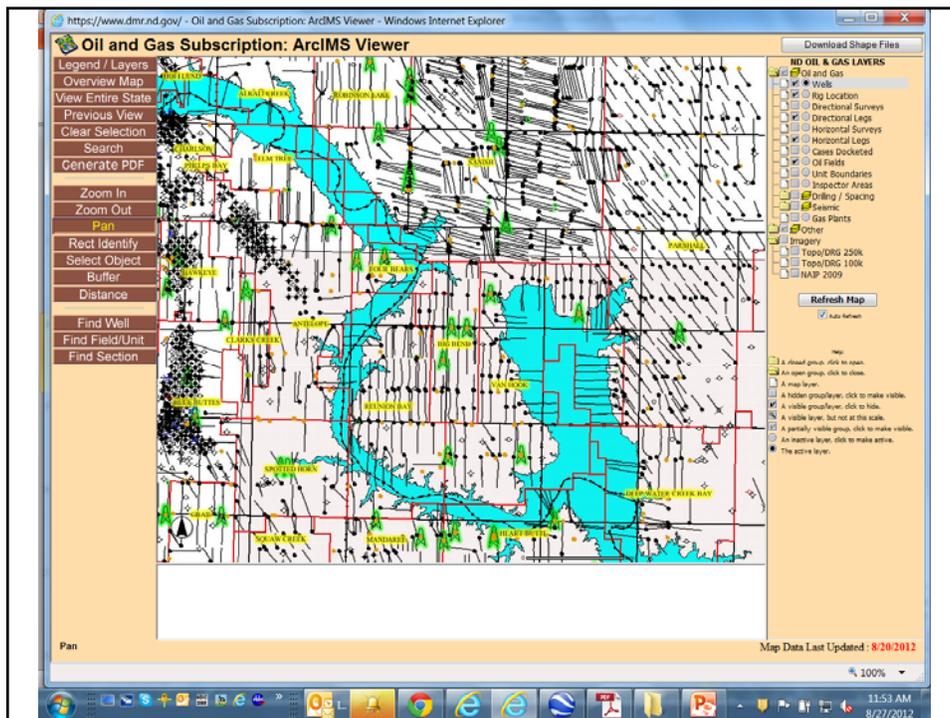
Millions of tons of sand and ceramic proppants are used every year in the Williston Basin, part of a multi-billion dollar industry. The Geological Survey has collected 125 sand samples throughout the state in our search for deposits that could be utilized for oil and gas proppants in the well fracing process. We are in the process of performing preliminary analysis on those samples to determine if any would fit the proppant criteria. We have also collected clay samples and will be testing those samples for their kaolin content to determine their suitability in the manufacturing of ceramic proppants.

Under the second phase of this project, the ten most promising sand samples will undergo full ISO analysis (including bulk density, specific gravity, crush resistance, etc), mineralogy (XRD), and stack conductivity analysis to determine which are the most suitable proppant candidates and we will continue to evaluate the clay beds.



Locations of sand samples (red dots) and clay samples (blue dots) collected during this study. The areas in yellow are known sand deposits and the areas in brown are kaolinitic claystones within the Golden Valley Formation.

