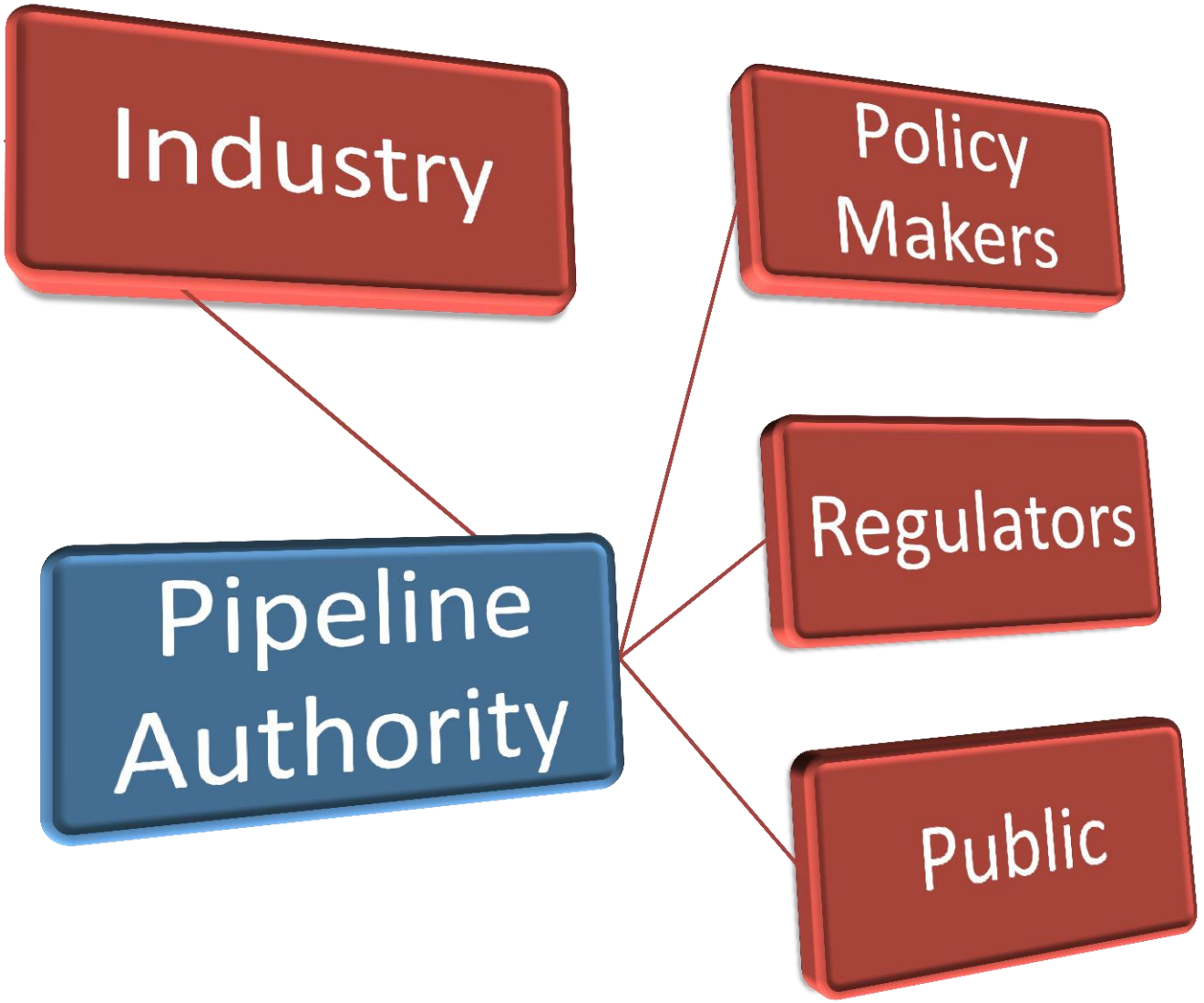
DUG Bakken and Niobrara

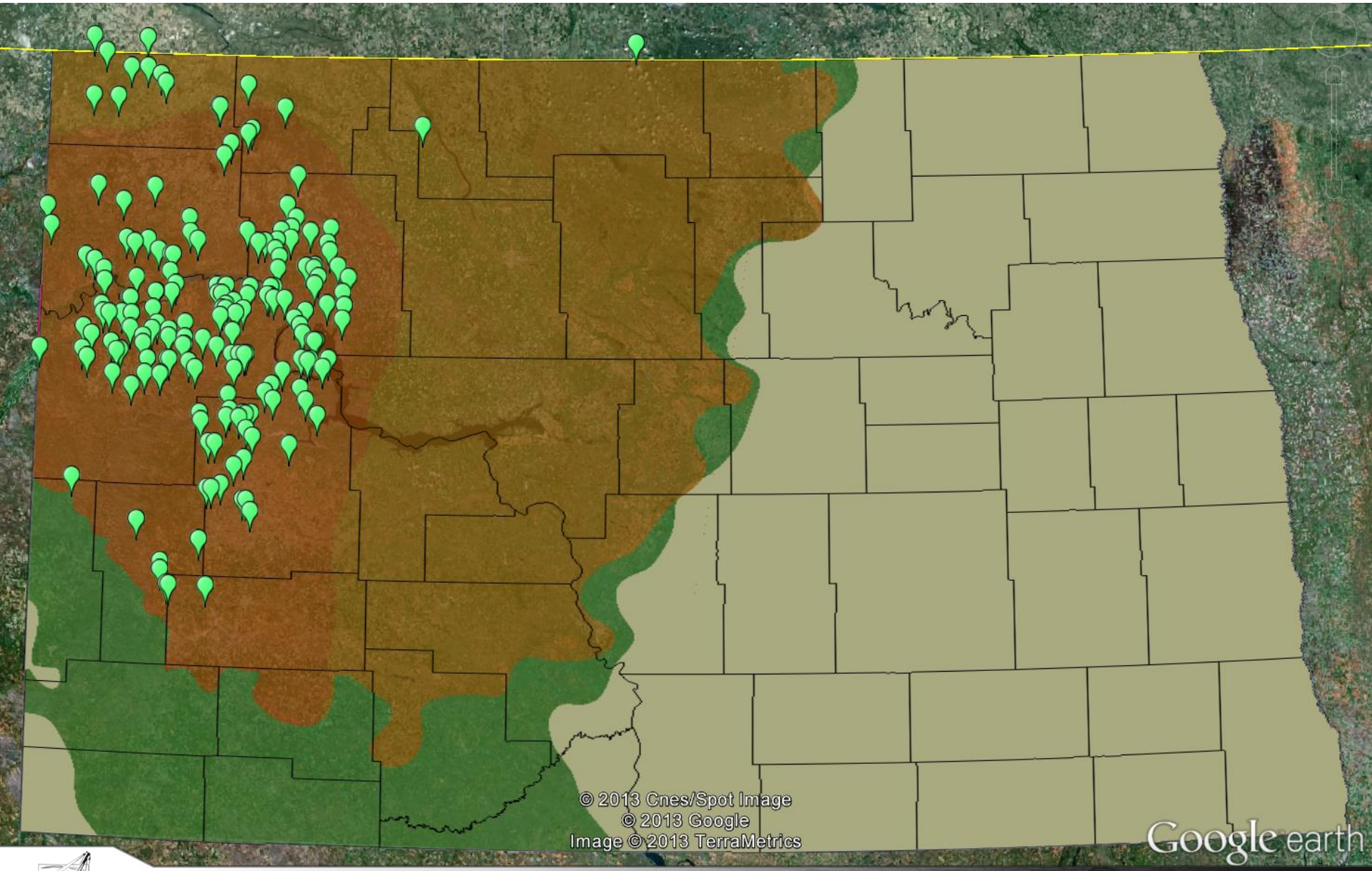
North Dakota Pipeline Authority

Justin J. Kringstad

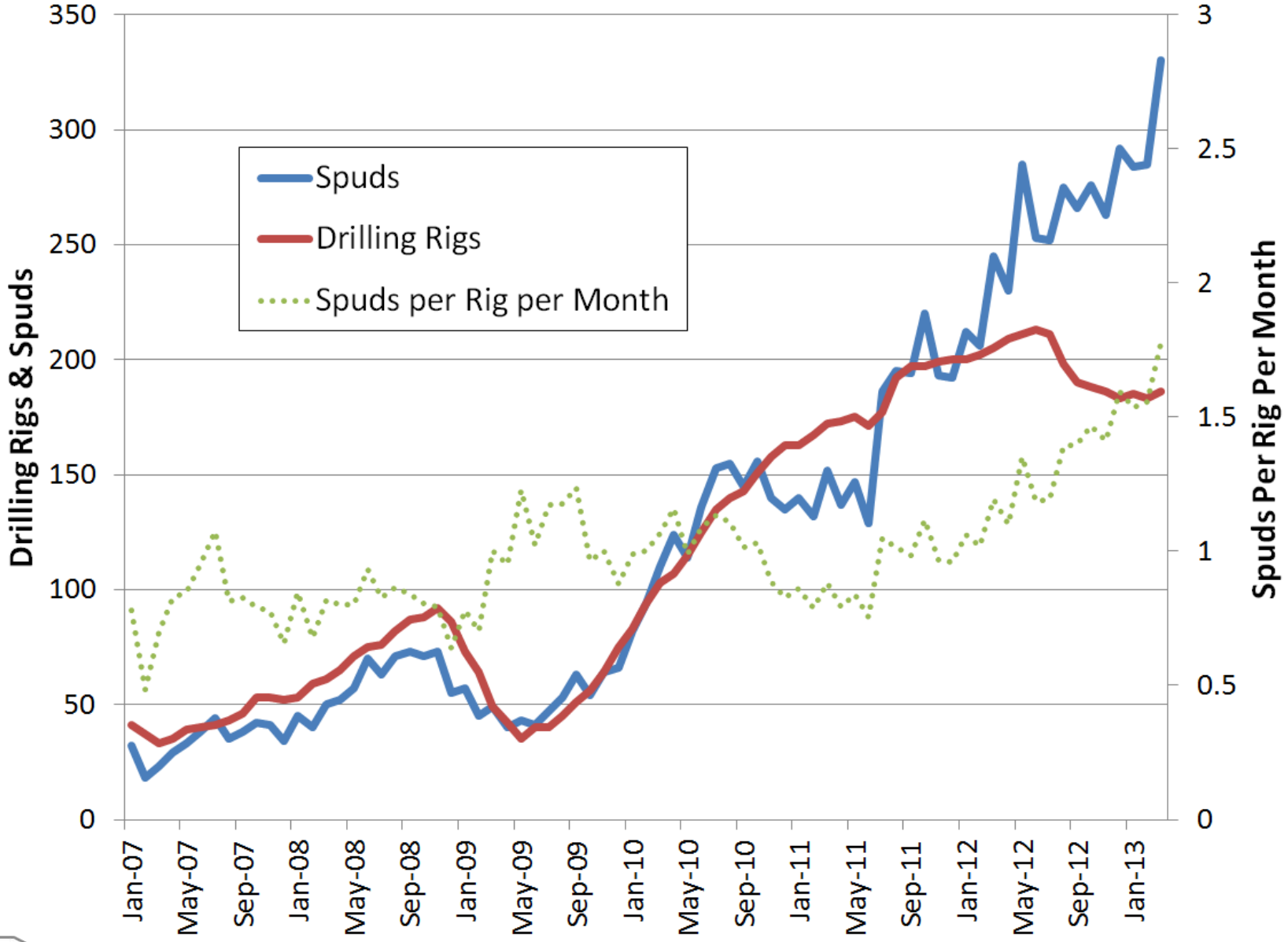
May 30, 2013 – Denver, CO


Industry
Policy Makers
Regulators
Pipeline Authority
Public

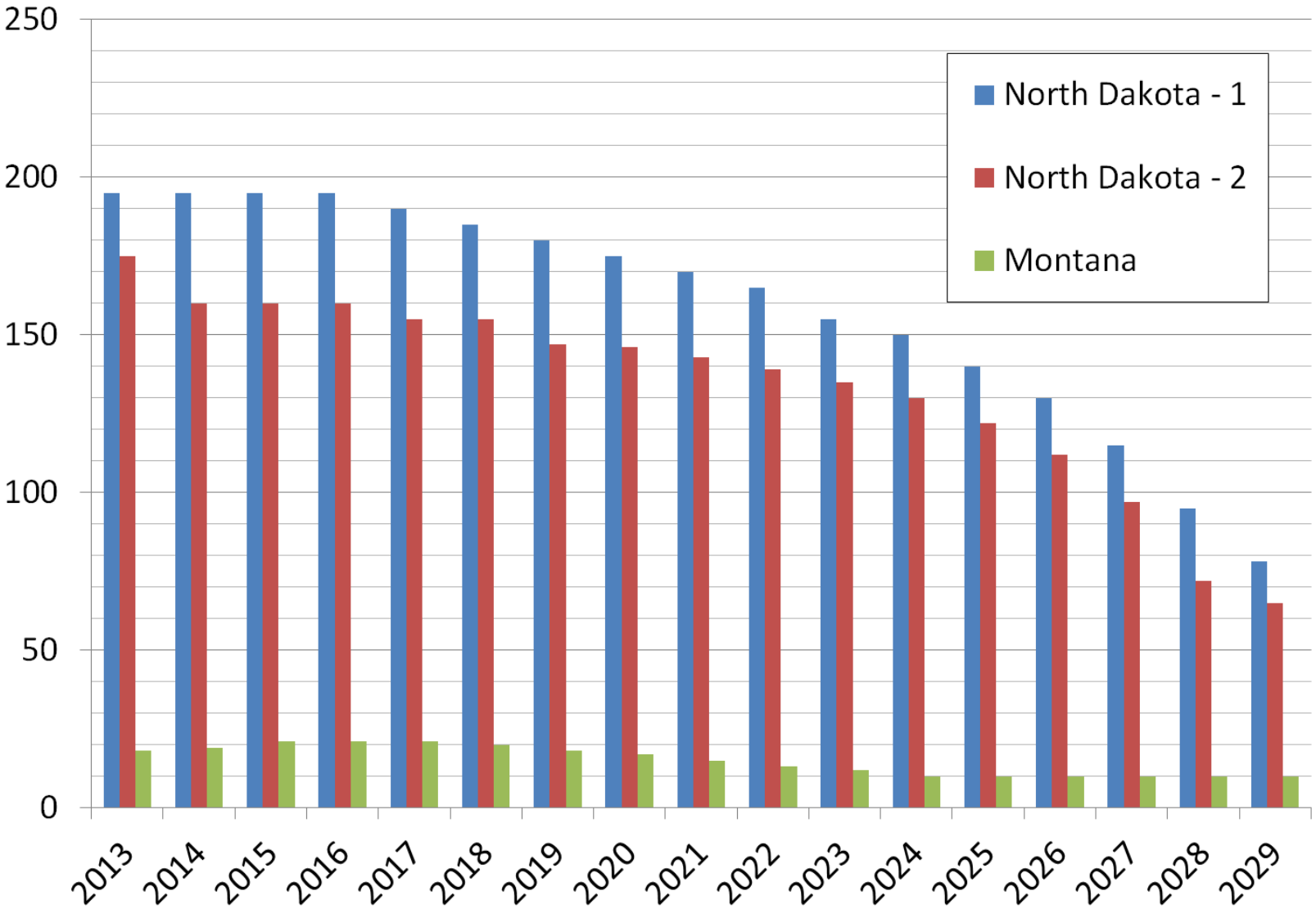
May 27, 2013 – 186 Drilling Rigs



ND Drilling Stats

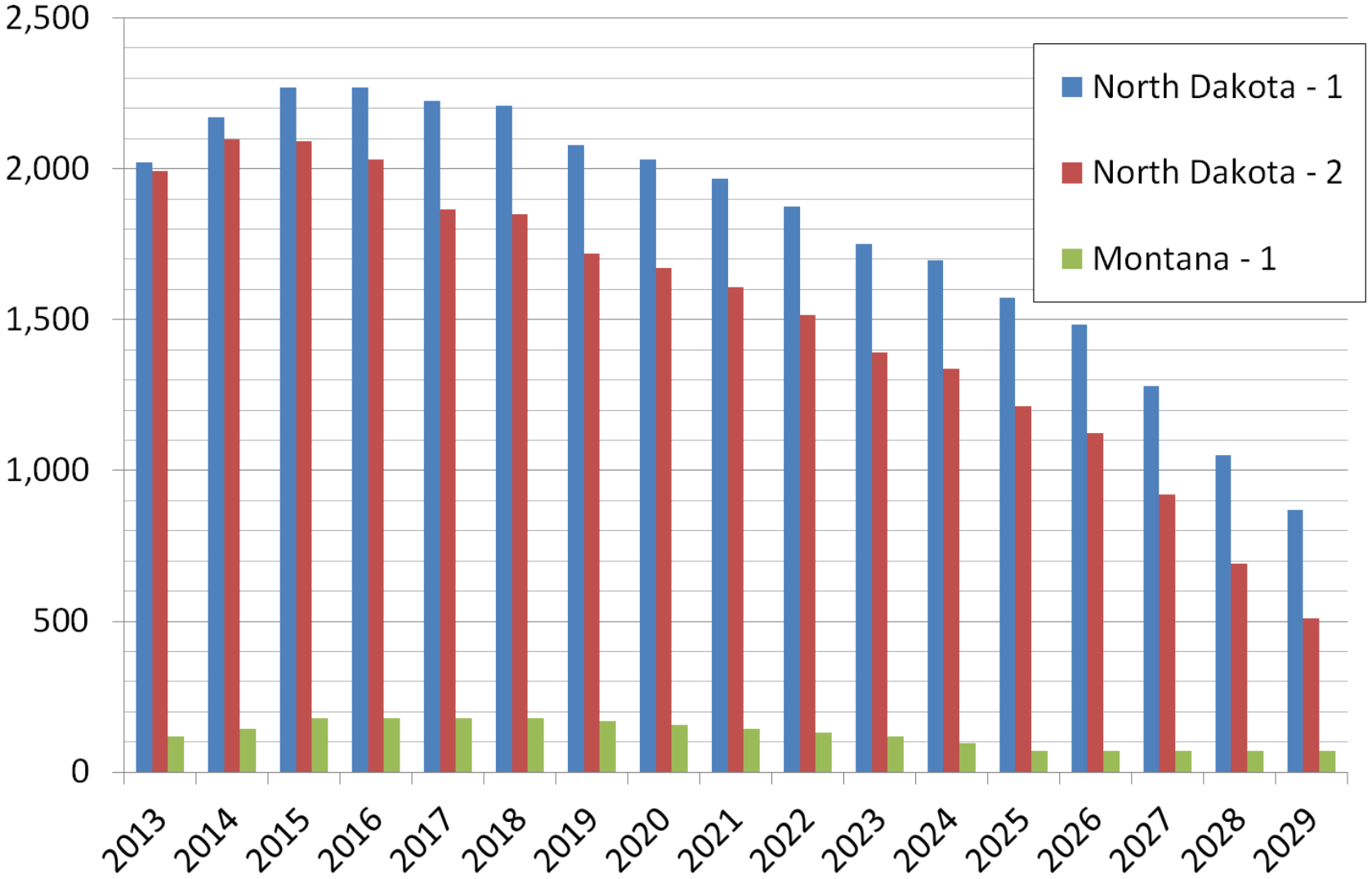


Forecasted Drilling Rigs



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

Forecasted New Wells



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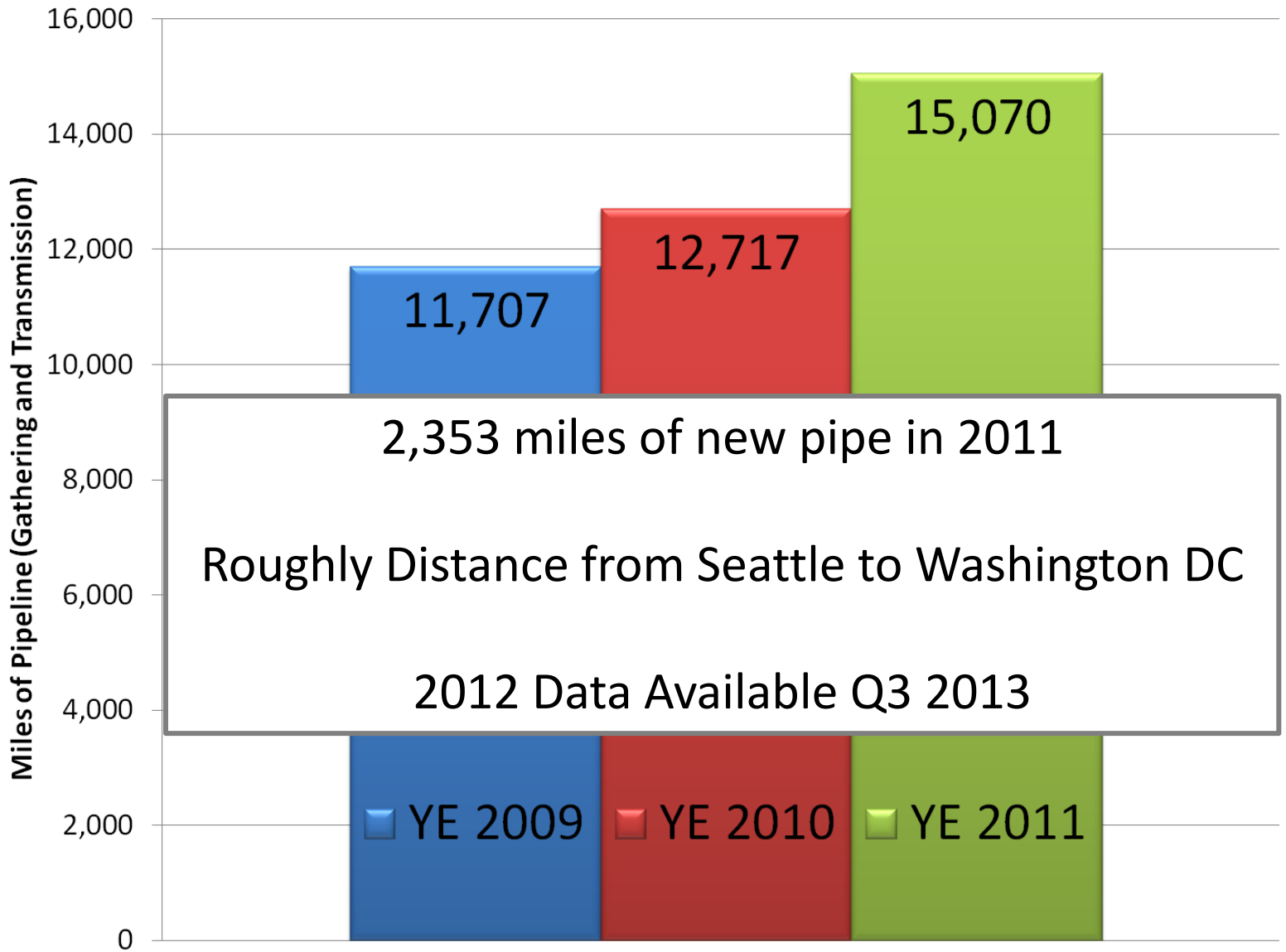
North Dakota Pipeline Miles



