Pipeline Authority

- Industry
- Policy Makers
- Regulators
- Public
Presentation Outline

• Understanding current and future oil production
  – Activity
  – Forecasts
  – Drilling economics
• Williston Basin oil transportation dynamics
  – Interstate oil movements
  – Intrastate oil movements
• North Dakota natural gas production
  – Flaring and gas capture
  – NGL Outlook
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North Dakota Drilling Activity
Understanding Current Production Dynamics
Non-Confidential Spud to Initial Production Timeline

 Avg. Spud to IP Days

2009 2010 2011 2012 2013 2014

Spud Month
North Dakota Oil Production Forecast

ND Oil Production, BOPD

- NDPA Oil Forecast: Case 1
- NDPA Oil Forecast: Case 2
North Dakota Forecast Activity Assumptions

- **ND New Wells Added Per Month**
  - ND New Wells Case 1
  - ND New Wells Case 2

- **NDPA Forecast**

Axes:
- Y-axis: ND New Wells Added Per Month
- X-axis: Years from 2009 to 2035
Peak Month Minimum 500 BOPD

4,115 Wells

Peak Month Well Production, BOPD

Well Cost

6 MM
7 MM
8 MM

0 $5 $10 $15 $20 $25 $30 $35 $40 $45 $50 $55 $60

Breakeven Wellhead Price (AT IRR of 20%)

$40 Wellhead

After Tax IRR

20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%

6 MM
7 MM
8 MM
Peak Month Minimum 600 BOPD

Peak Month Well Production, BOPD

<table>
<thead>
<tr>
<th>Well Cost</th>
<th>$0</th>
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<td>Breakeven Wellhead Price (AT IRR of 20%)</td>
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Peak Month Minimum
700 BOPD

Peak Month Well Production, BOPD

Well Cost

6 MM
7 MM
8 MM

$0 $5 $10 $15 $20 $25 $30 $35 $40 $45

Breakeven Wellhead Price (AT IRR of 20%)

After Tax IRR

24%
22%
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%

Peak Month BOPD / Well Cost

700

6 MM
7 MM
8 MM

$40 Wellhead
Peak Month Minimum
800 BOPD

Peak Month Well Production, BOPD

Well Cost
6 MM
7 MM
8 MM

BreaKeven Wellhead Price (AT IRR of 20%)

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Peak Month Minimum
900 BOPD

Peak Month Well Production, BOPD

Well Cost

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<td>$30</td>
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Breakeven Wellhead Price (AT IRR of 20%)

After Tax IRR

6 MM: $40 Wellhead

7 MM: $40 Wellhead

8 MM: $40 Wellhead

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Peak Month Minimum 1,000 BOPD

Peak Month Well Production, BOPD

Well Cost

<table>
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<th>Well Cost</th>
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Breakeven Wellhead Price (AT IRR of 20%)
Peak Month Minimum
1,200 BOPD
Peak Month Minimum 1,500 BOPD

Peak Month Well Production, BOPD

Well Cost
- 6 MM
- 7 MM
- 8 MM

$0 $2 $4 $6 $8 $10 $12 $14 $16 $18 $20 $22 $24 $26 $28

Breakeven Wellhead Price (AT IRR of 20%)

$40 Wellhead
Peak Month: 100-300 BOPD*

*Low production wells also occur in areas deemed “Core” or “Hot Spot”.

Risk is still present in most areas.