The North Dakota Way





Vern Whitten Photography

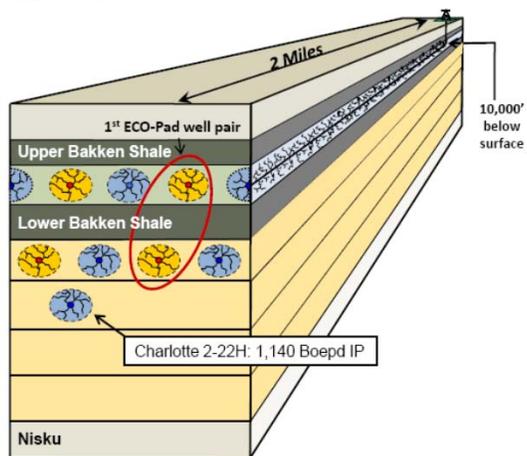
Six Wells on a Single Pad



Vern Whitten Photography

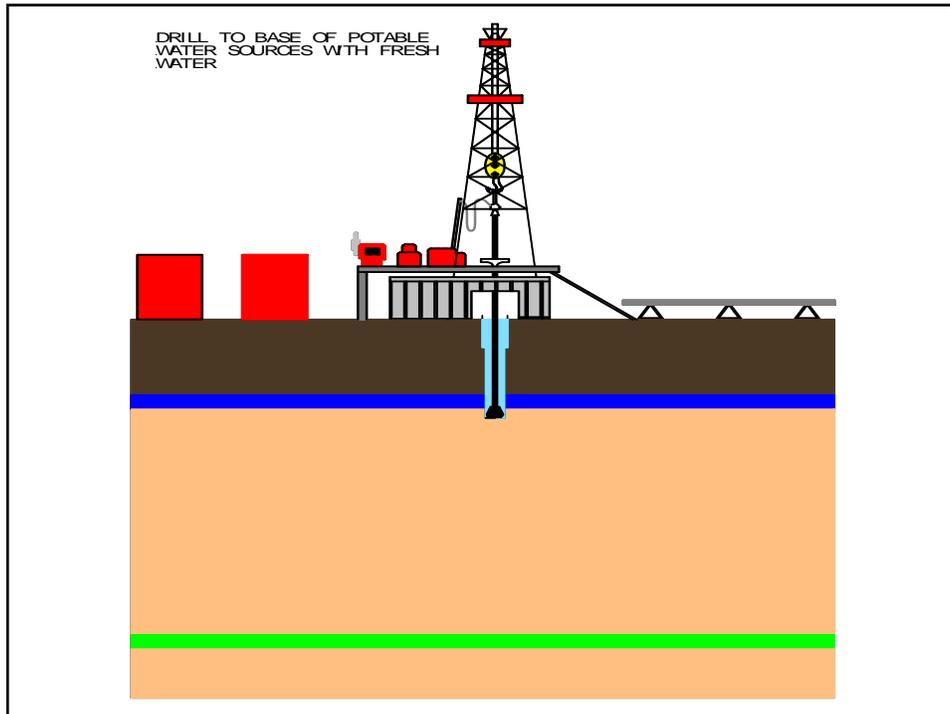
Bakken Development Plan

- 🔥 Original dual-zone development plan
 - 8 wells per 1,280 acres – 4 MB, 4TF
 - 603,000 Boe EUR per well (avg. 24.5 stages/completion)
 - ECO-Pad® design: 2 wells south, 2 wells north
- 🔥 Additional Three Forks potential



Oil and gas well locations are built (stockpiling top soil and lining reserve pits) to make reclamation easier.

