North Dakota Development

• Regulations
• Resource Play
• Development
• Bakken Results

Bruce E. Hicks
Assistant Director
NDIC-DMR-OGD
Bismarck, ND
Welcome to the North Dakota Industrial Commission, Mineral Resources, Oil and Gas Division.

Rules Approved by the Commission and ARC Health Rule Changes Full Notice

General Guidelines for Temporary Abandonment of Bakken and Three Forks Information!

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 ensure public health and safety.
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.

**Tentative Director's Cut Dates**

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

**Recent Presentations**

View [press releases](https://www.dmr.nd.gov/oilgas/informationcenter.asp) 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](https://www.dmr.nd.gov/oilgas/informationcenter.asp)

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Regulations
Spacing

Drilling Units
• NDAC Sec 43-02-03-18
  – One hor well per Section (640 acres)
  – Exception—notice & hearing

Spacing Units
• Comm order after notice & hearing
  – Multiple hor wells per SU (2-30+)
  – 320,640,960,1280,1920,2640,3200,5280
Pooling

NDCC Sec 38-08-08
• Two or more separately owned tracts
• No voluntary pooling
• NDIC “shall” force pool all interests
Unitization

NDCC Sec 38-08-09.3
• Project to substantially increase recovery
• EOR unnecessary for approval

NDCC Sec 38-08-09.5
• 55% MIO approval
• 55% WIO approval
• Corral Creek-Bakken Unit—eff 1-1-2012
• Grail-Bakken Unit—3-3-2014 failed to ratify
• Hofflund-Bakken Unit—hearing 4-4-2018
MONTHLY HEARINGS

Administrative Docket
  • pooling
  • increase density wells
  • saltwater disposal

Regular Docket
  • hearing examiner—Asst Atty Gen
  • create 1280-ac spacing unit
  • create overlapping spacing units
  • other exceptions to rules
DISPOSING OF CASES

Industrial Commission
- Gov, Atty Gen, Comm of Ag
- controversial cases
- orders denying the appl
- orders imposing fines
- orders involving unitization

Director of Oil & Gas Division
- routine cases
- IC delegated cases
Resource Play
Current drilling activity is focused in Mountrail, Dunn, McKenzie, and Williams Counties.
North Dakota Average Monthly Rig Count

2014 → 1 well / mth / rig
2017 → 2 wells / mth / rig
TYPICAL HORIZONTAL OIL WELL

Potable Waters

Horizontal Lateral
- 4.5” liner
- 30-65 frac stages
- sliding sleeves / P&P

Upper Bakken Shale
Middle Bakken
Lower Bakken Shale
Sea Level

Oil & Gas

Bakken/Three Forks

Precambrian Basement

Base of fresh water

9000'

Sea Level

Bakken/Three Forks

Precambrian Basement
1,320’ & 660’ Pilot Density Projects: 2013-14

Hawkinson, Tangsrud, and Rollefstad

1,320’ Pilot

- 2 MILES
- 68’
- 1,320’
- BAKKEN
- 3 project areas
- 1,320 ft. same-zone spacing
- 34 new wells (gross)

Wahpeton, Lawrence, Mack, and Hartman

660’ Pilot

- 2 MILES
- 68’
- 660’
- Three Forks Fm
- Bakken Fm
- 4 project areas
- 660 ft. same-zone spacing
- 31 new wells (gross)
Development
ICO 14497—signed 4-22-2010
3000 sq miles
Uniform standup 1280-acre units
Uniform Spacing
Energy Corridors
Energy Corridor
- uniform development
- pipelines, electrical, traffic
- less impact on adjacent roads

Vern Whitten Photography
Small Footprint
Bakken Results
North Dakota Daily Oil Produced and Price

BOPD

1,250,000
1,000,000
750,000
500,000
250,000
0


ND Sweet $/BO

$200
$160
$120
$80
$40
$0

BOPD

$/BO
North Dakota Idle and Non-Completed Wells
North Dakota Daily Oil Produced and Price

Dec Production 1,181,319 bopd (appr 1,122,236 Bakken—95%)
WELLS

- 14,338 wells currently producing
  - 12,361 Bak/TF (86%)
- 40,000 additional development wells
  - 59 rigs – another 28 years
- Bakken Pool: up to 3 targets
14,338 total wells – 12,361 Bakken horizontal (86%)

2004 1st Bak Hor

North Dakota Wells Producing

Mostly Bakken / FT

2004 1st Bak Hor
Bakken/Three Forks EOR Potential

• Pilot projects
  – CO₂ 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 1951-2017 = 4.2 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
NDIC – DMR - OGD

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

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

Bruce E. Hicks
Assistant Director
NDIC-DMR-OGD