Crude Oil

Understanding production potential

Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions

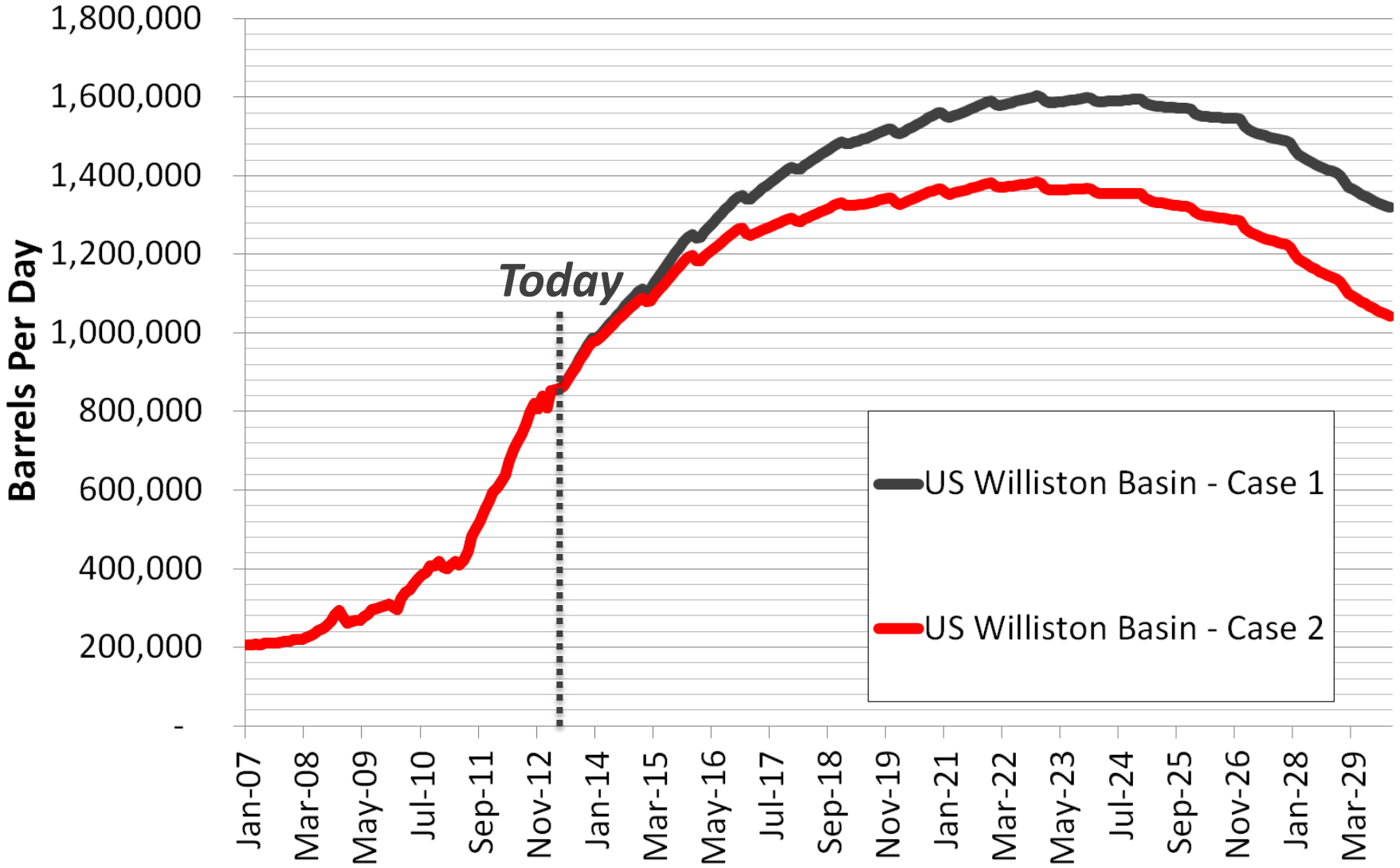
Crude Oil

Understanding production potential

Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions

Forecasting Williston Basin Oil Production, BOPD



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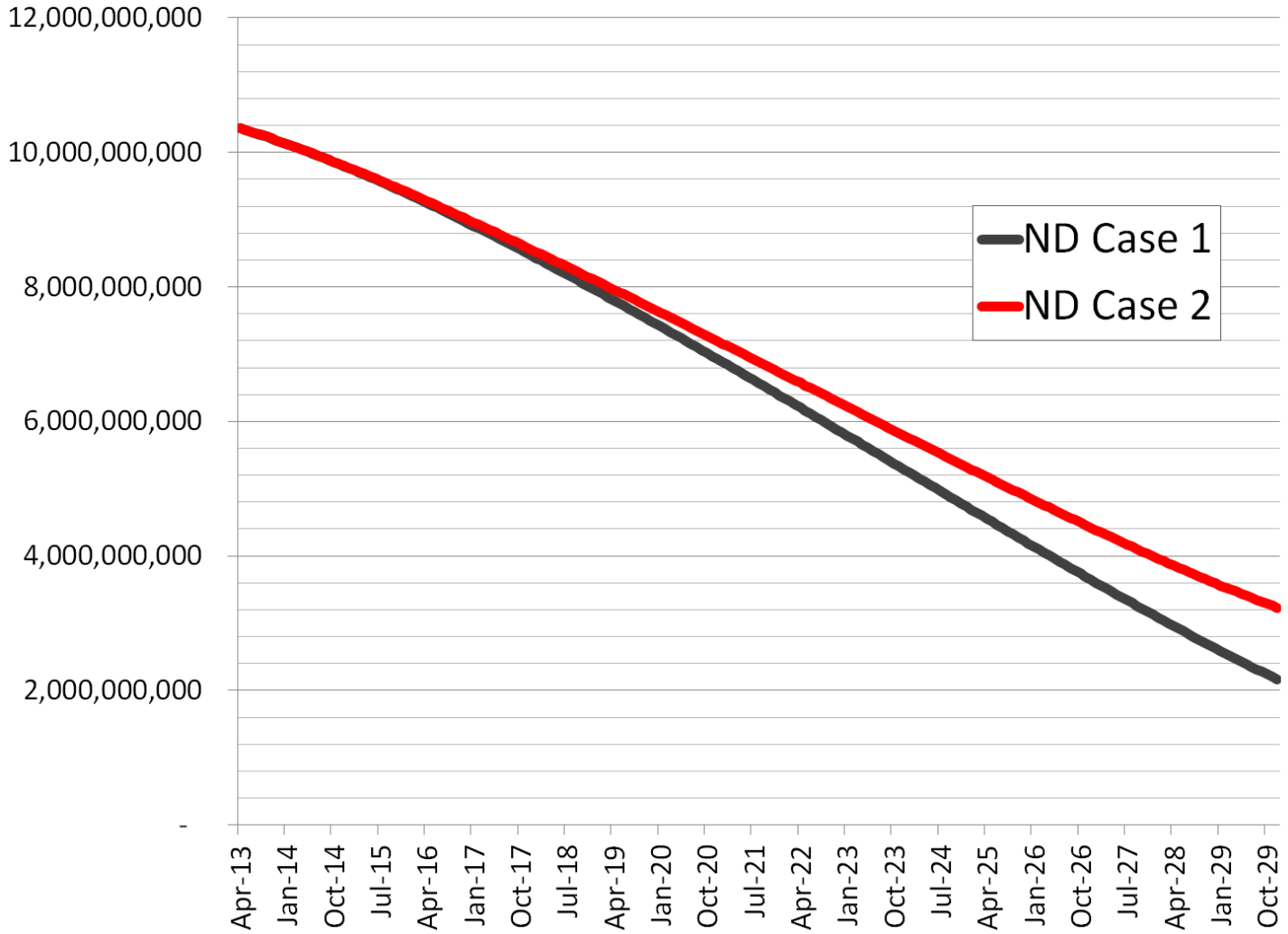
Forecasted Remaining Reserves (ND Only)

Assuming 11 Billion Barrels Recoverable



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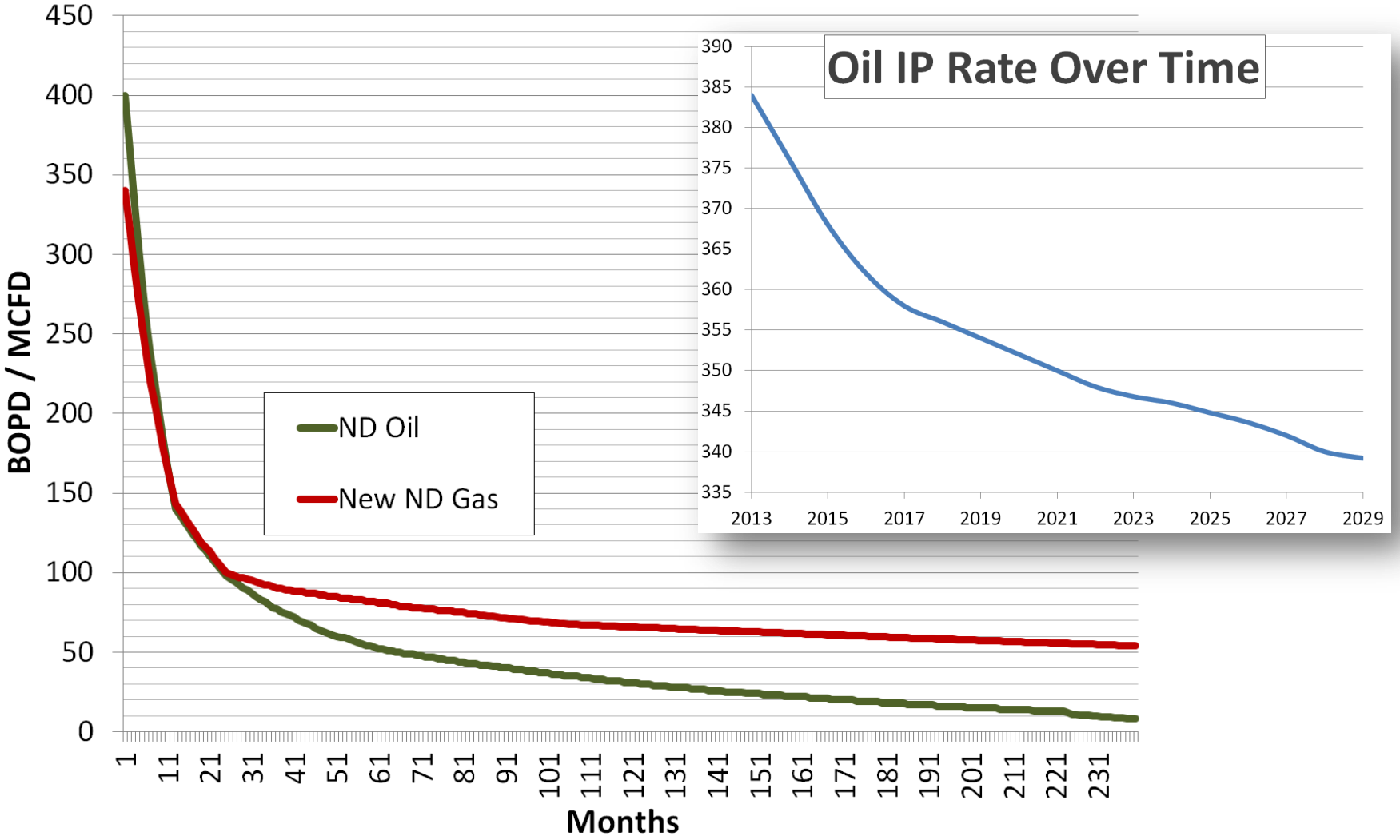
North Dakota Type Curves*