Mapped wells drilled 2012-2014
Breakeven Summary

Peak Month Well Production, BOPD / Well Cost

Breakeven Wellhead Price (AT IRR of 20%)

<table>
<thead>
<tr>
<th>400</th>
<th>500</th>
<th>600</th>
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Breakeven Wellhead Price (AT IRR of 20%)

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Arguments

• Well economic assumptions too optimistic or conservative
  – Jump to lower or higher well performance footprints

• Some rigs are not drilling Bakken/Three Forks wells
  – No economics were run on wells in other formations
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Estimated Williston Basin Oil Transportation

- Pipeline Export: 45%
- Refined: 7%
- Truck to Canadian Pipelines: 1%
- Estimated Rail: 47%

October 2015
Estimated Williston Basin Oil Transportation

- Estimated Rail
- Estimated Pipeline Export
- Refined
- Truck to Canadian Pipelines
- Brent - WTI Spread (EIA)

Graph showing the market share of different transportation methods from October 2007 to October 2015.
Rail Destinations Market Share (Sep 2015)

Data for Rail Destination Market Share Provided by the US Energy Information Administration

Destinations Market Share
- Canada
- PADD I (East Coast)
- PADD II (Midwest)
- PADD III (Gulf Coast)
- PADD IV (Rockies)
- PADD V (West Coast)
Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.
Energy Transfer Partners: Dakota Access

- Successful Open Season During the First Half of 2014
- 450,000 BOPD Capacity to Patoka, IL (30”)
- Expandable Up To 570,000 BOPD if Shipper Demand Exists
- Target In-service Date: Late 2016

Map Source: Energy Transfer Partners
North Dakota Pipeline Company LLC - formerly known as Enbridge Pipelines (North Dakota) LLC

- 225,000 BOPD ND Capacity to Clearbrook, MN (24”)
- 375,000 BOPD Clearbrook, MN to Superior, WI (30”)
- Target In-service Date: 2017
TransCanada: Upland Pipeline

- Successful Open Season During 2014
- Initial Capacity 220,000 BOPD (Expandable to 300,000 BOPD)
- Target In-service Date: 2020
- Energy East Project Capacity 1.1 MMBOPD

Map: NEB – NDPA Upland Addition
Forecasting Future Market Share is Difficult

Predicting how future oil production will move with any degree of confidence is difficult/impossible due to:

- Future oil production uncertainty
- Shifting market conditions
- Project commitments are unknown (pipe & rail)
- Regulatory uncertainty (pipe, rail, exports, etc)
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Evolution of Oil Gathering in ND Statewide Totals

- Estimated Piped, BOPD:
  - 2012: 263,352
  - 2013: 410,629
  - 2015: 725,743

- Estimated Trucked, BOPD:
  - 2012: 465,966
  - 2013: 524,649
  - 2015: 441,644
Estimated Loaded Oil Truckloads Per Day

April 2015 Data
220 bbls/Truck
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Solving the Flaring Challenge

**Simple Terms**
- **Blue** – Lack of pipelines
- **Orange** – Challenges on existing infrastructure

**October 2015 Data – Non-Confidential Wells**

- **GREEN** – % of gas captured and sold
- **Blue** – % flared from zero sales wells
- **Orange** – % flared from wells with at least one mcf sold.

- **87%** Statewide
- **10%**
- **3%**
Solving the Flaring Challenge

ND Gas Flaring Percent

Wells Not Connected
Wells Connected
ND Gas Production

ND Gas Production, MMCFD

JJ Kringstad - North Dakota Pipeline Authority
Solving the Flaring Challenge

- **Suspended Capacity**
- **Planned Plant Capacity**
- **Existing Plant Capacity**
- **NDPA Case 1 Forecast**
- **NDPA Case 2 Forecast**
- **Historical Sold, MMCFD**
- **Historical Flared, MMCFD**
- **Targets Case 1 (Sold)**
- **Targets Case 1 (Flared)**

**Key Data Points**:
- 91-93% Q4-20
- 88% Q4-18
- 85% Q4-16
- 80% Q2-16
- 77% Q1-15
- 74% Q4-14

**Timeline**:
- Jan-05 to Sep-21
Capturing the 3%
Faster Well Connections

New Wells Selling Gas

New Producing Wells

Number of Wells Per Month

JJ Kringstad - North Dakota Pipeline Authority
NGL Pipeline Transportation
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