

# the PIPELINE publication

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## INDUSTRIAL COMMISSION OF NORTH DAKOTA PIPELINE AUTHORITY

**Governor**  
Jack Dalrymple

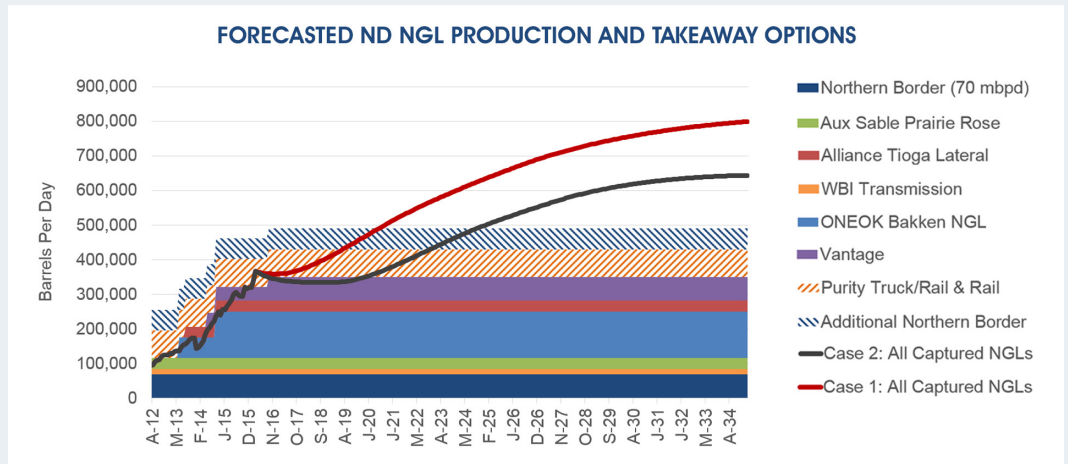
**Attorney General**  
Wayne Stenehjem

**Agriculture Commissioner**  
Doug Goehring

**Director**  
Justin J. Kringstad

## UNDERSTANDING NATURAL GAS LIQUIDS

Much attention has been focused on gathering natural gas produced in association with crude oil in western North Dakota. Receiving less attention is the unique quality of the natural gas stream being gathered to gas plants around North Dakota. Natural gas produced from the Bakken and Three Forks Formations is very high in natural gas



liquids (NGLs) such as ethane, propane, and butane (see table on back page). While majority of the NGL's are removed at processing plants in the state to separate the liquids from the "dry" methane stream, a large percent of the ethane remains with the methane stream.

NGLs gathered and processed in the region will ultimately need to be moved to consuming markets. A forecast of gathered NGLs in North Dakota was created to quantify the growing transportation needs from the region. The forecast in the chart shows two potential production cases based on different activity level assumptions. In either case, a significant shortfall of gross pipeline capacity occurs in the next 5-10 years. Further complicating the situation is the fact that not all NGL pipelines can handle the same types of NGL products and natural gas plants around the region produce either purity products or unfractionated product, known as Y-grade.

There are several options going forward to address the growing volume of NGLs in North Dakota. One option would be to build, expand, or repurpose existing pipeline systems. A second option could be the development of value added industries that would use NGL products as feedstock. One potential use of NGLs is for enhanced oil recovery (EOR) in the Williston Basin as fields continue to mature. The use of NGLs as a working EOR fluid is still in the research phase.

## NORTH DAKOTA — Production Numbers

⌘ [www.pipeline.nd.gov](http://www.pipeline.nd.gov)

### Average Daily Oil Production, BOPD

Jan. 2016	Feb. 2016	Mar. 2016
1,122,462	1,119,092	1,109,246

### Average Daily Gas Production, MMCFD

Jan. 2016	Feb. 2016	Mar. 2016
1,641	1,689	1,710

### Average Rig Count

Jan. 2016	Feb. 2016	Mar. 2016
52	40	32

As of May 20, 2016, there are 25 active rigs in North Dakota.

## NATURAL GAS STORAGE

One primary use of natural gas is heating residential and commercial buildings. Without the use of underground natural gas storage, the supply chain would be challenged to handle strong seasonal demand shifts. During the warm summer months, natural gas is stored in underground reservoirs and withdrawn during colder periods with higher demand. The reservoirs used for natural gas storage are typically depleted gas producing fields that are converted to serve a storage role. The nearest storage field is located near Baker, MT and is operated by WBI Transmission. Regional pipelines provide transportation service to and from the Baker storage field.

## Generalized Bakken Gas Quality

Component	Gallons per MCF	% of Liquids
Nitrogen	NA	NA
Carbon Dioxide	NA	NA
Hydrogen Sulfide	NA	NA
Methane	NA	NA
Ethane	5.32	52.5%
Propane	3.11	30.7%
Isobutane	0.32	3.1%
Normal Butane	0.89	8.8%
Isopentane	0.14	1.4%
Normal Pentane	0.20	2.0%
Hexane+	0.16	1.5%
<b>Totals</b>	<b>10.14</b>	<b>100%</b>

**Gas Stream BTU Value** 1,399

*Mole % Source: Energy & Environmental Research Center (EERC)*

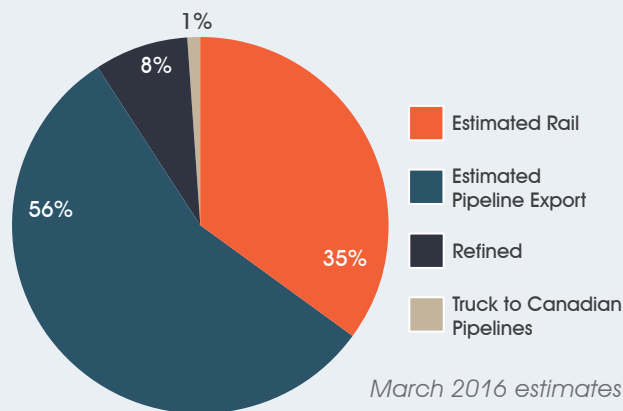
## North Dakota Pipeline Authority

State Capitol, 14<sup>th</sup> Floor  
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Bismarck, ND 58505-0840

## PIPELINE FACTOID

The largest natural gas storage field in the United States is located in the Williston Basin. WBI Transmission's Baker gas storage field has a working gas capacity of over 164 billion cubic feet. The storage field is located primarily in SE Montana in the Cedar Creek Anticline.

## Estimated Williston Basin Oil Transportation



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## North Dakota Pipeline Authority

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