**Typical Type Curve Based on the July 2012 BENTEK Natural Gas Study*

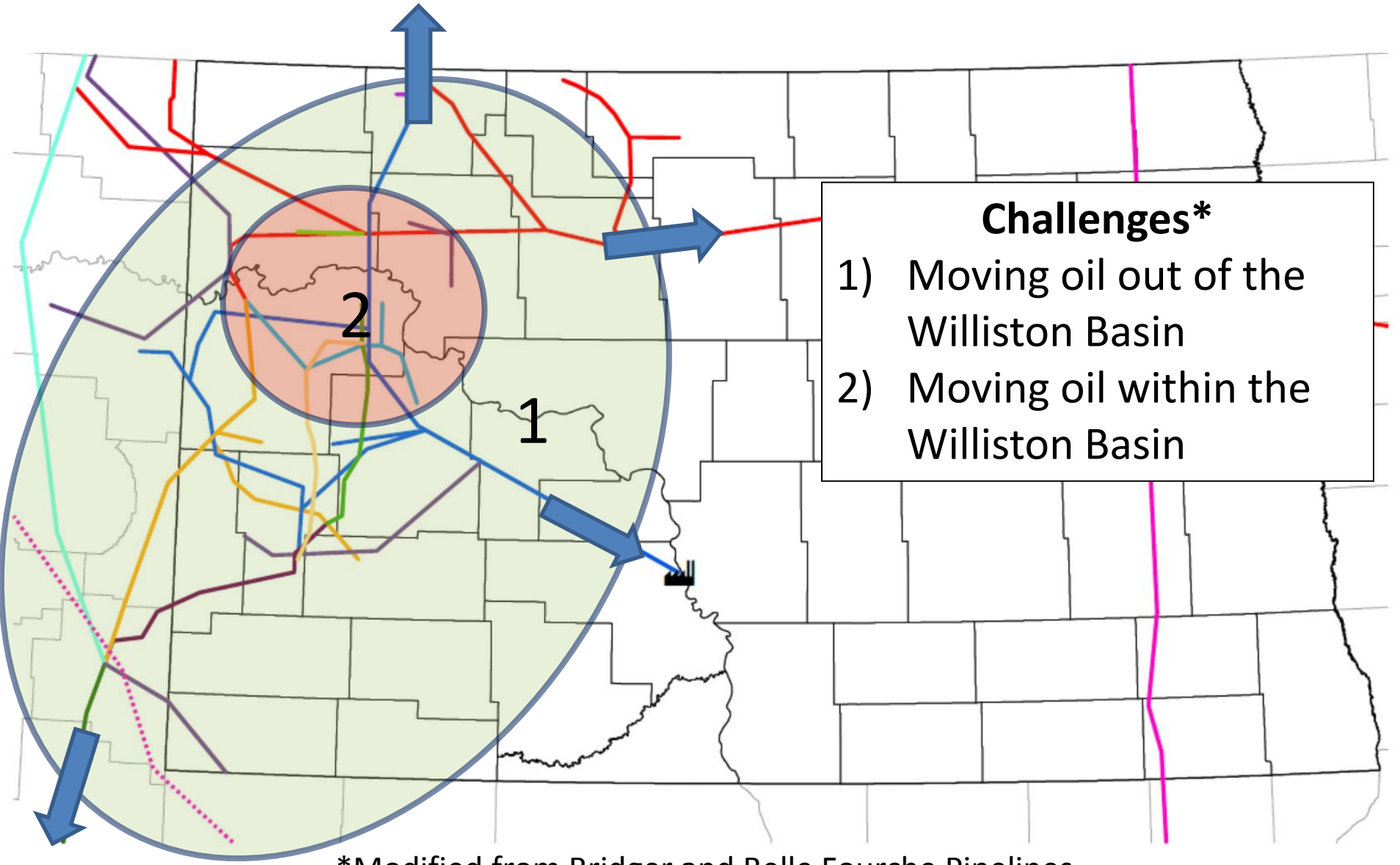
Crude Oil

Understanding production potential

Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions

North Dakota Crude Oil Pipelines

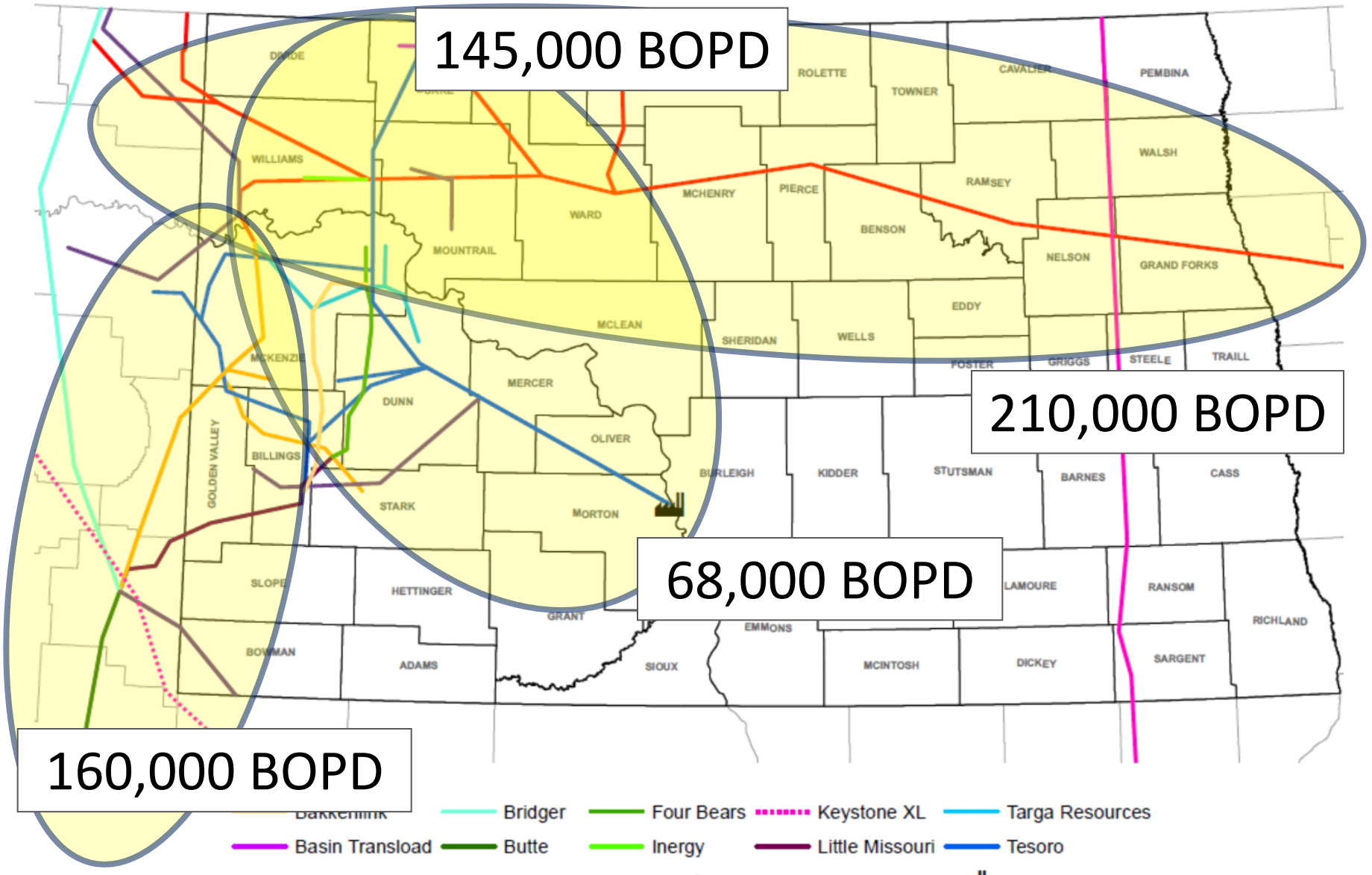


Challenges*

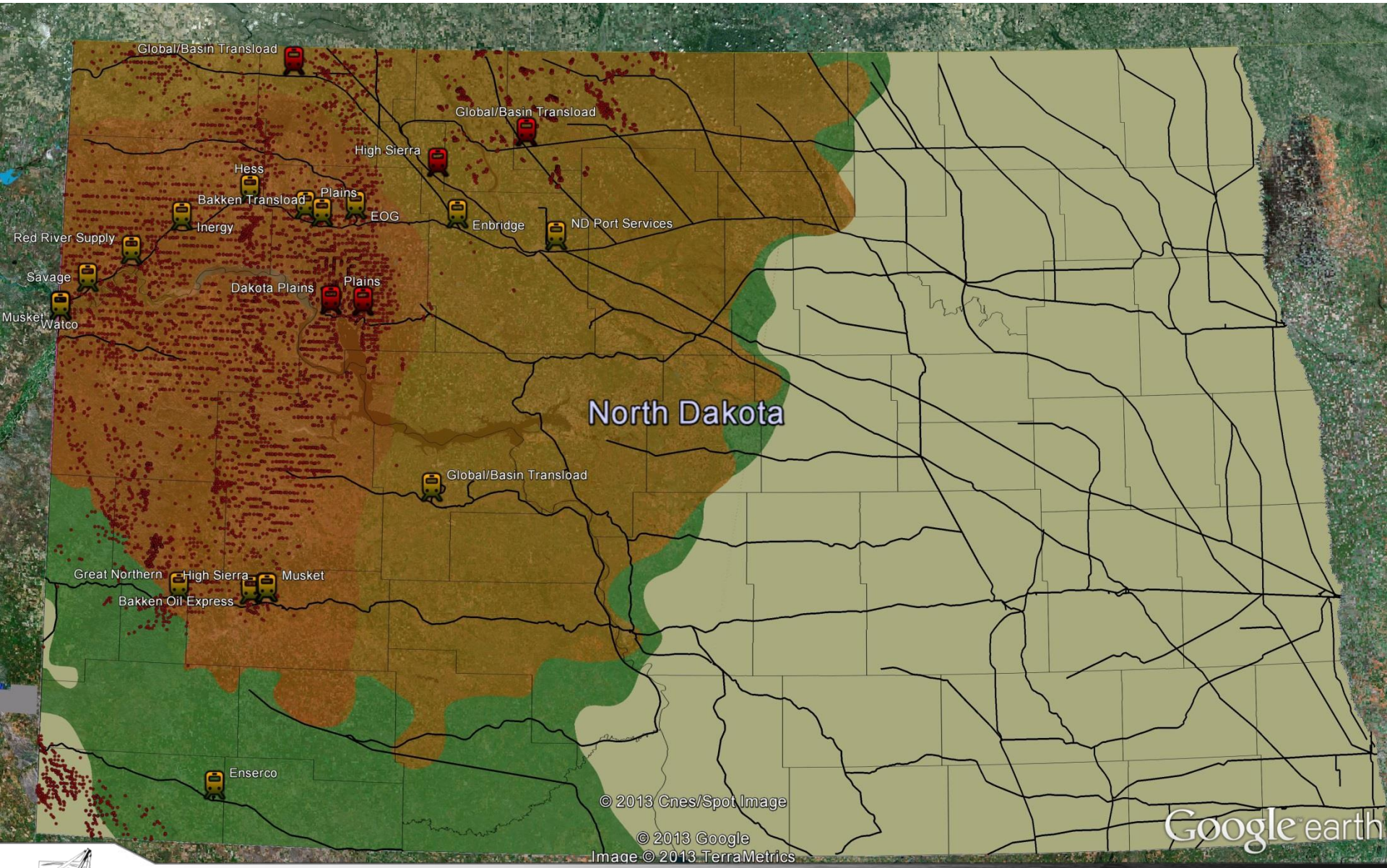
1) Moving oil out of the Williston Basin
2) Moving oil within the Williston Basin

*Modified from Bridger and Belle Fourche Pipelines

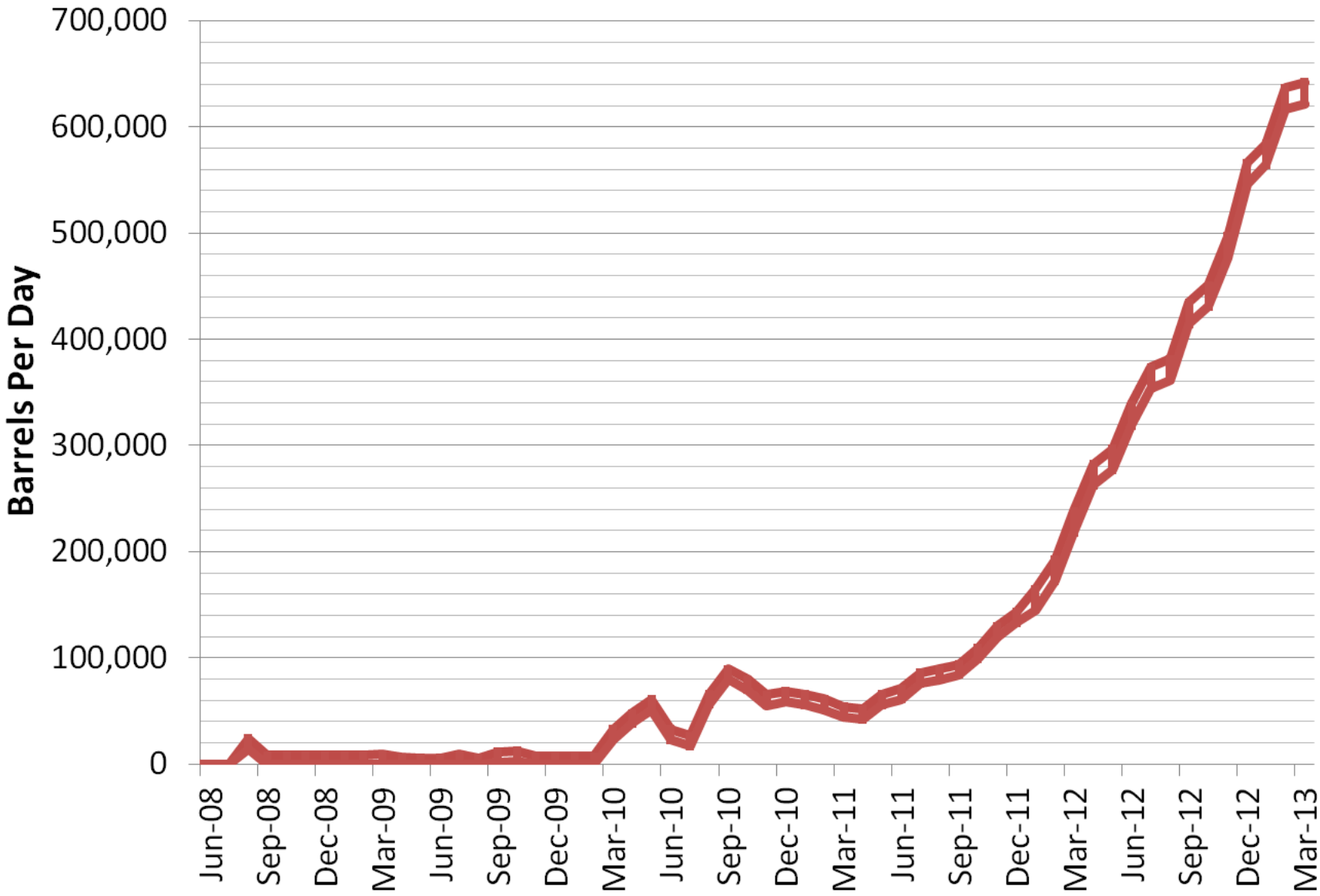
North Dakota Crude Oil Pipelines



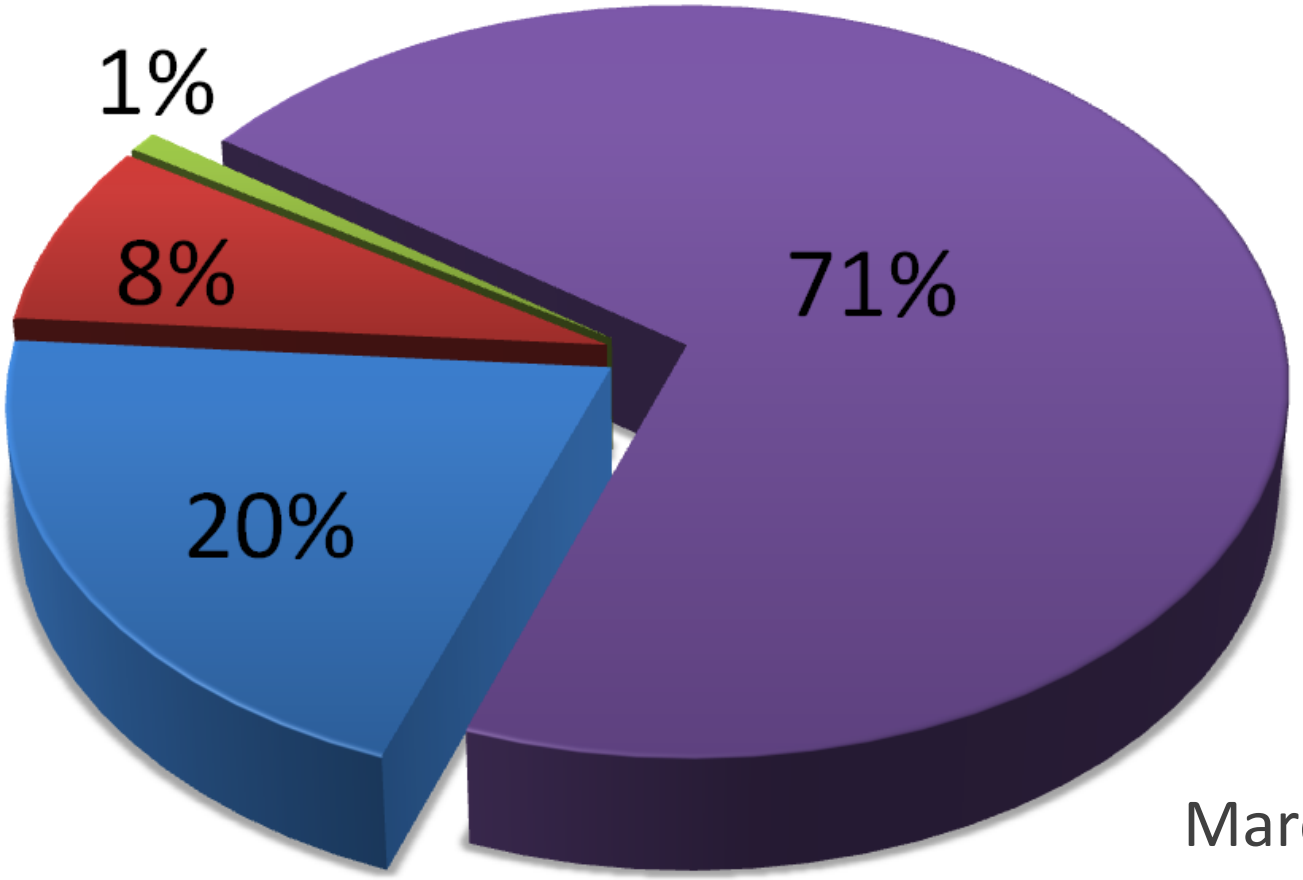
Oil Loading Rail Facilities



Estimated ND Rail Export Volumes



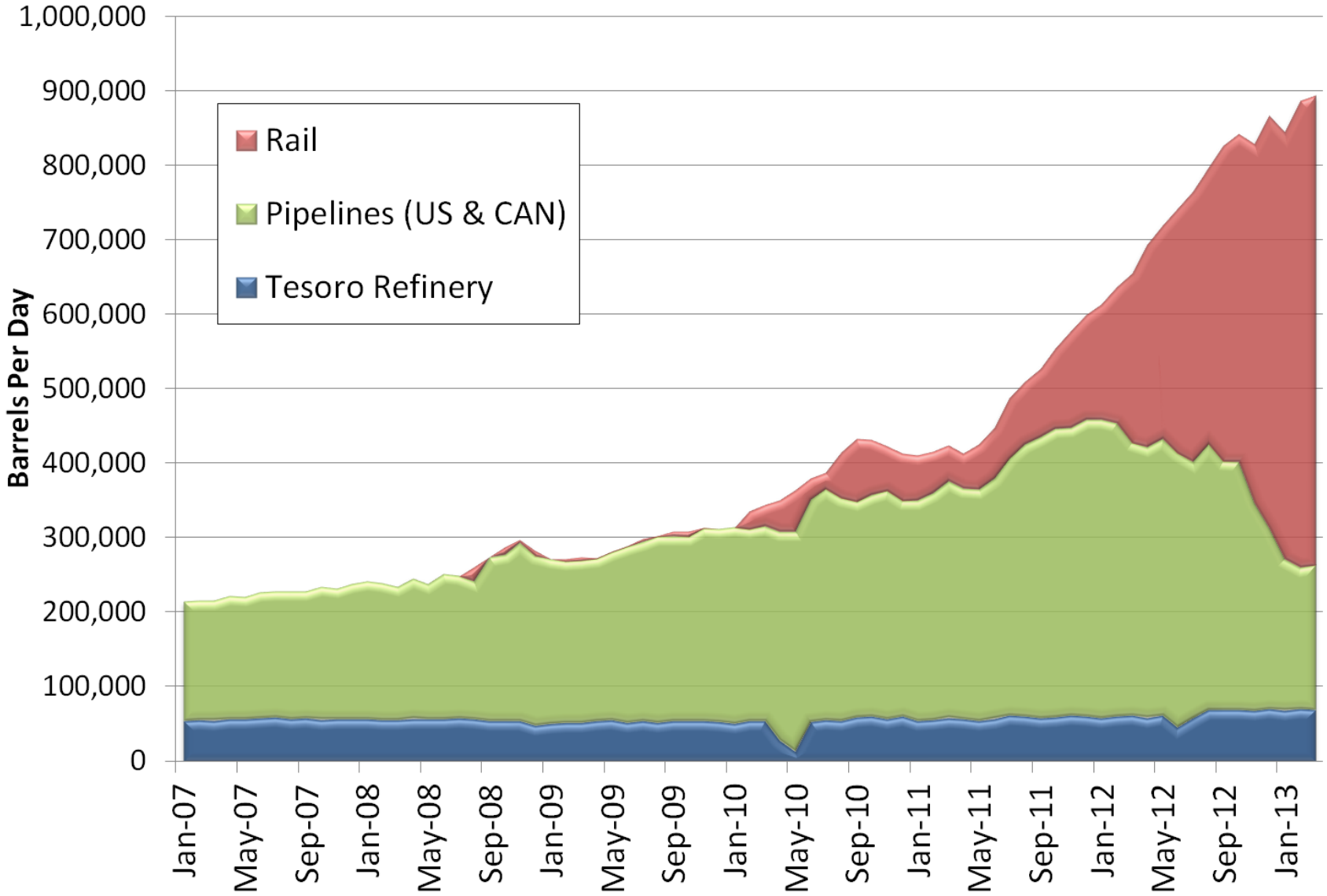
Estimated Williston Basin Oil Transportation



March 2013

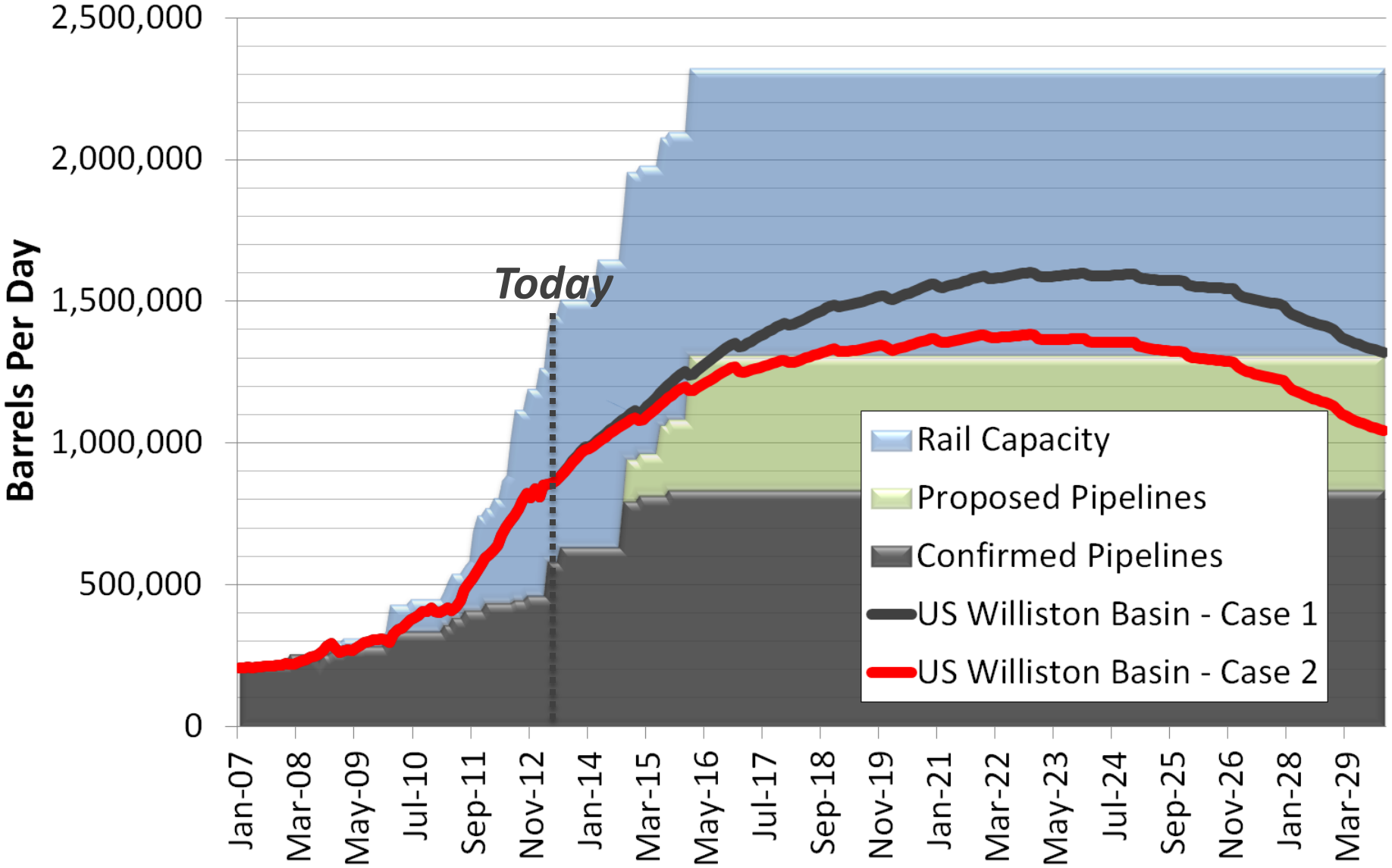
- Pipeline Export
- Tesoro Refinery
- Truck to Canadian Pipelines
- Estimated Rail

US Williston Basin Oil Transport*



*Some data based on estimates or assumptions

Williston Basin Oil Production & Export Capacity, BOPD



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

OIL TRANSPORTATION TABLE

This is a table used by the Pipeline Authority to create the charts seen in the presentations. If anyone notices an error, please contact the Pipeline Authority to get the table updated.