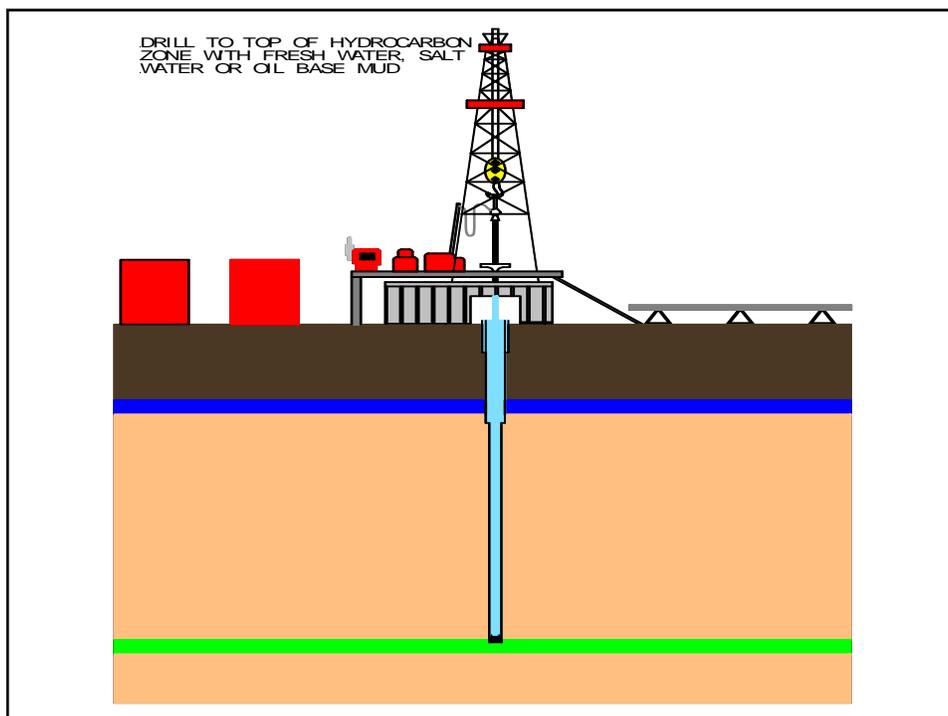




TYPICAL HORIZONTAL OIL WELL

Potable Waters  9-5/8" in 13.5" Hole

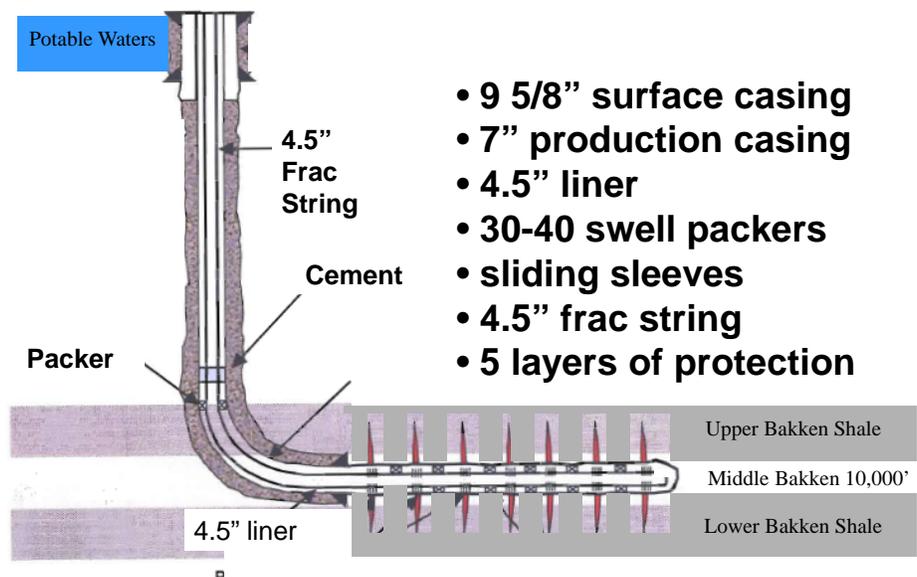
- Drill with fresh water
- Total depth below lowest potable water
- Run in hole with surface casing
- 1st layer of surface water protection
- Cement casing back to surface of ground
- 2nd layer of surface water protection



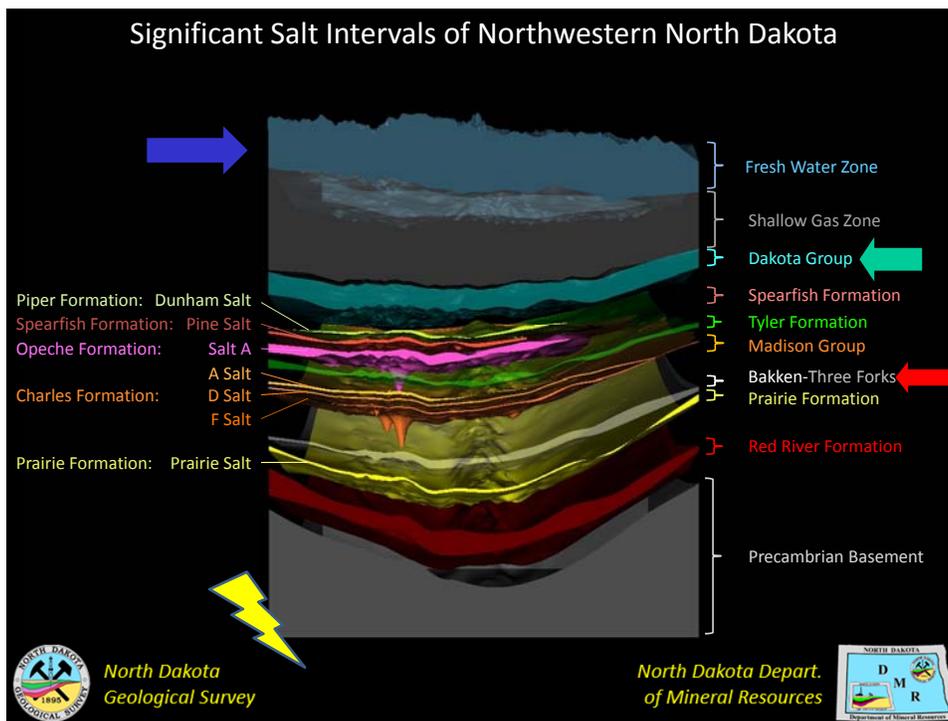




TYPICAL HORIZONTAL OIL WELL



- 9 5/8" surface casing
- 7" production casing
- 4.5" liner
- 30-40 swell packers
- sliding sleeves
- 4.5" frac string
- 5 layers of protection



