Crude Oil

Understanding production potential

Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions
Crude Oil

Understanding production potential

Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions
Forecasting Williston Basin Oil Production, BOPD

Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.
Forecasting Williston Basin Oil Production, BOPD

Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.
Forecast Assumptions

Drilling Rigs

- North Dakota - 1
- North Dakota - 2
- Montana - 1
Forecast Assumptions

Completed Wells

- North Dakota - 1
- North Dakota - 2
- Montana - 1
Crude Oil

Understanding production potential

Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions
Challenges

1) Moving oil out of the Williston Basin
2) Moving oil within the Williston Basin

*Modified from Bridger and Belle Fourche Pipelines
Williston Basin Oil Transportation

- Pipeline Export: 38%
- Tesoro Refinery: 8%
- Truck to Canadian Pipelines: 2%
- Estimated Rail: 52%

October 2012
Estimated ND Rail Export Volumes

Through October 2012
BNSF Crude Rail Locations

**Existing**

1) Dore – Musket – Unit
2) Dore - Manifest
3) Trenton – Savage – Manifest/Unit
4) Williston – Red River Supply – Manifest
5) Epping – Rangeland – Unit
6) Tioga – Hess - Unit
7) Manitou – Plains - Unit
8) Ross – Bakken Transload - Manifest
9) Stanley – EOG – Unit
10) Berthold – Enbridge – Unit (Full Q1/13)
11) Minot – ND Port Services- Manifest
12) Zap/Republic – Basin Transload - Unit
13) Eland – BOE - Unit
14) Dickinson – Centennial - Manifest
15) Gascoyne – Enserco – Manifest/Unit

**Planned**

1) Fryburg – Great Northern - Unit
1) Stampede – US Development
2) Donnybrook - Centennial
3) New Town – Dakota Plains
4) Van Hook– US Development
Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.
Challenges*
1) Moving oil out of the Williston Basin
2) Moving oil within the Williston Basin
Crude Oil Gathering
North Dakota Crude Gathering

- Truck: 74%
- Pipeline: 26%

February 2012 Data
North Dakota Crude Gathering

- Williams
- Mountrail
- McKenzie
- Dunn

Grey = Truck
Color = Pipe
North Dakota Crude Gathering

- Williams: 95% (5% in blue)
- Mountrail: 55% (45% in blue)
- McKenzie: 89% (11% in blue)
- Dunn: 78% (22% in blue)

Pie Charts
Truck = Red
Pipeline = Blue
Crude Oil

Understanding production potential

Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions
Pipeline Challenges Outside ND
Crude Oil Prices – January 2, 2013

- Clearbrook: $89.74 WTI - $3.50
- Cushing: $93.24
- Brent: $112.36 WTI + $19.12

Map showing oil prices and locations.
PADD II Decrease in Light Demand

BP
Whiting, IN
-260 MBOPD
2013

ConocoPhillips
Wood River, IL
-130 MBOPD
2011

Marathon
Detroit, MI
-65 MBOPD
2013

Source: Enbridge
Pipeline Challenges Outside ND
Two Projects to Watch...
$6.2 Billion – Light Oil Market Access

1. Canadian Mainline Terminal Capability ($0.6B)
2. Sandpiper Project ($2.5B)
3. U.S. Mainline Expansion ($1.8B)
   a) Superior to Flanagan
   b) Chicago Area Connectivity
4. Eastern Access Upsize ($0.5B)
   a) Line 6B Expansion
   b) Line 9 Reversal Expansion
5. Southern Access Extension ($0.8B)
Natural Gas
Top Two Natural Gas Misconceptions

“Natural gas is just a byproduct of oil production with very little economic value.”

“Nothing is being done to address natural gas flaring in western North Dakota.”
Rich Bakken Natural Gas

Raw Natural Gas (1500+ BTU) → Processing Plant → Consumer Quality Natural Gas

- Methane ($3.45 MMBTU)
- Ethane
- Propane
- Butane
- Natural Gasoline

Natural Gas Liquids (8-12 Gallons Per Thousand Cubic Feet)
Williston Basin Gas Production

Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.
Natural Gas Gathering Challenge
First Time Gas Sales Per Month

Number of Wells

Date
2/1/2005
6/1/2005
10/1/2005
2/1/2006
6/1/2006
10/1/2006
2/1/2007
6/1/2007
10/1/2007
2/1/2008
6/1/2008
10/1/2008
2/1/2009
6/1/2009
10/1/2009
2/1/2010
6/1/2010
10/1/2010
2/1/2011
6/1/2011
10/1/2011
2/1/2012
6/1/2012
10/1/2012
ND Gas Gathering Statistics

- Wells With Gas Sales or Lease Use
- Wells Without Gas Sales
Rich Bakken Natural Gas

Raw Natural Gas (1500+ BTU) → Processing Plant →

Consumer Quality Natural Gas

- Methane ($3.45 MMBTU)
- Ethane
- Propane
- Butane
- Natural Gasoline

Natural Gas Liquids (8-12 Gallons Per Thousand Cubic Feet)
North Dakota NGL Potential

Assumptions
- No Flaring
- 8 Gal/MCF
- All liquids extracted
Case 1: ND NGL Potential*

*Using NGL breakdown from the July 2012 BENTEK Natural Gas Study

Barrels Per Day

- Nat Gasoline
- Isobutane
- Butane
- Propane
- Ethane

Percentage Breakdown:
- Nat Gasoline: 41.64%
- Isobutane: 28.33%
- Butane: 13.51%
- Propane: 9.55%
- Ethane: 6.98%
Moving Future NGL Volumes

Transportation Options

- Trucking Regionally
- Rail Transportation
- Vantage Pipeline (Ethane)
- ONEOK Bakken Pipeline (Y-Grade)
- Alliance Pipeline (Rich Gas)
- New Pipeline Infrastructure?
ND Natural Gas Pipelines

- Williston Basin Interstate Pipeline
- Alliance Pipeline
- Northern Border Pipeline

2.37 BCFD
1.51 BCFD
Natural Gas Study
WEBINARS

December 18, 2012 – Natural Gas Flaring Alternatives Slides

December 18, 2012 – Natural Gas Flaring Alternatives

“VX Cycle” Applications

Upstream
• Monetize associated gas at oil wells
• Eliminate gas flaring
• Separate NGLs from feed gas (with optional “bolt-on” units)
• Stranded gas fields w/o pipelines
• LNG fuel to replace diesel for:
  • Drilling rigs
  • Hydraulic fracturing pumps
  • Field trucks
  • Construction equipment

Midstream
• Peak-shaving gas storage facilities
• LNG for shipping to remote communities
• LNG for shipping to remote industrial & mining sites

Downstream
• “Distributed” production of vehicle-grade LNG at fueling stations (replaces diesel fuel)
• Eliminates the need to truck LNG from large, centralized plants to distant fueling depots
• Upgrade existing CNG stations
• Clean, inexpensive LNG fuel for:
  • Long-haul/heavy-duty trucks
  • Delivery fleets

NDPA Gas Flaring Alternatives 12-18-2012

June - December 2012
24,000+ views
Contact Information

North Dakota Pipeline Authority

600 E. Boulevard Ave. Dept. 405
Bismarck, ND 58505-0840

Phone: (701)220-6227
Fax: (701)328-2820
E-mail: jjkringstad@ndpipelines.com

Websites:
www.pipeline.nd.gov
www.northdakotapipelines.com