US Williston Basin Crude Oil Export Options - May 27, 2013

Year End System Capacity, Barrels Per Day

	2007	2008	2009	2010	2011	2012	2013	2014*	2015*	2016*
Butte Pipeline	92,000	104,000	118,000	118,000	145,000	160,000	160,000	160,000	160,000	160,000
Butte Loop (Late 2014)	-	-	-	-	-	-	-	110,000	110,000	110,000
Tesoro Mandan Refinery (June/July 2012)	58,000	58,000	58,000	58,000	58,000	68,000	68,000	68,000	68,000	68,000
Enbridge Mainline North Dakota	80,000	110,000	110,000	161,500	185,000	210,000	210,000	210,000	210,000	210,000
Enbridge Bakken Expansion Program (Q1-11/Q1-13)	-	-	-	-	25,000	25,000	145,000	145,000	145,000	145,000
Plains Bakken North (Q2 2013, Up to 75,000 BOPD)	-	-	-	-	-	-	50,000	50,000	50,000	50,000
High Prairie Pipeline*	-	-	-	-	-	-	-	150,000	150,000	150,000
Enbridge Sandpiper* (Q1 2016)	-	-	-	-	-	-	-	-	-	225,000
TransCanada Keystone XL* (2015)	-	-	-	-	-	-	-	-	100,000	100,000
Dakota Prairie Refinery (Q4 2014/Q1 2015)	-	-	-	-	-	-	-	-	20,000	20,000
Thunder Butte Refinery (2015)	-	-	-	-	-	-	-	-	20,000	20,000
Hiland Partners Double H Pipeline (Q3 2014, Up to 100,000 BOPD)	-	-	-	-	-	-	-	50,000	50,000	50,000
Pipeline/Refining Total	**230,000**	**272,000**	**286,000**	**337,500**	**413,000**	**463,000**	**633,000**	**943,000**	**1,083,000**	**1,308,000**
EOG Rail, Stanley, ND (Up to 90,000 BOPD)	-	-	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000
Dakota Plains, New Town, ND	-	-	-	20,000	30,000	30,000	30,000	80,000	80,000	80,000
Various Sites in Minot, Dore, Donnybrook, Gascoyne, and Stampede (est)	-	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Inergy COLT Hub, Epping, ND (Q2 2012)	-	-	-	-	-	120,000	120,000	120,000	120,000	120,000
Hess Rail, Tioga, ND (Up to 120,000 BOPD)	-	-	-	-	-	60,000	60,000	60,000	60,000	60,000
Bakken Oil Express, Dickinson, ND	-	-	-	-	100,000	100,000	100,000	100,000	100,000	100,000
Savage Services, Trenton, ND (Q2 2012 Unit Trains)	-	-	-	-	-	90,000	90,000	90,000	90,000	90,000
Enbridge, Berthold, ND (Q4 2012)	-	-	-	-	-	10,000	80,000	80,000	80,000	80,000
Great Northern Midstream, Fryburg, ND (Q1 2013)	-	-	-	-	-	-	60,000	60,000	60,000	60,000
Musket, Dore, ND (Q2 2012)	-	-	-	-	-	60,000	60,000	60,000	60,000	60,000
Plains, Ross, ND	-	-	-	-	20,000	20,000	65,000	65,000	65,000	65,000
Plains - Van Hook, New Town, ND	-	-	-	-	-	35,000	65,000	65,000	65,000	65,000
Global/Basin Transload, Zap, ND (Estimate Not Confirmed)	-	-	-	-	20,000	40,000	40,000	40,000	40,000	40,000
Northstar Transloading - Fairview, MT (Q1 2014)	-	-	-	-	-	-	-	100,000	100,000	100,000
Rail Only Total	-	30,000	95,000	115,000	265,000	660,000	865,000	1,015,000	1,015,000	1,015,000
All Transportation Total	**230,000**	**302,000**	**381,000**	**452,500**	**678,000**	**1,123,000**	**1,498,000**	**1,958,000**	**2,098,000**	**2,323,000**

*Project Still in the Review or Proposed Phase

Click on table to enlarge

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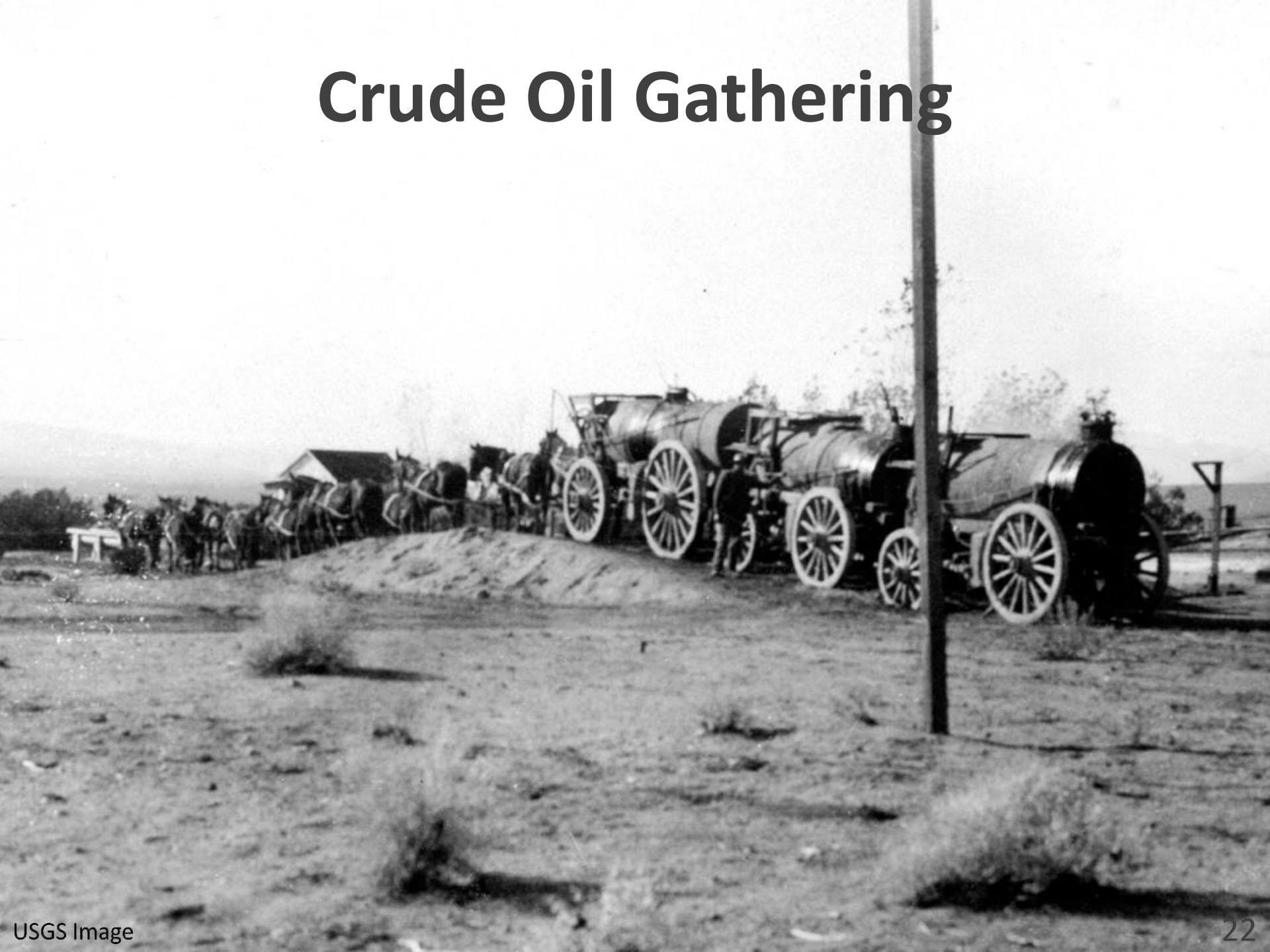
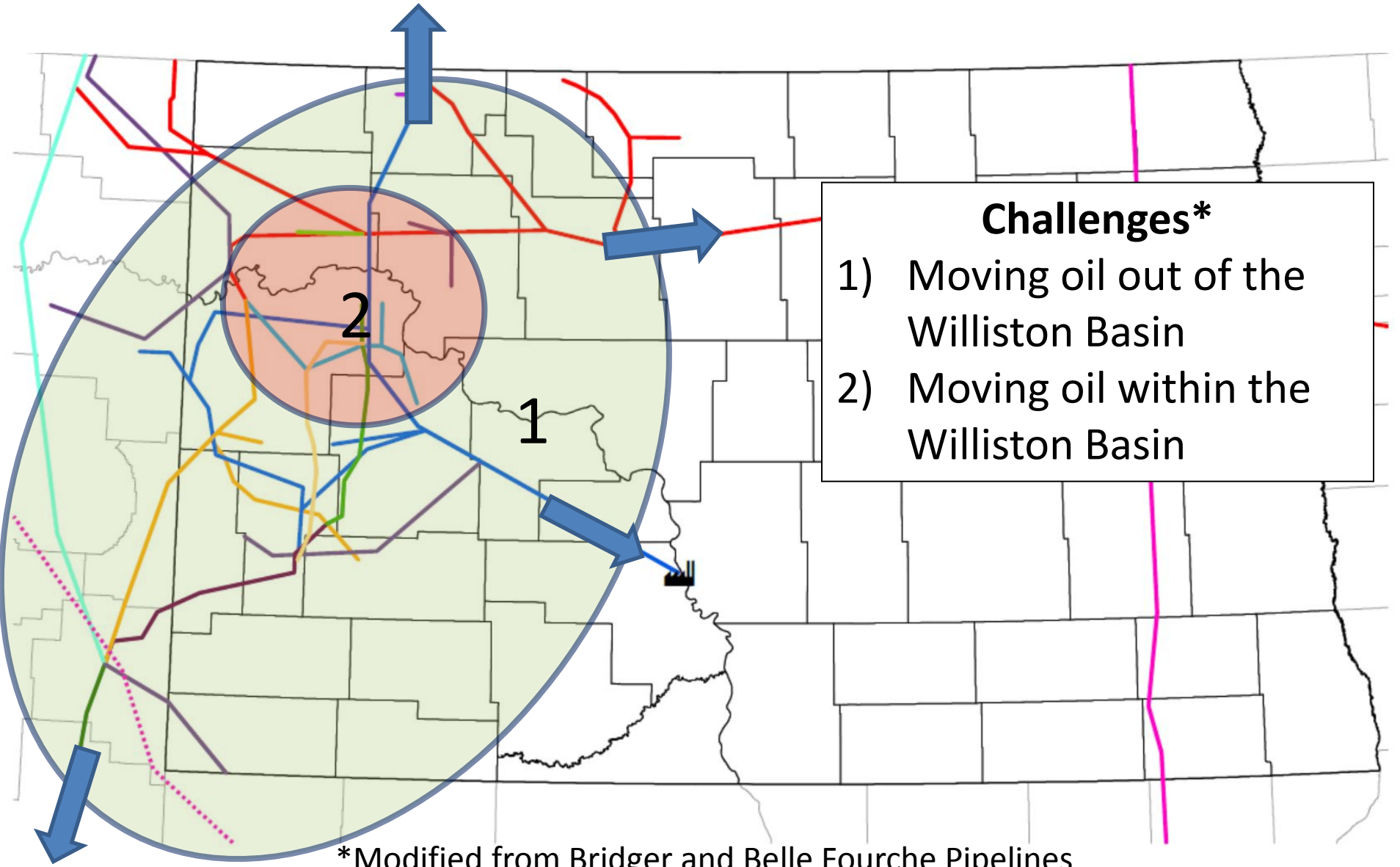
Crude Oil Gathering



USGS Image

North Dakota Crude Oil Pipelines



Challenges*

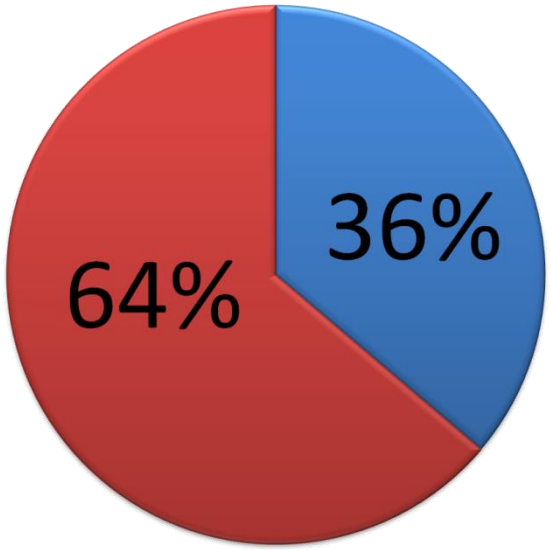
1) Moving oil out of the Williston Basin
2) Moving oil within the Williston Basin