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Frac Focus
Chemical Disclosure Registry

HYDRAULIC FRACTURING
HOW IT WORKS

GROUNDWATER
PROTECTION

CHEMICAL
USE

REGULATIONS
BY STATE

FIND A WELL
BY STATE

FREQ
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Find a Well

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Next Page

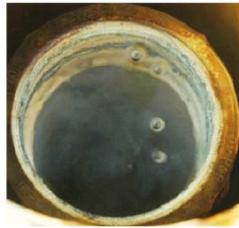
Page of 5 [Go](#)

API No.	Job Date	State	County	Operator	WellName	Well Type	Latitude	Longitude	Datum	
	33-025-01132	4/13/2011	North Dakota	Dunn	XTO Energy/ExxonMobil	Alwin Federal 12X-19	Oil	47.627564	-102.967017	NAD83
	33-105-01913	4/18/2011	North Dakota	Williams	XTO Energy/ExxonMobil	Lonnie 31X-3	Oil	48.196639	-102.880264	NAD83
	33-105-01824	5/14/2011	North Dakota	Williams	XTO Energy/ExxonMobil	Allen 21X-17	Oil	48.254792	-103.058819	NAD83
	33-105-01825	4/28/2011	North Dakota	Williams	XTO Energy/ExxonMobil	Woodrow 34X-32	Oil	48.198603	-103.053617	NAD83
	33-053-03113	3/22/2011	North Dakota	Mc Kenzie	XTO Energy/ExxonMobil	101 Federal 21X-24	Oil	47.546178	-104.000694	NAD83
	33-105-01948	2/26/2011	North Dakota	Williams	XTO Energy/ExxonMobil	Normark 24X-31	Oil	48.460233	-103.008811	NAD83
	33-105-01899	2/17/2011	North Dakota	Williams	XTO Energy/ExxonMobil	Michael State 31X-16	Oil	48.167464	-103.031950	NAD83
	33-025-01165	5/9/2011	North Dakota	Dunn	Marathon Oil	Lucky Fleckenstien #34-20H	Oil	47.264306	-102.330608	NAD83
	33-025-01173	5/3/2011	North Dakota	Dunn	Marathon Oil	Wardner #24-35H	Oil	47.245872	-102.445641	NAD83

SHALLOW GAS PROJECT



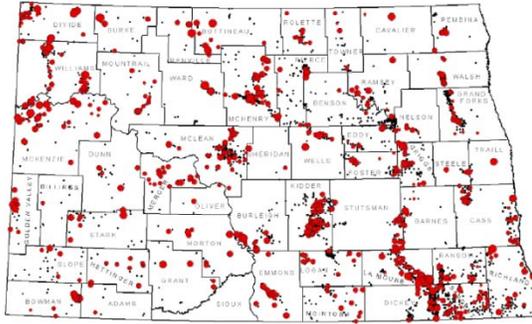
The Geological Survey tested 4,325 NDSWC monitoring wells for methane in 52 of the 53 counties in North Dakota from 2006-2010.



Methane bubbling to the surface in a two-inch NDSWC monitoring well.

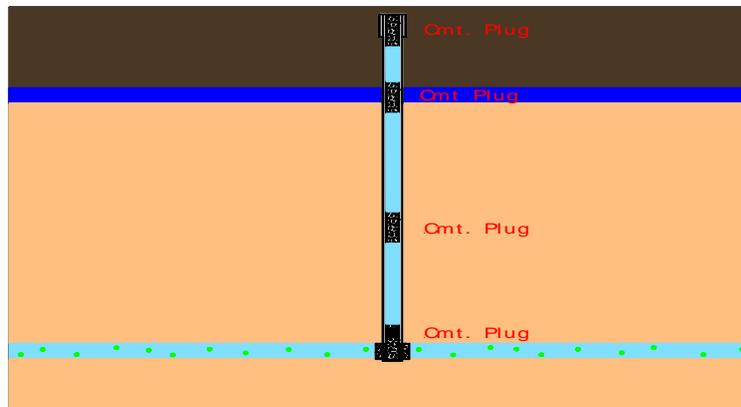
The Geological Survey recently completed phase I of a study of shallow natural gas in North Dakota. We investigated 9,400 ND State Water Commission monitoring well sites, tested 4,325 wells, and detected methane in 905 wells. Approximately 20% of the wells contained detectable gas.