*Modified from Bridger and Belle Fourche Pipelines

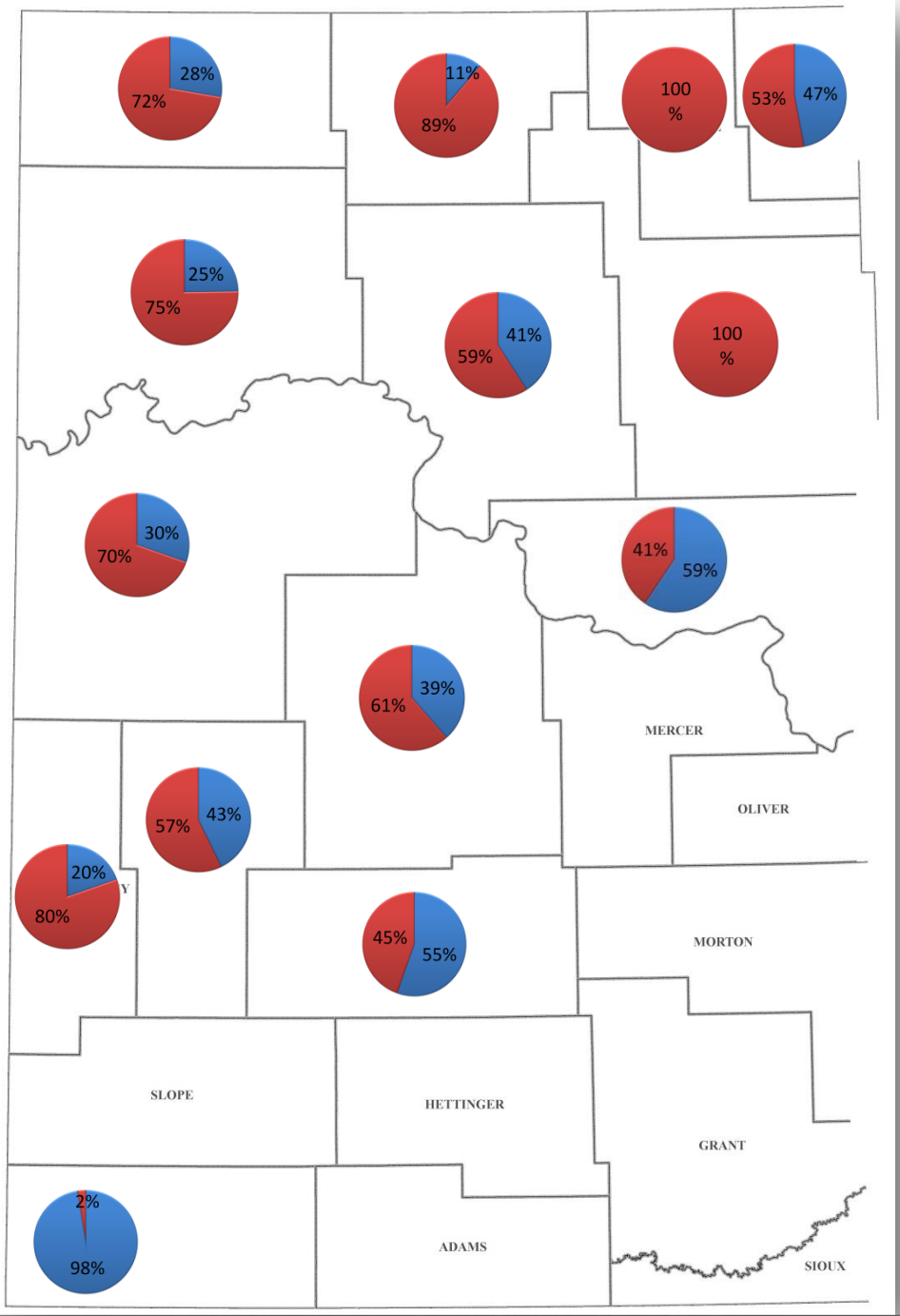
ND Crude Oil Gathering

Red – Trucked

Blue – Pipeline



All ND Production

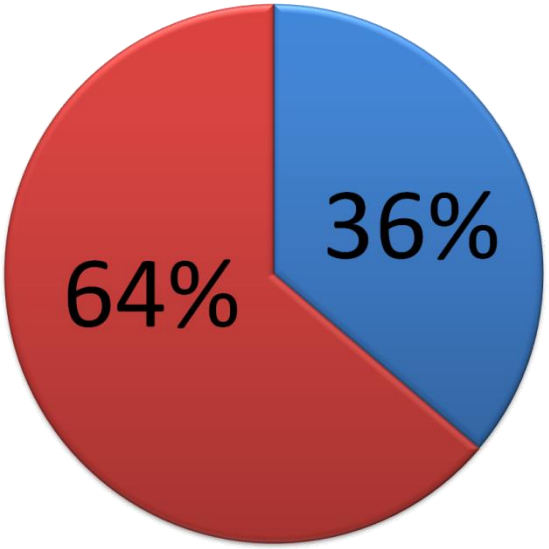


Sep 2012 Estimates – Some data incomplete or unavailable

ND Crude Oil Gathering

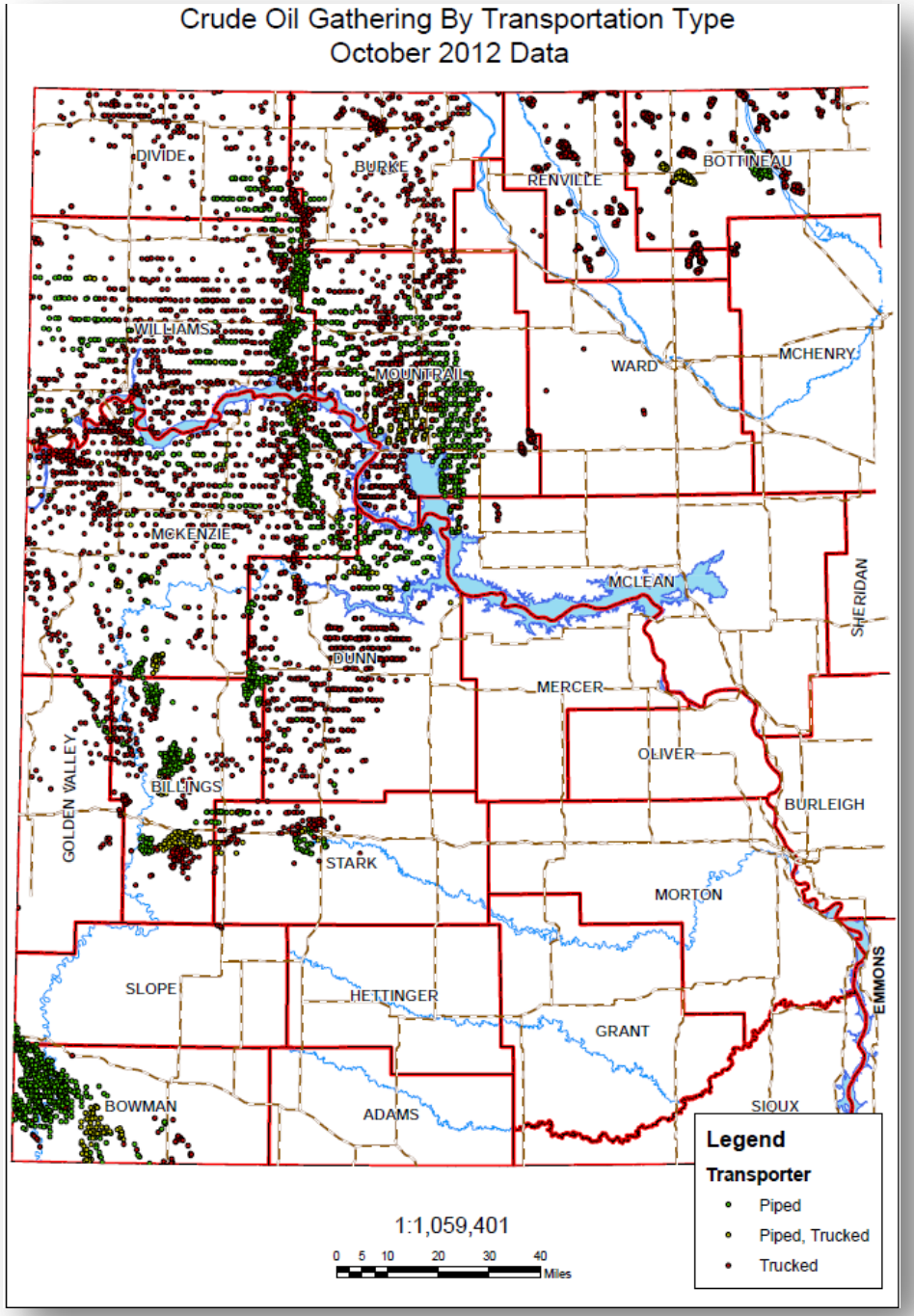
Red – Trucked

Blue – Pipeline



All ND Production

Sep 2012 Estimates – Some data incomplete or unavailable



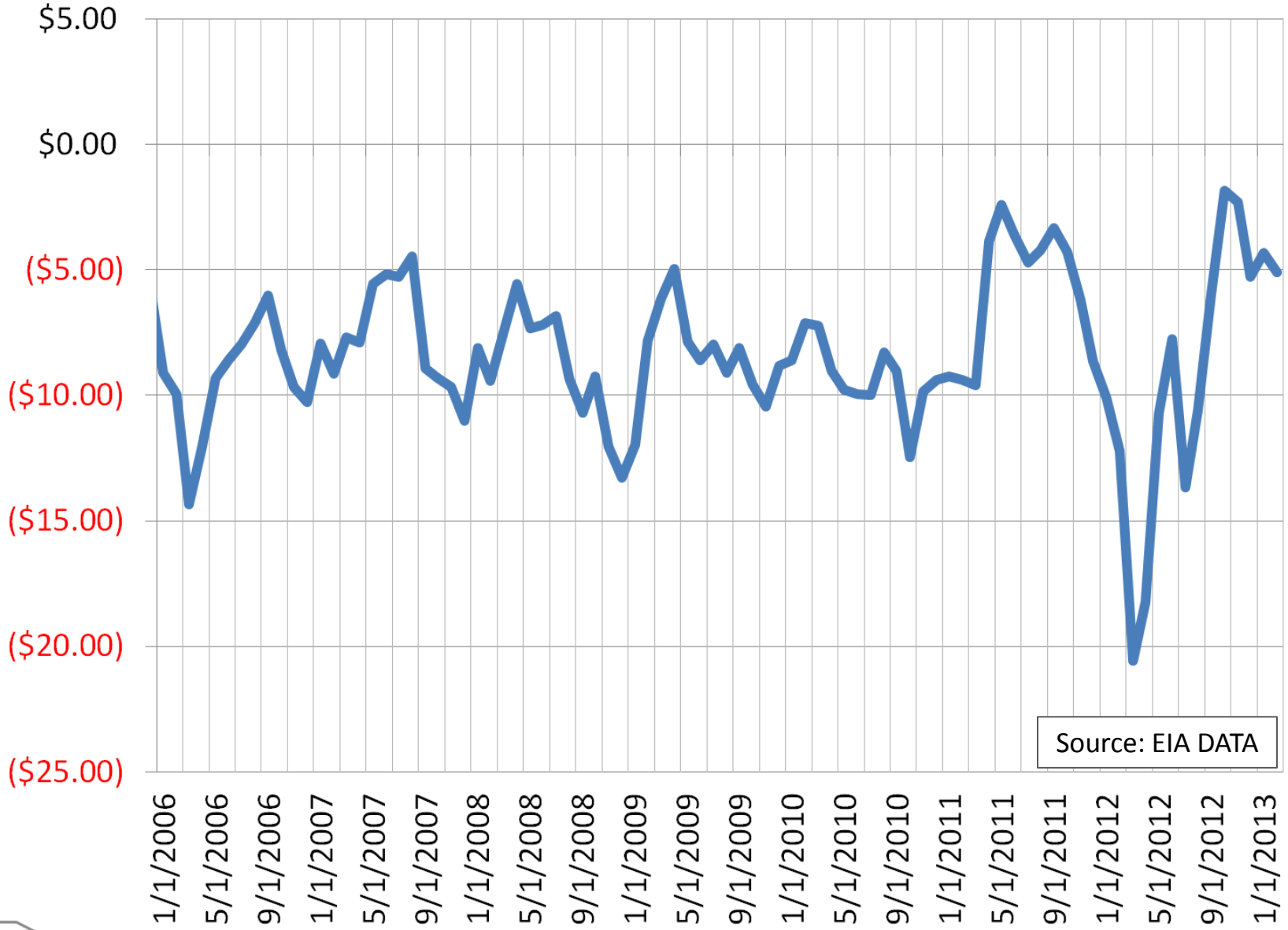
Crude Oil

Understanding production potential

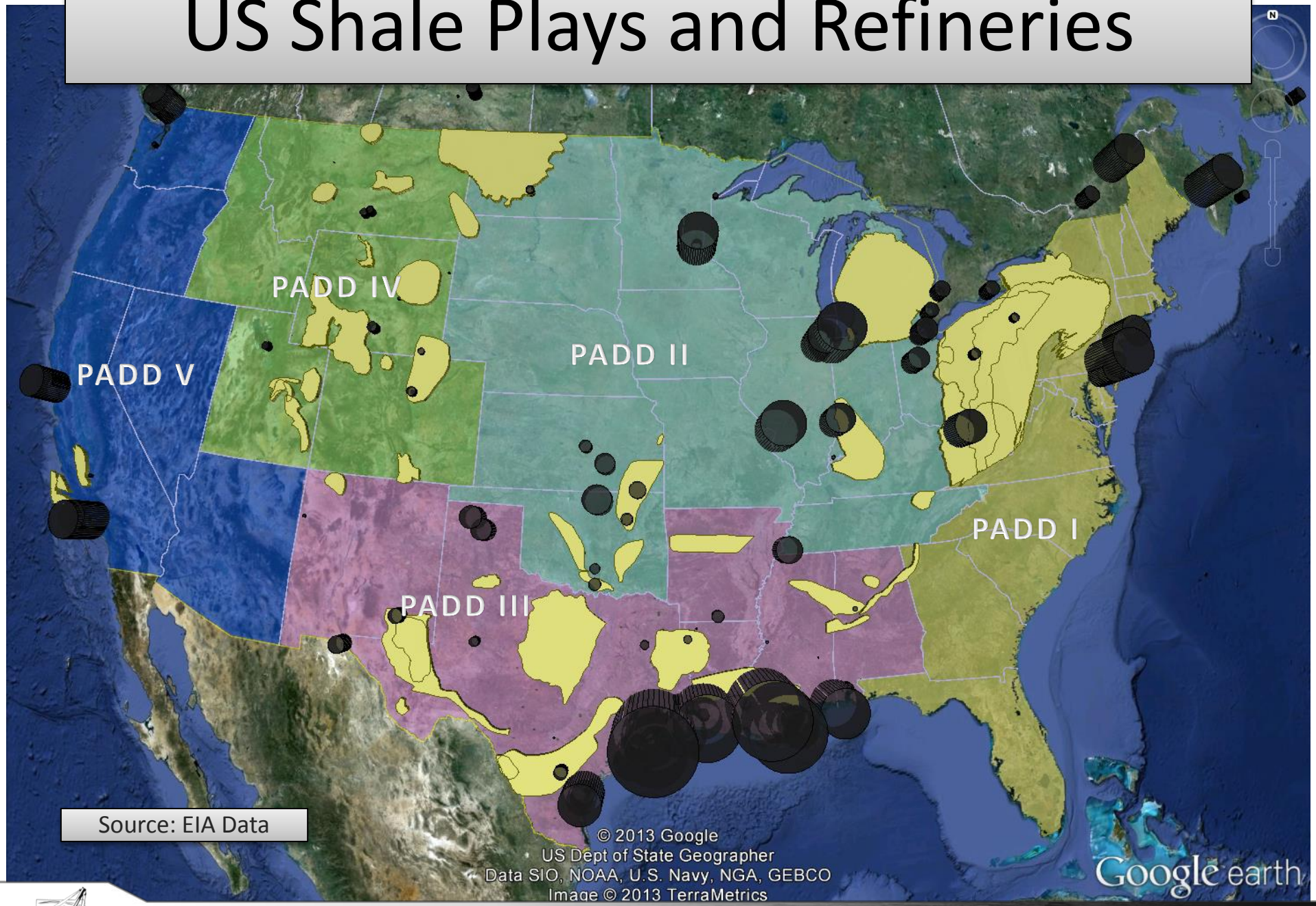
Understanding current transportation dynamics and potential transportation constraints

Understanding current and future market conditions (EPRINC & Others)

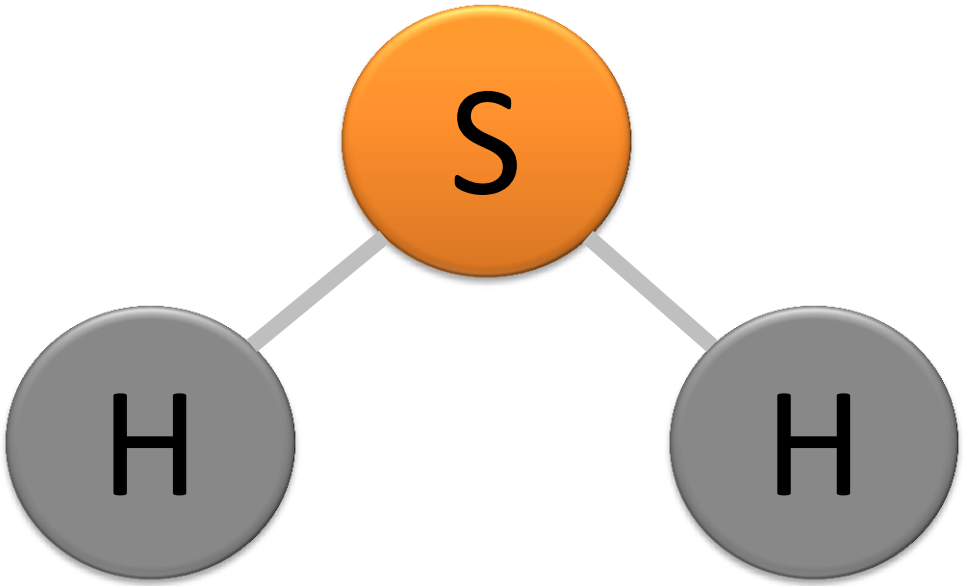
ND Oil Pricing: ND-WTI Differential



US Shale Plays and Refineries



Hydrogen Sulfide

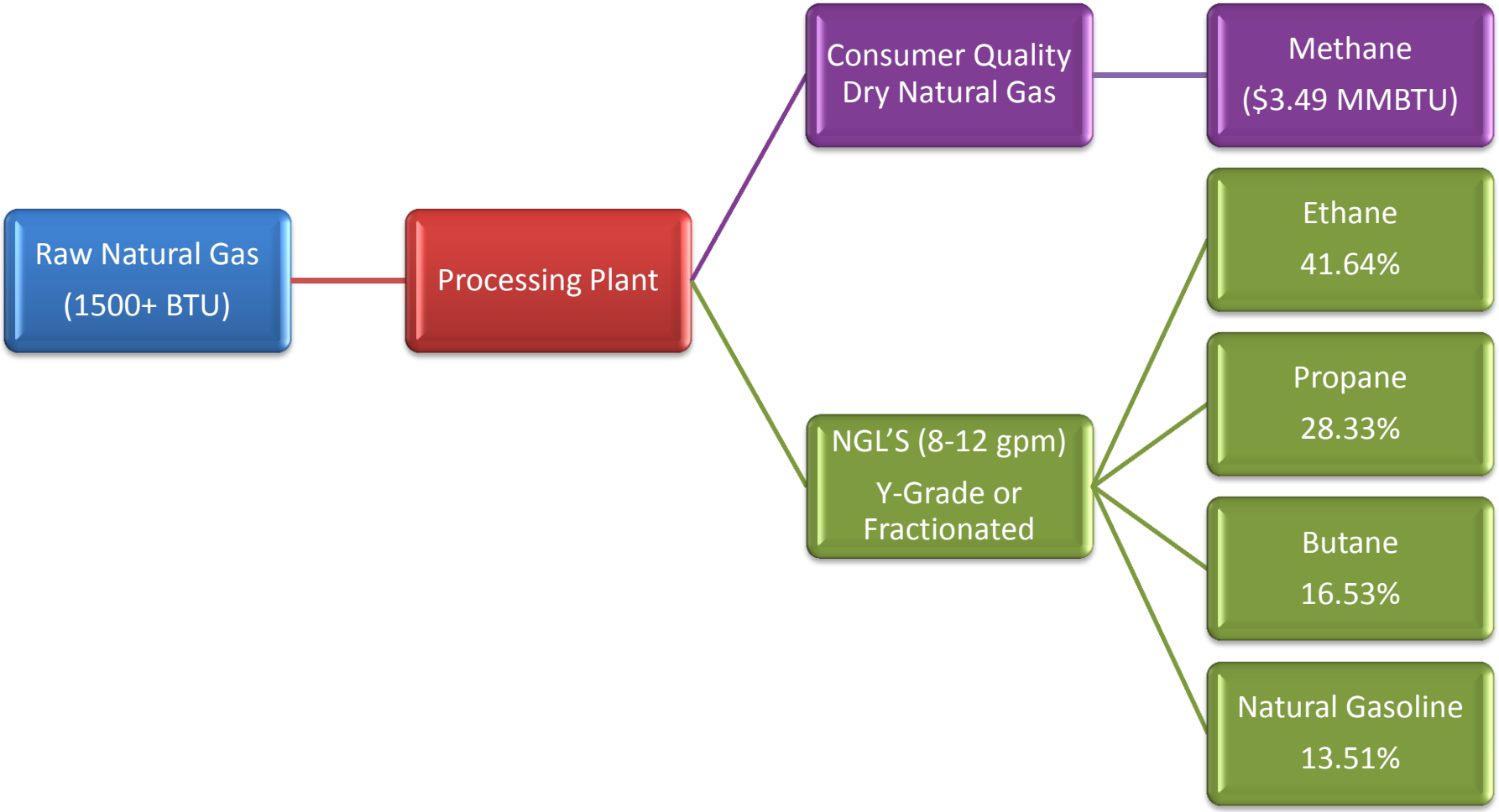


Natural Gas

Keys to Reducing Flaring

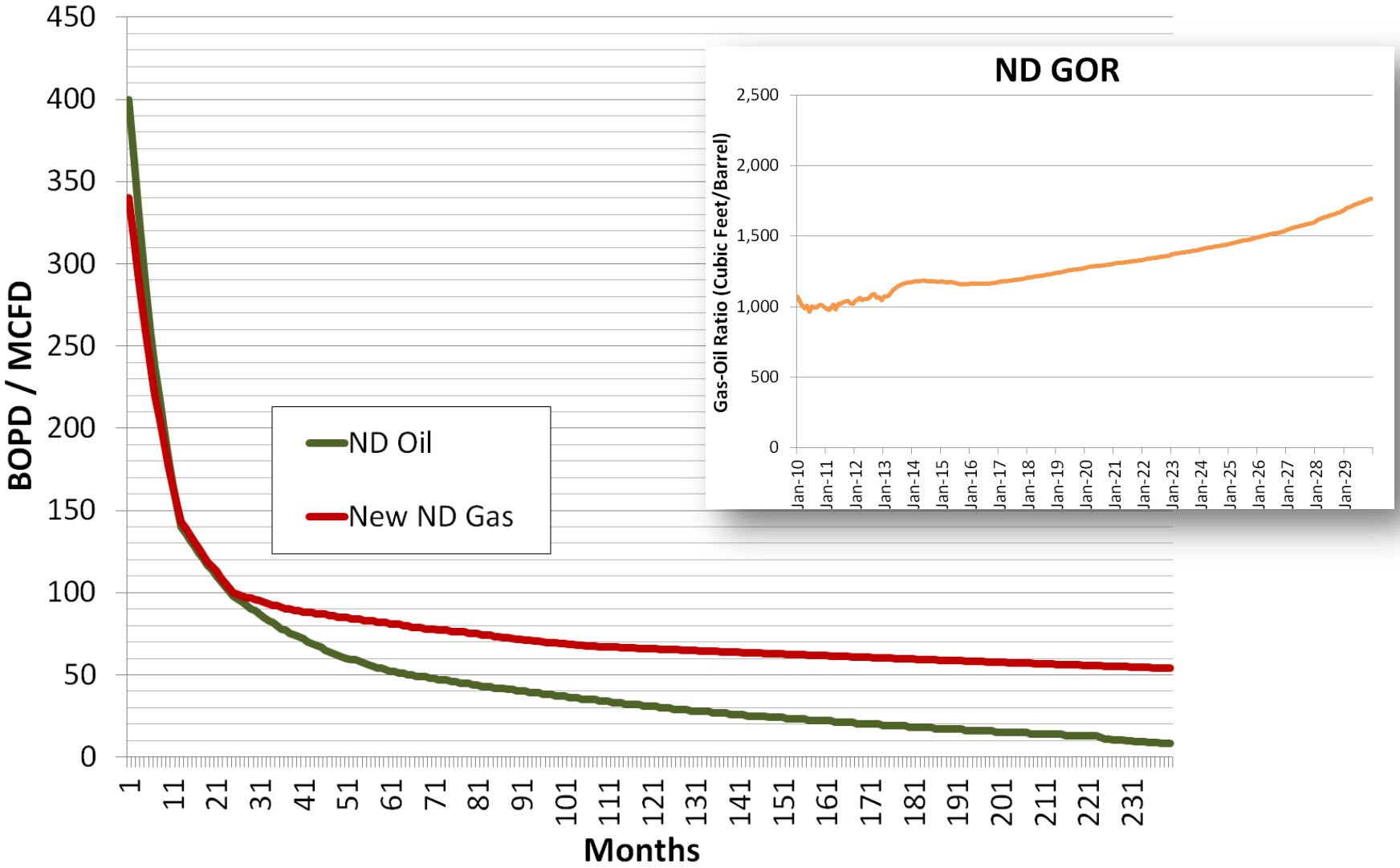
1. *Economics Must Work*
2. *Understanding Production Potential*
3. *New Gas Gathering Pipelines*
4. *Enhancing Existing Gathering Pipelines*
5. *Adequate Gas Processing Capacity*
6. *Adequate Interstate Pipeline Capacity*
7. *Flaring Alternatives (Short & Long Term)*

Rich Natural Gas



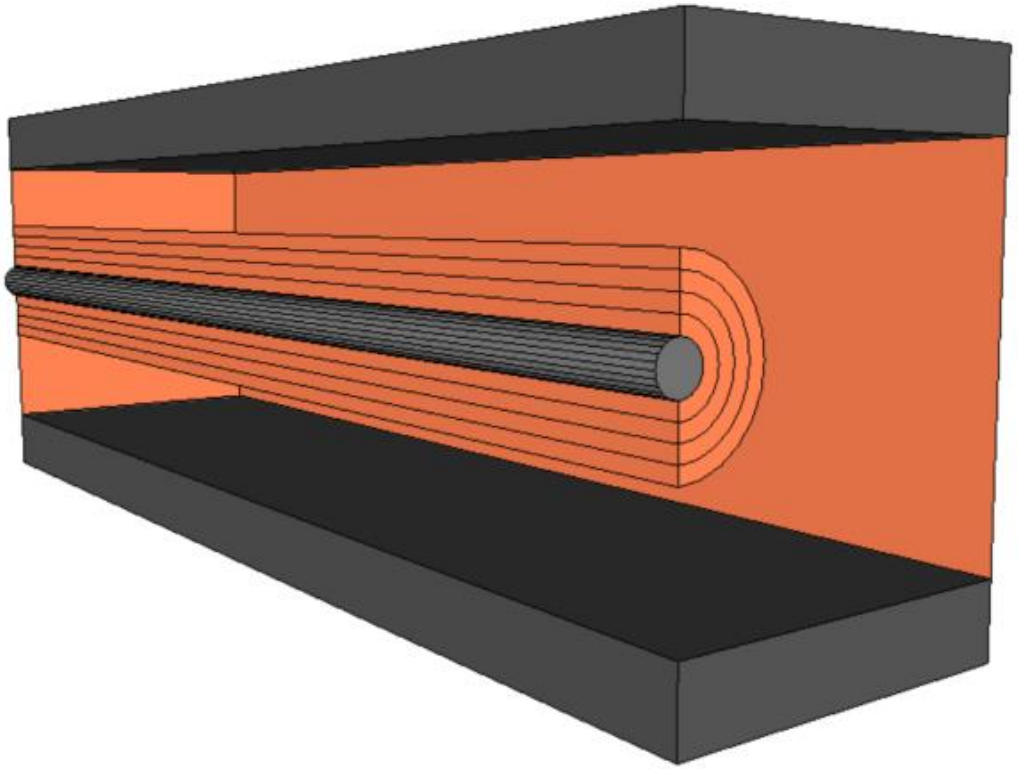
**Using NGL breakdown from the July 2012 BENTEK Natural Gas Study*

North Dakota Type Curves*

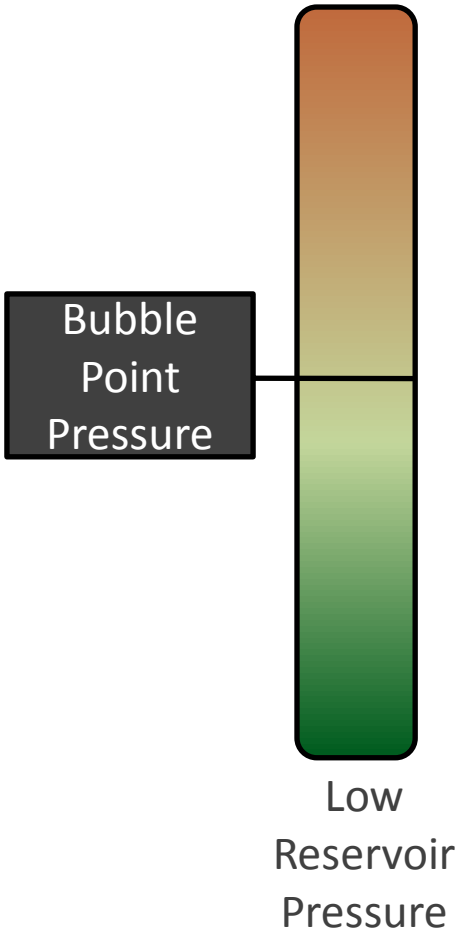


**Typical Type Curve Based on the July 2012 BENTEK Natural Gas Study*

Gas – Oil Ratio (GOR) Increasing Over Time



Horizontal Well Completed in Target Reservoir



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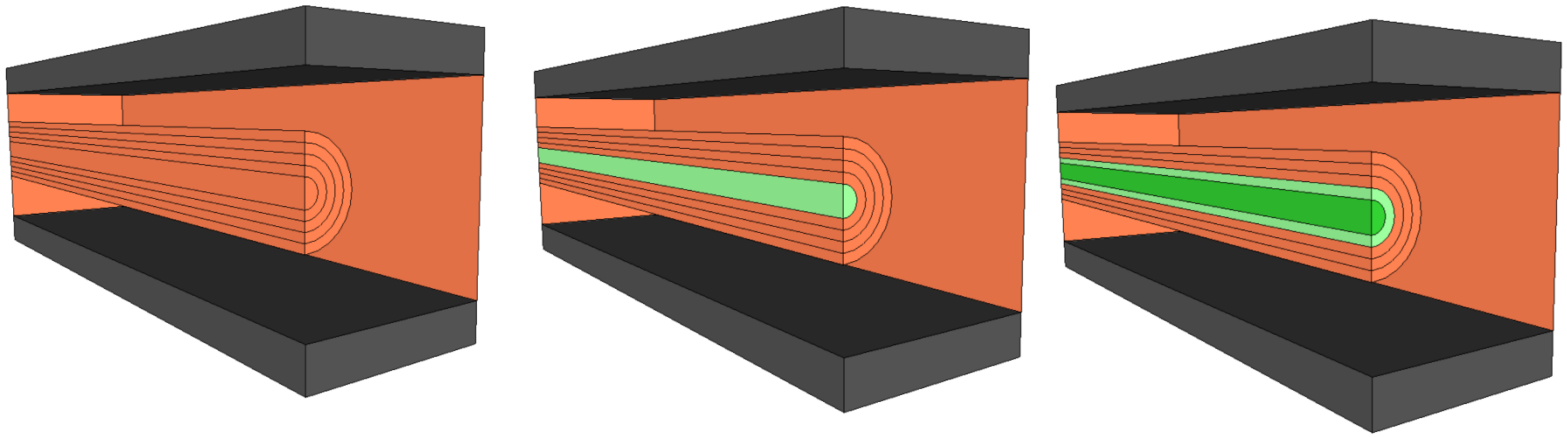
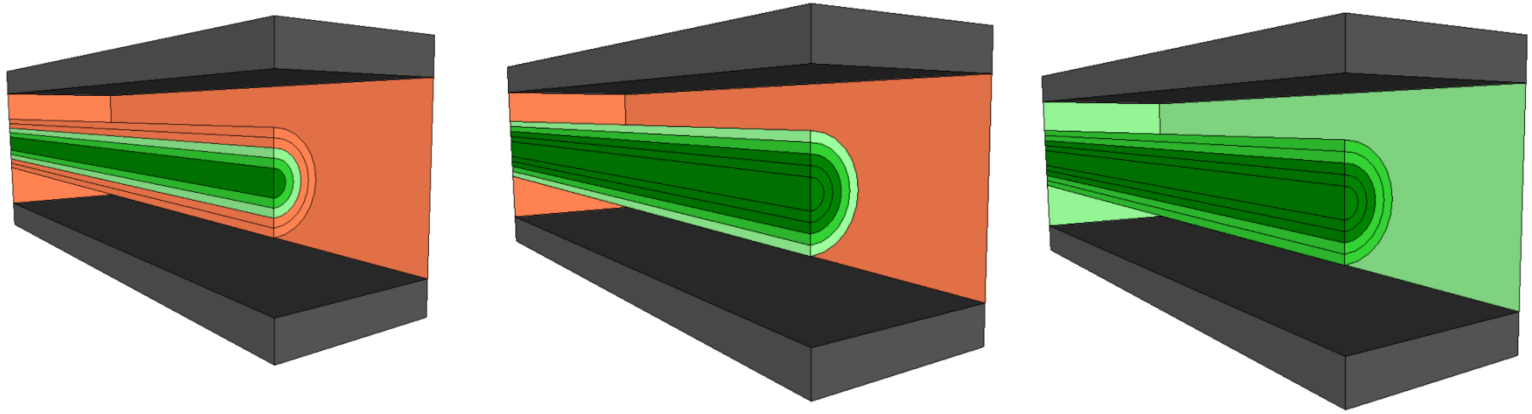


Youngest - Original Reservoir Pressure

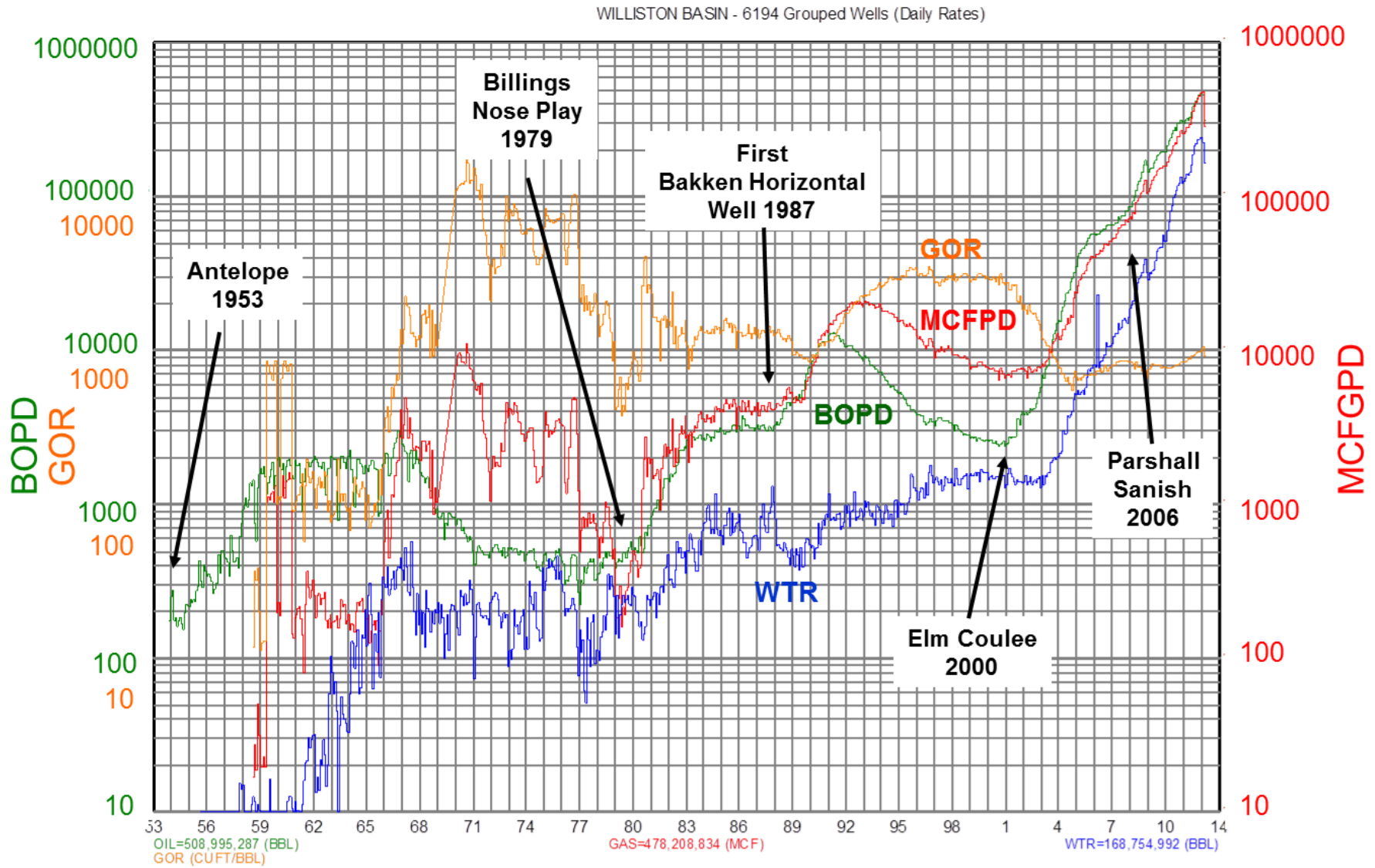


Oldest – Entire Reservoir Below Bubble Point

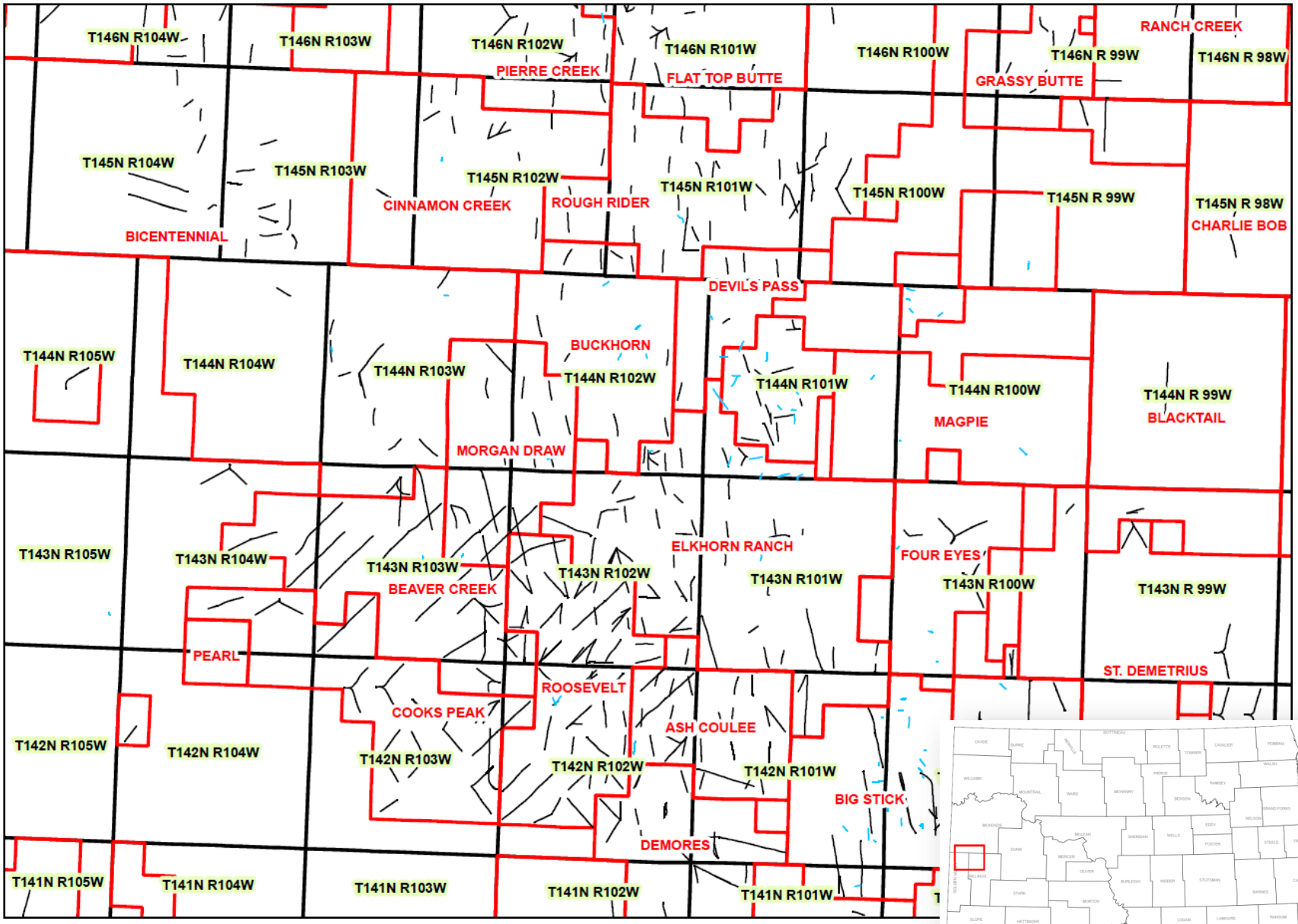
High Reservoir Pressure

Bubble Point Pressure

Low Reservoir Pressure

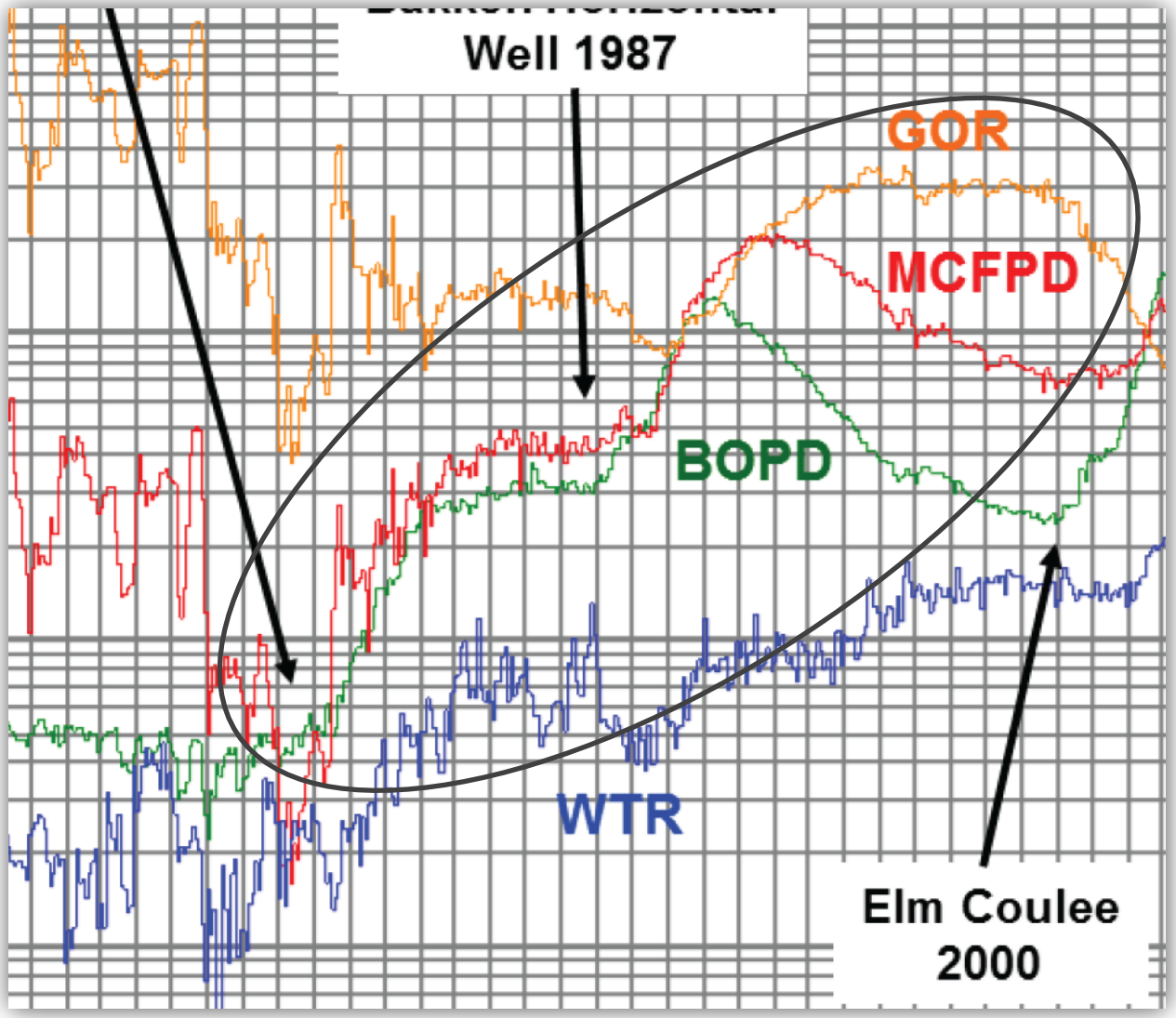


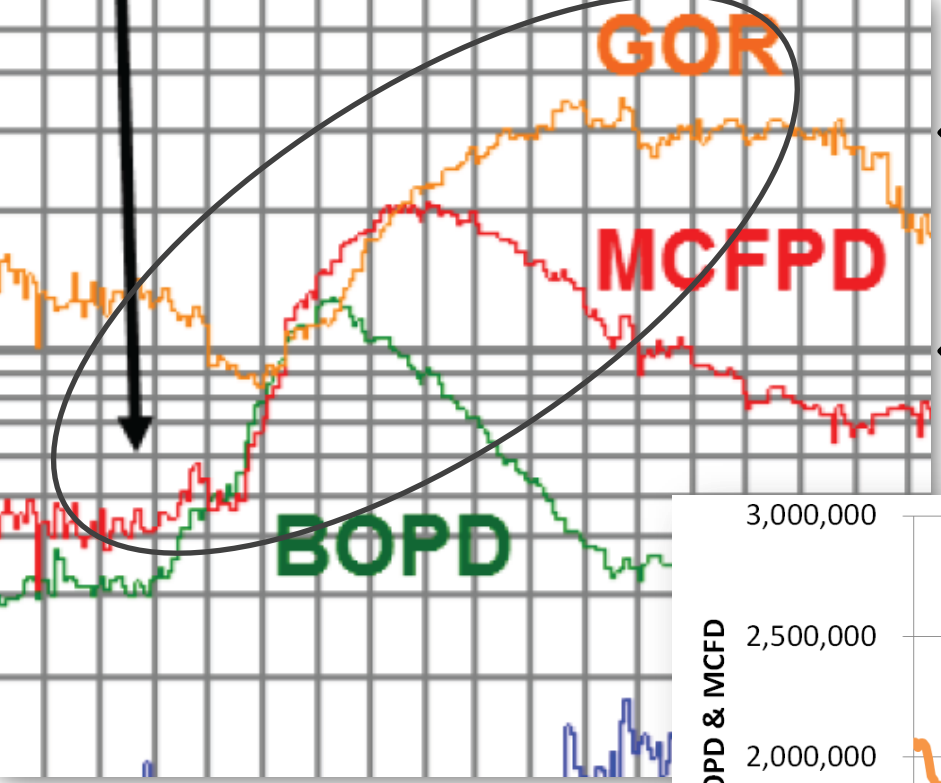
Production curve for the Bakken and Three Forks, US Williston Basin.
Source: BENTEK Energy July 2012 Report