During the second phase of the project, thirty groundwater samples, primarily from eastern North Dakota, will be analyzed for dissolved gas composition, isotopes, and general chemistry. This will enable us to determine the source of the gas and identify chemical groundwater signatures that might assist the oil and gas industry in natural gas exploration.



Monitoring wells that contained methane are indicated with red dots, black dots are wells that contained no detectable methane. The red dots are sized to reflect the concentration of methane – the higher the concentration, the larger the dot.

PLUG AND ABANDON





Well was plugged in 07/1998
Reclamation work in 09/1998
Seeded in Spring of 1999

BTA Oil Producers. JV-P#1. Near Rider Field
NDIC File No. 14857. SE SE 15-140-103.
Panoramic Reclamation photo taken looking 070
towards middle of location. May 1, 2001. dwn.



BTA Oil Producers - JV-P#1 - Rider Field.
NDIC File No. 14857. SE SE 15-140-103.
Panoramic photo looking east. Photo taken from butte to west on 7/2/2002.

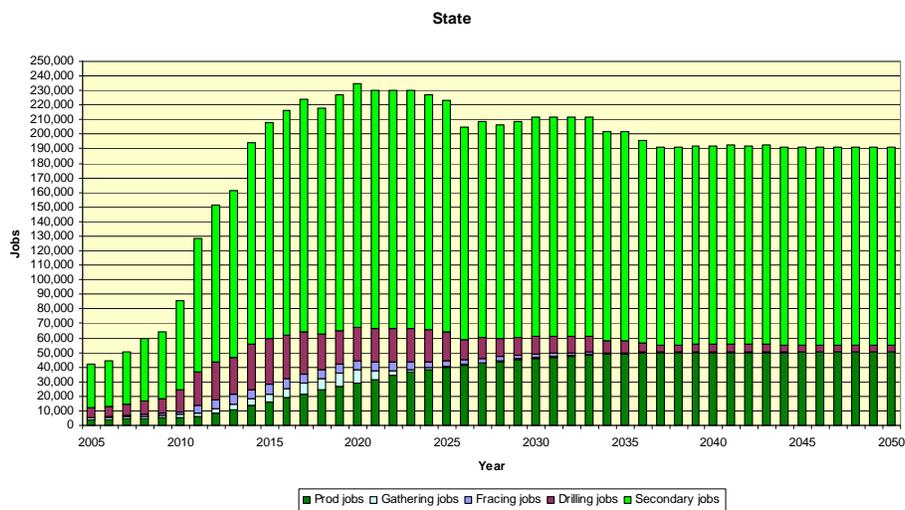


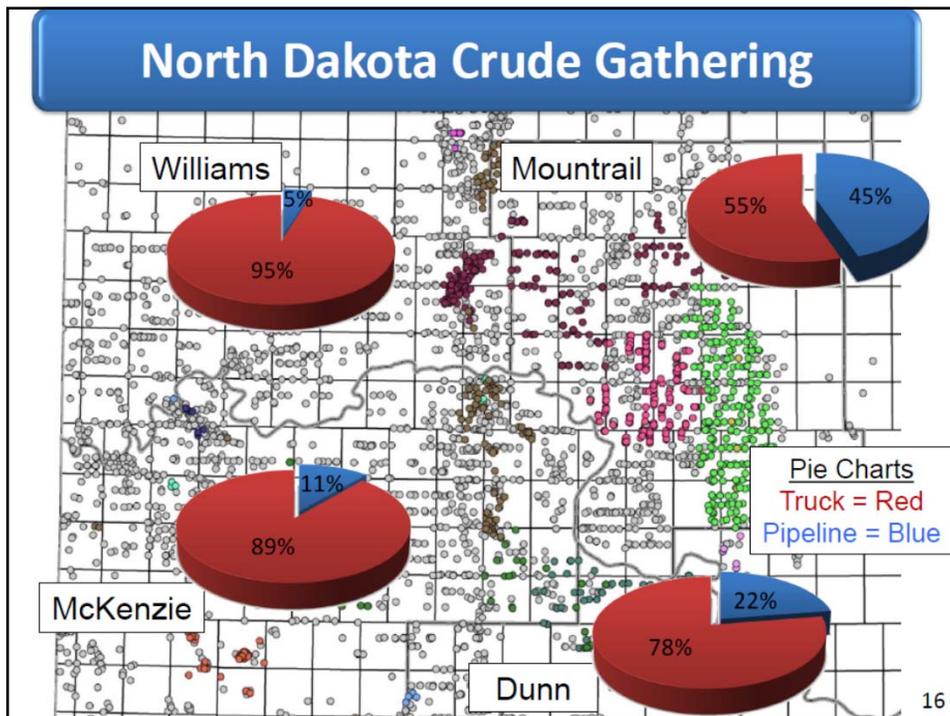
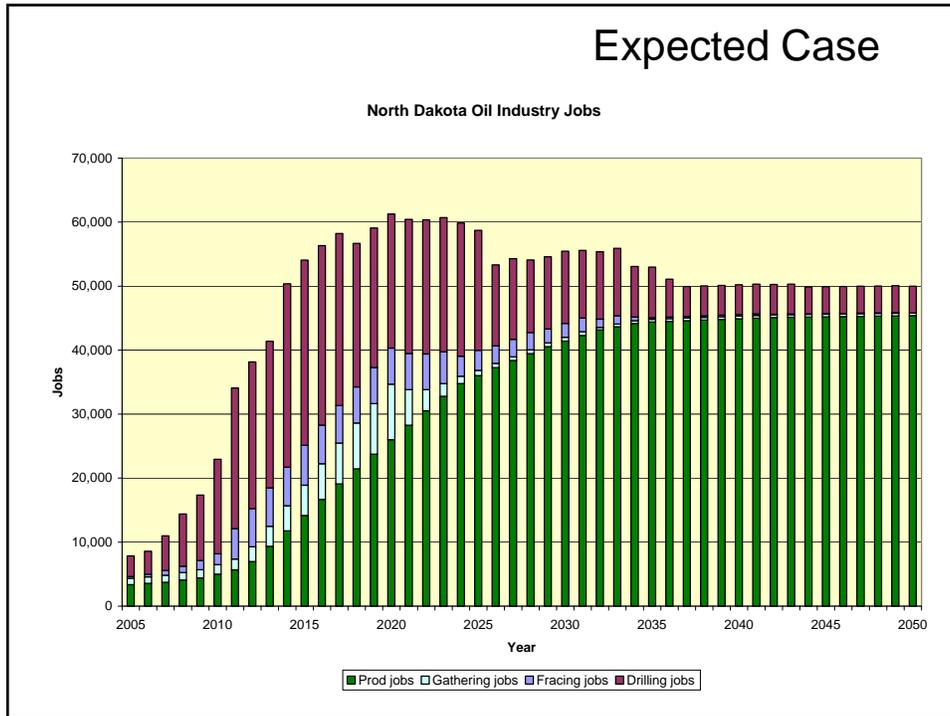
BTA Oil Producers. JV-P#1. Near Rider and Knutson Fields.
NDIC File No. 14857. SE SE 15-140-103.
Panoramic photo looking east from butte west of location.
Photo taken on May 7th, 2003. dwn.