Only horizontal wells shown on map

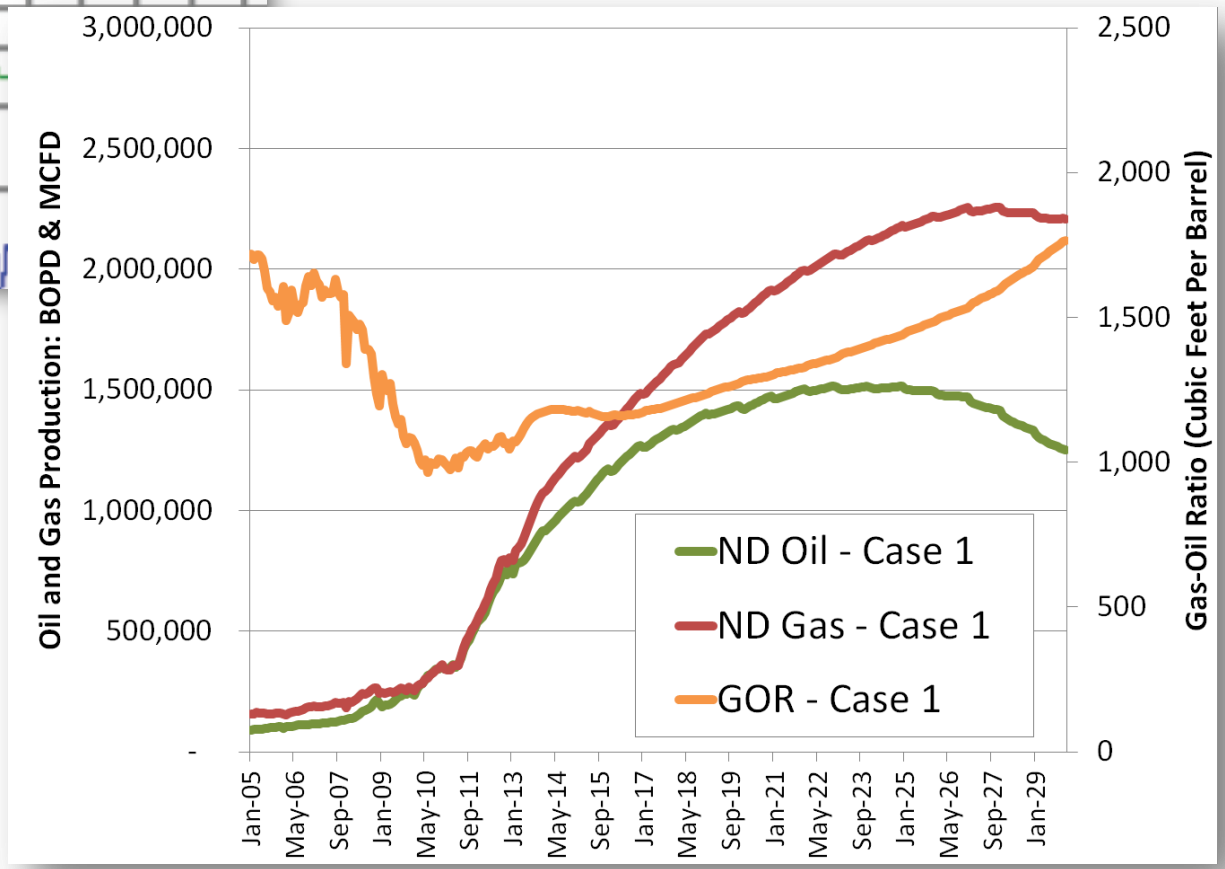
1980's-90's Bakken Development



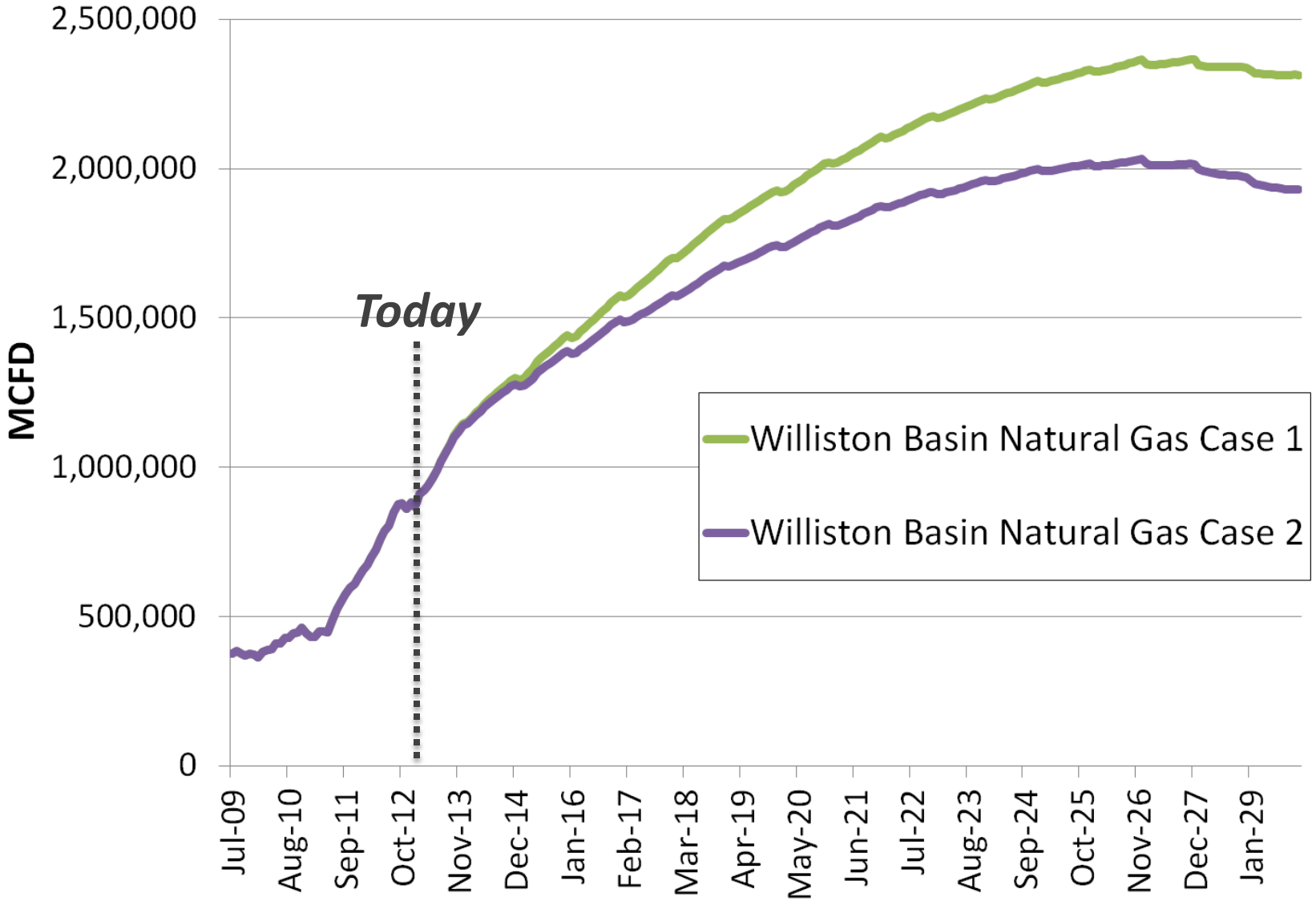


GOR 3,000 CUFT/BBL

GOR 1,000 CUFT/BBL



Forecasting Williston Basin Gas Production



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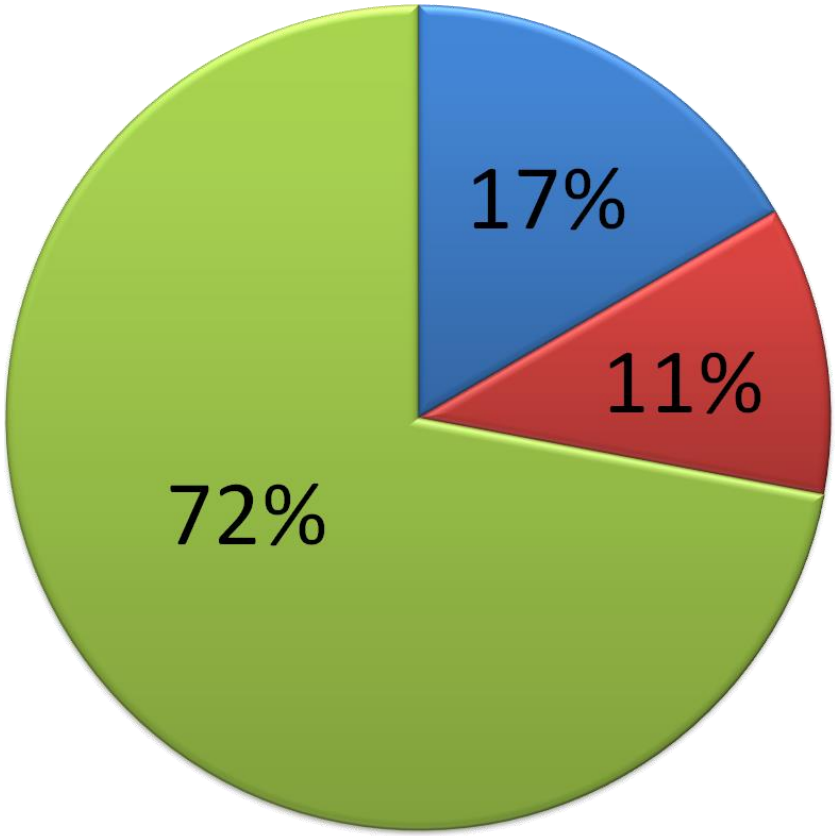
Solving the Flaring Challenge



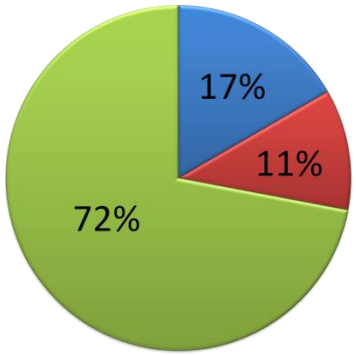
Statewide

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

Simple Terms

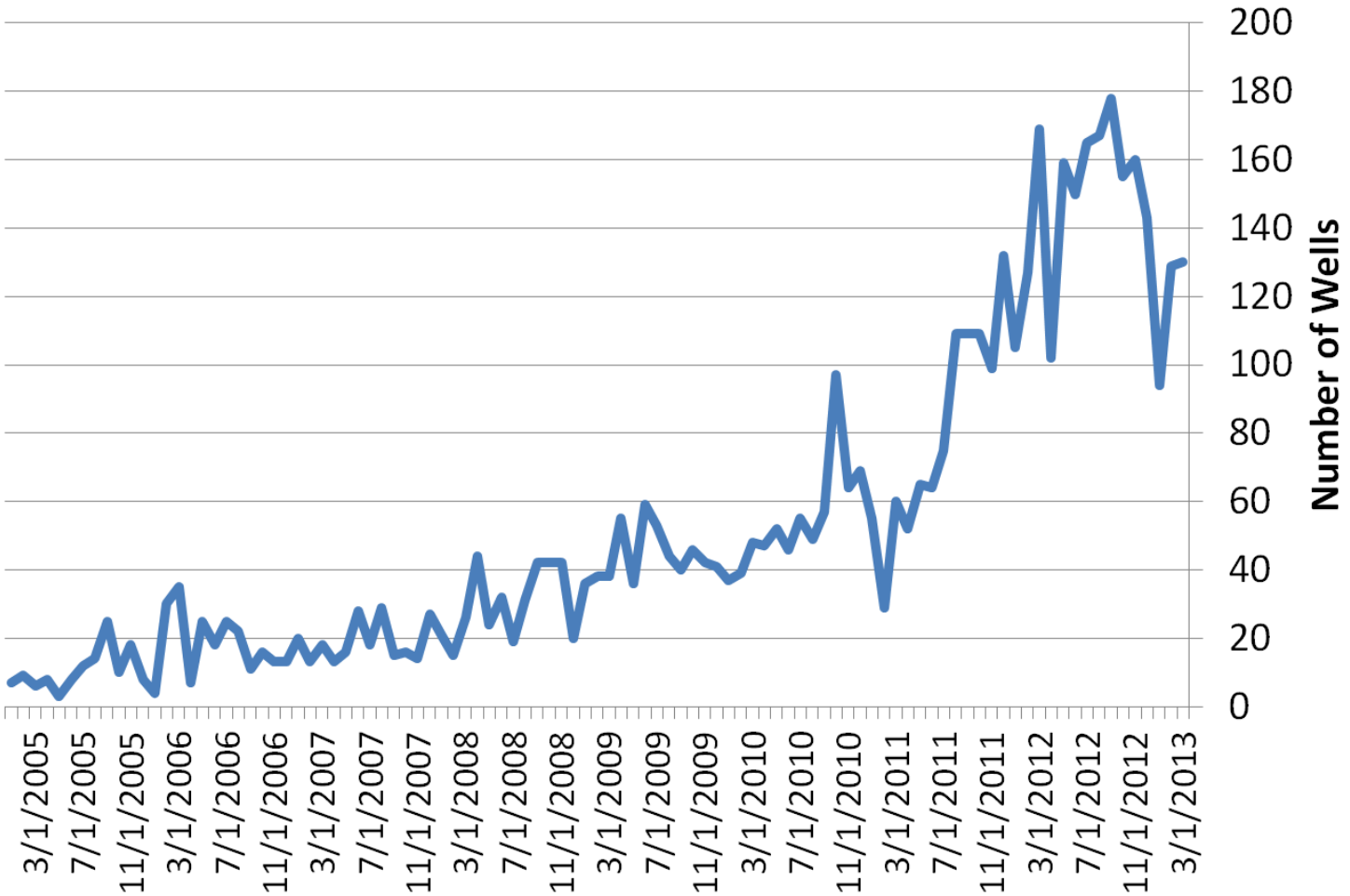
Red – Challenges on existing infrastructure
Blue – Lack of pipelines