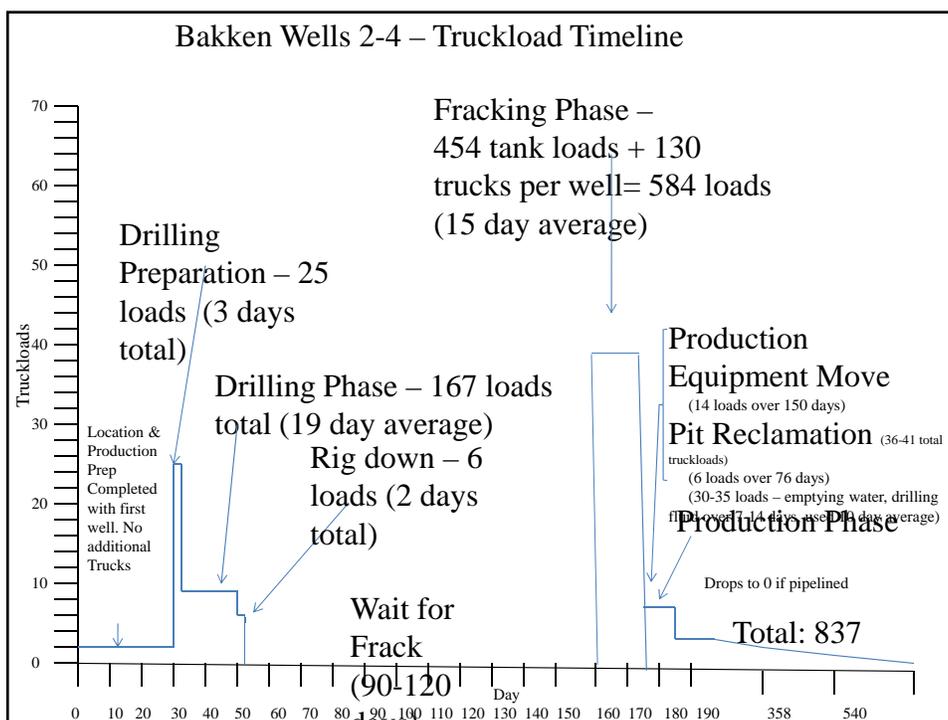
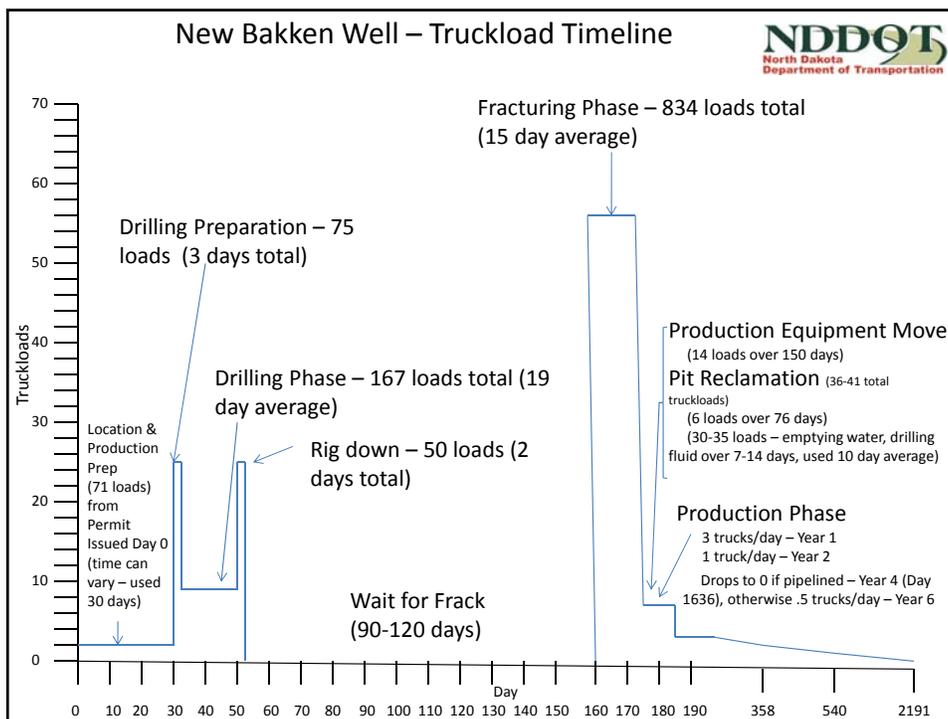


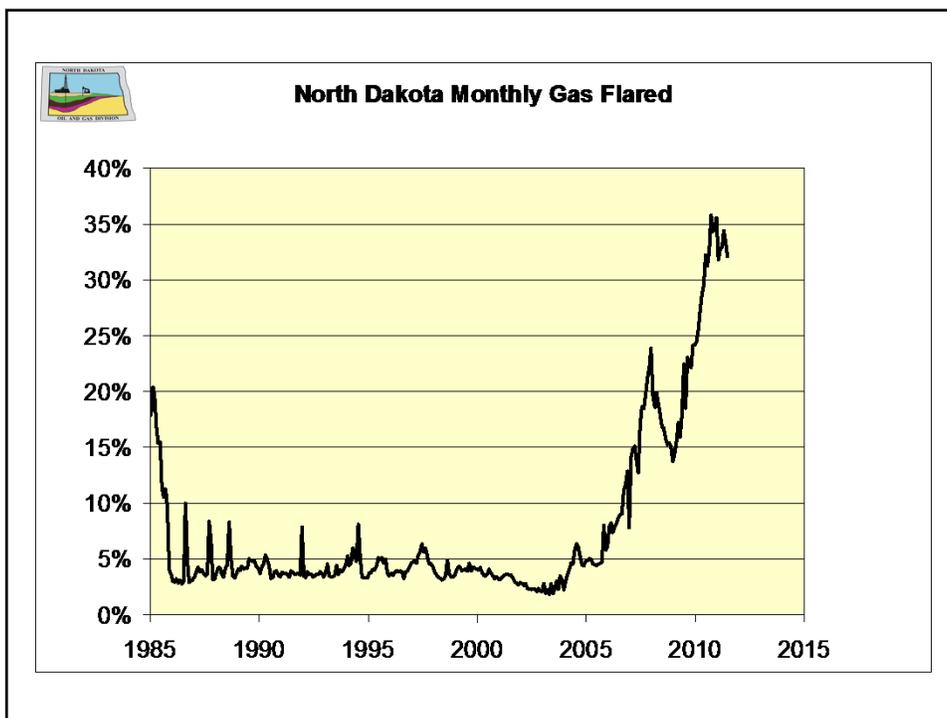
The North Dakota Challenges

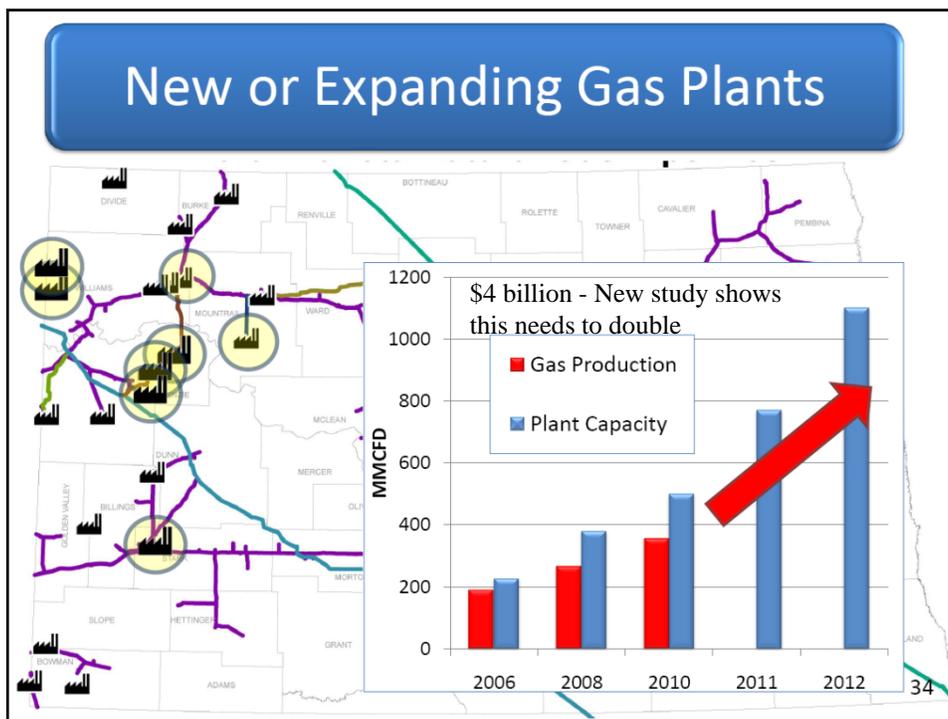
Expected Case











Draft BLM Hydraulic Fracturing rule could double federal drilling permit approval time or worse.

The future looks promising for sustained Bakken/Three Forks development

Draft EPA guidance on diesel fuel in hydraulic fracturing could triple drilling permit approval time or worse.

Current administration budget contains tax changes that could reduce drilling capital 35-50%

World and U.S. economies continue to struggle. If China joins the downward spiral oil price could fall enough to make some areas uneconomic

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