March 2013 Data – Non-Confidential Wells

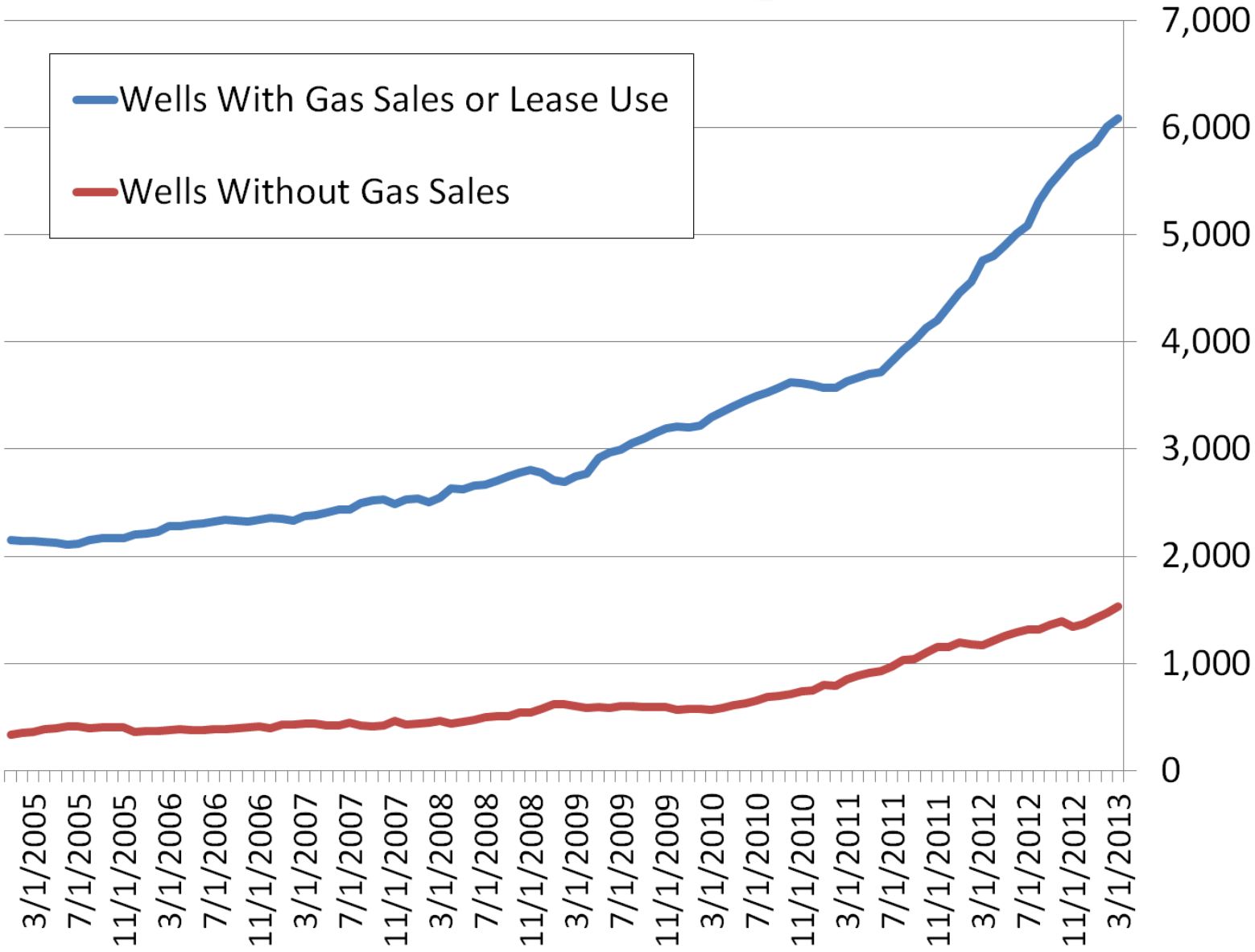


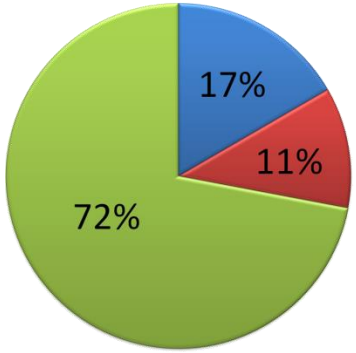
Capturing the 17%

Faster Well Connections

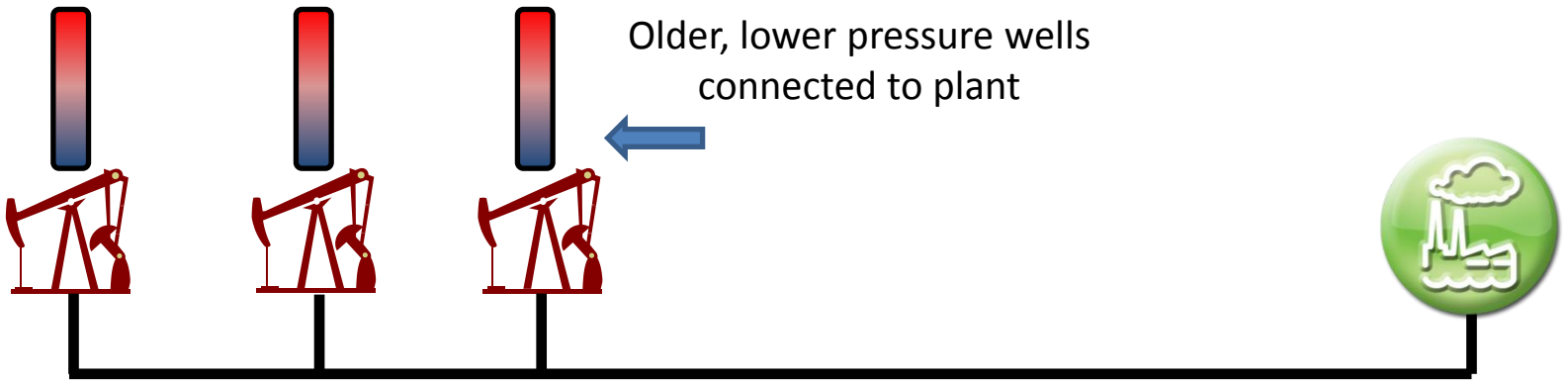


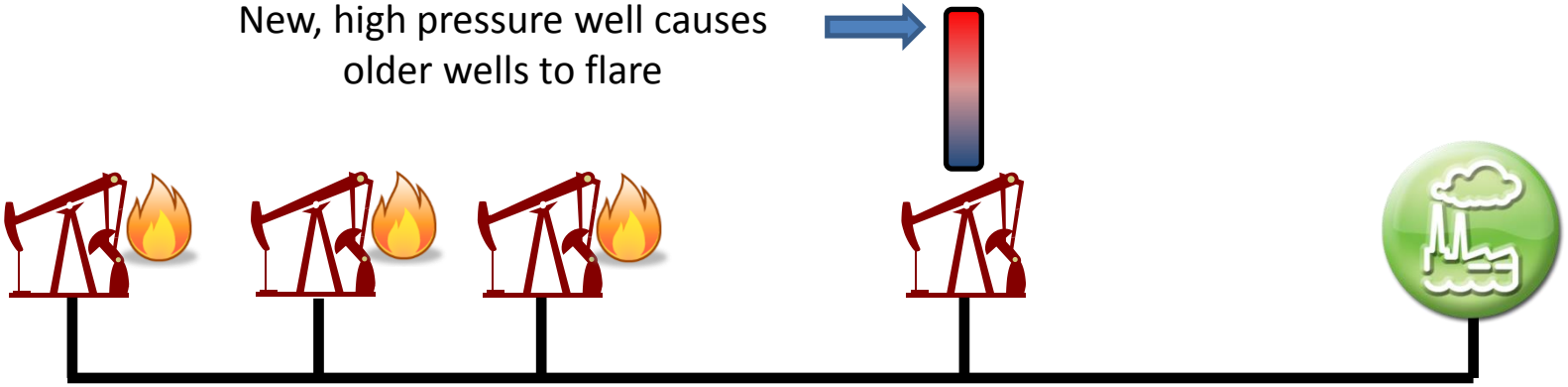
ND Gas Gathering Statistics

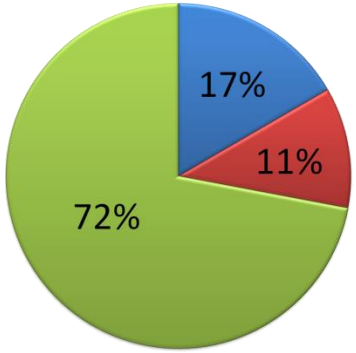




Capturing the 11%
Additional Compression

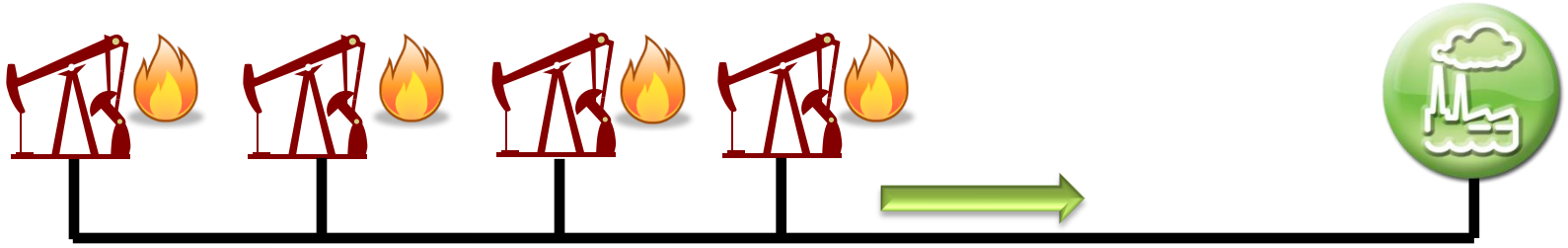


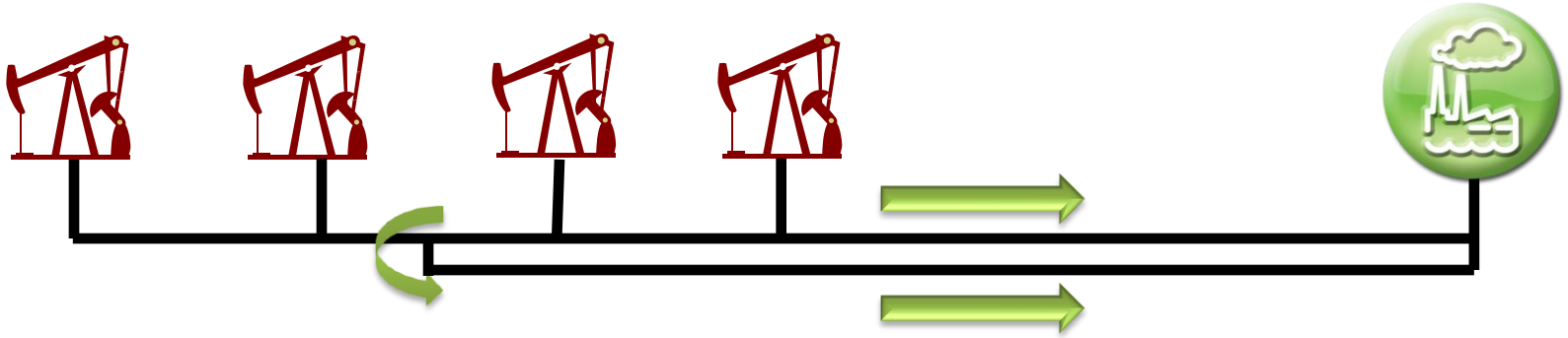


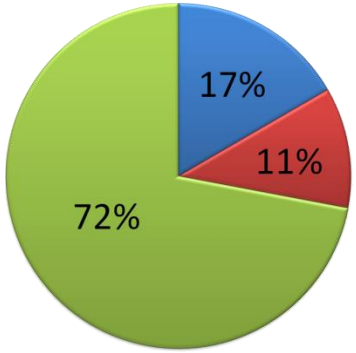


Capturing the 11%

Looping Existing Pipelines





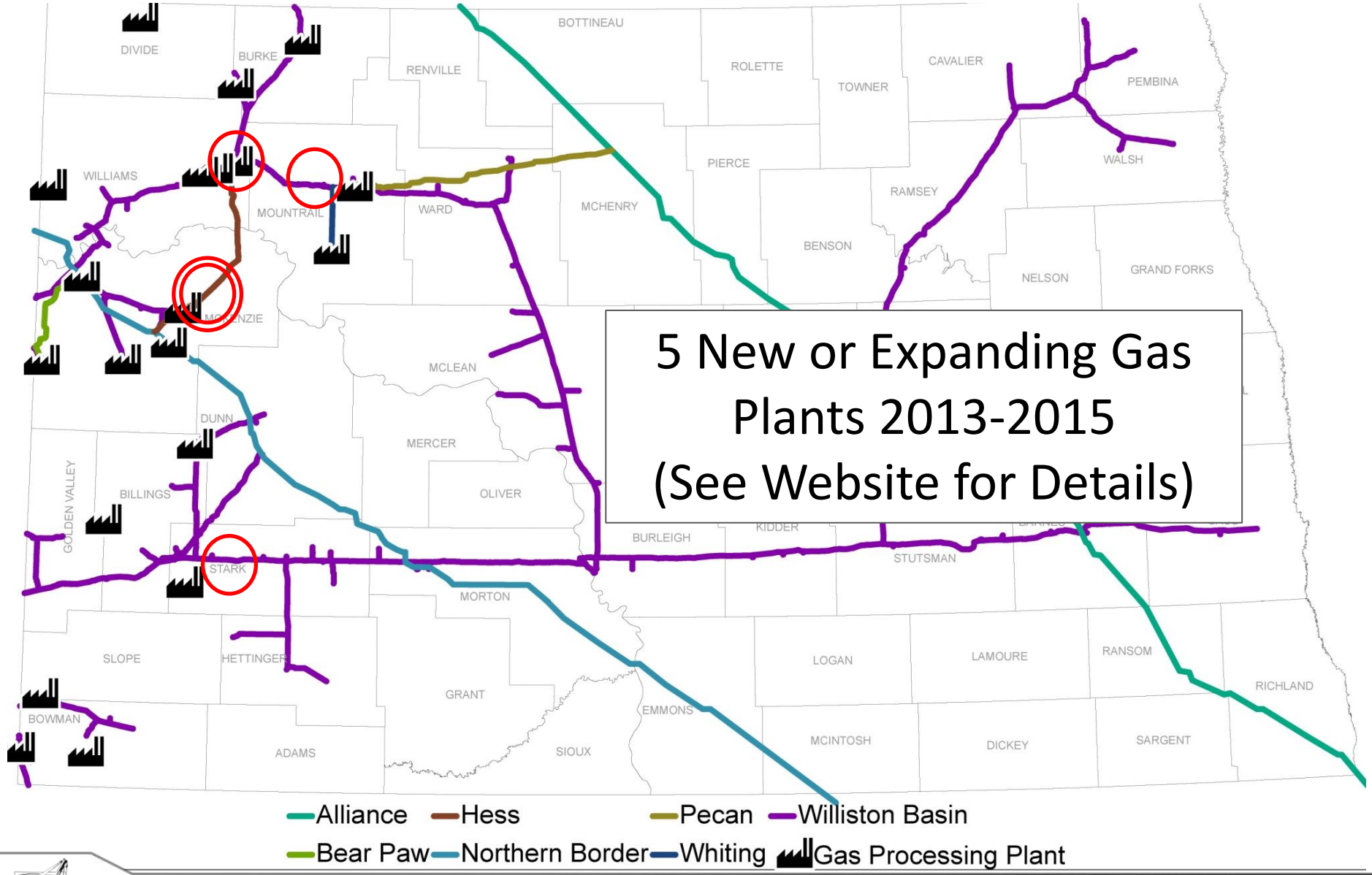


Capturing the 11%
Frequent Pigging

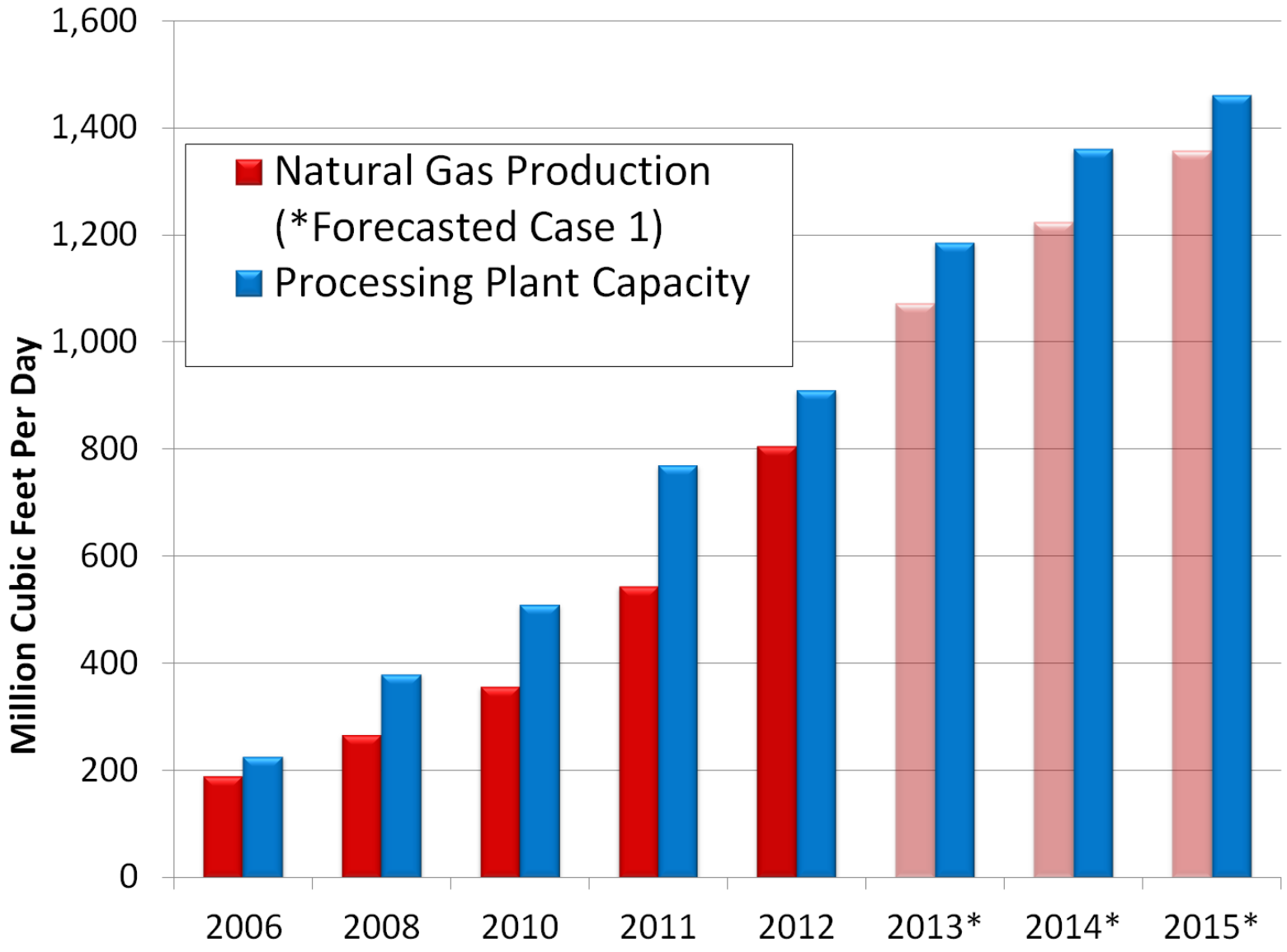
NGL buildup in gathering pipelines reduces area for gas to flow

More of an issue in winter months due to lower ground temperature causing more liquids to drop out

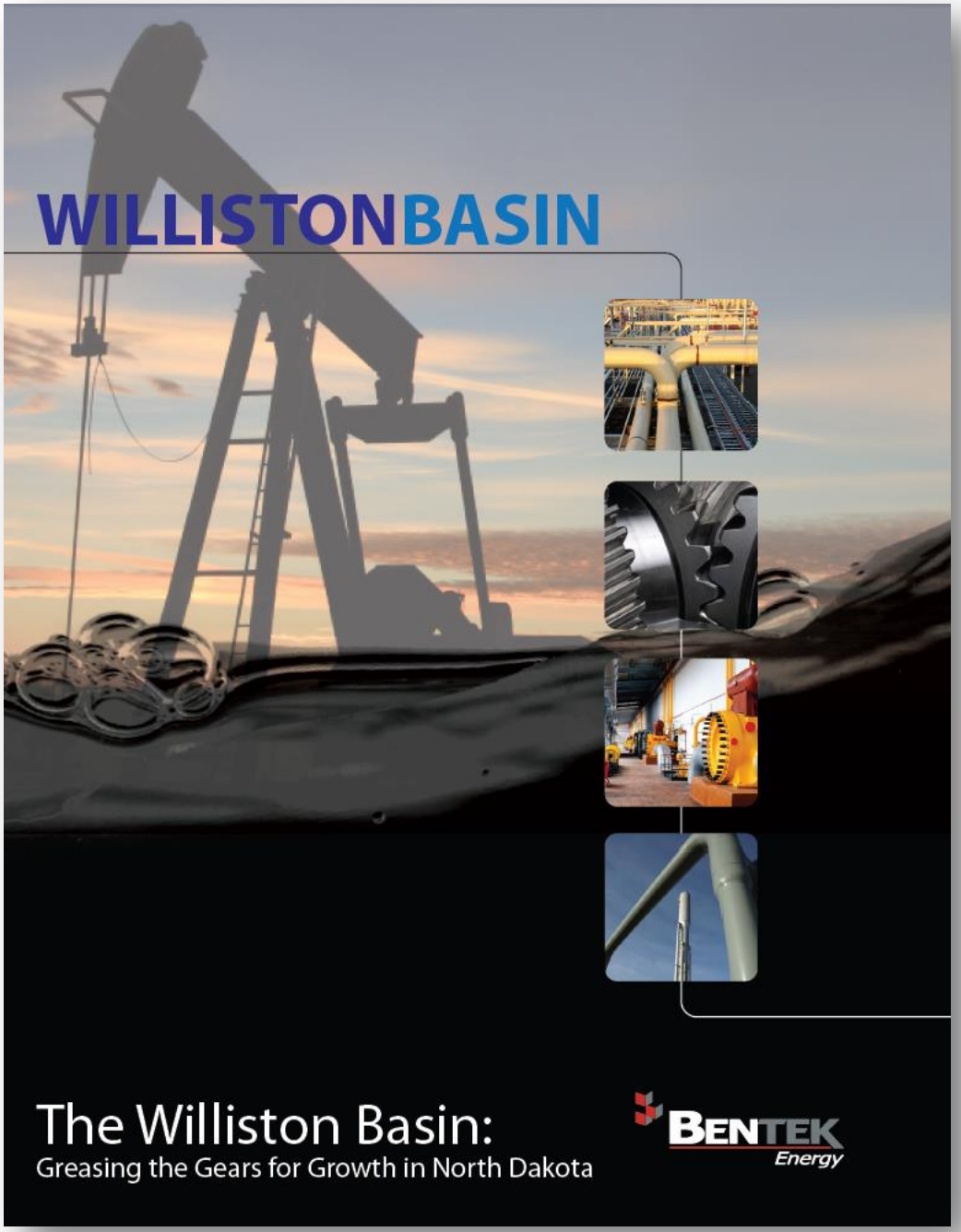
Natural Gas Processing & Transmission



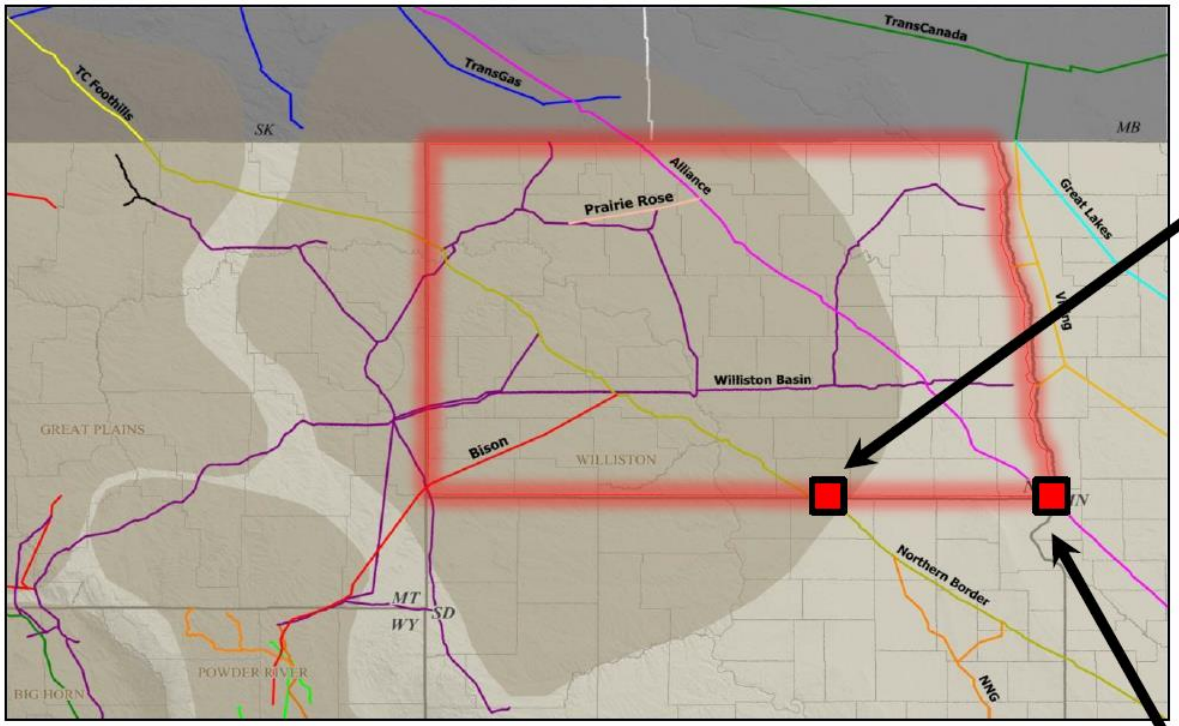
ND Gas Plant Capacity

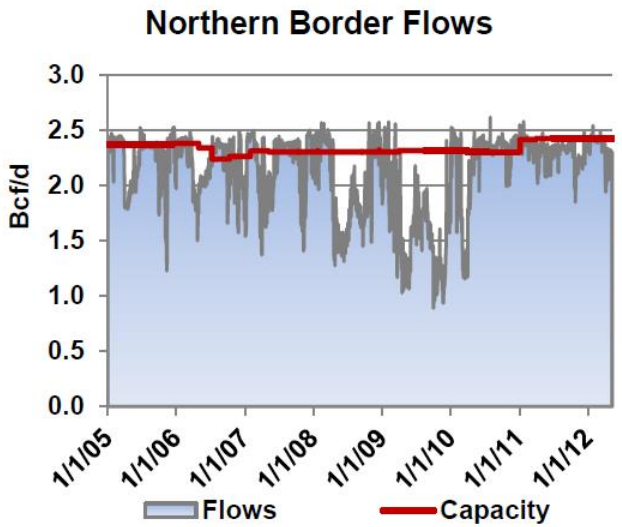


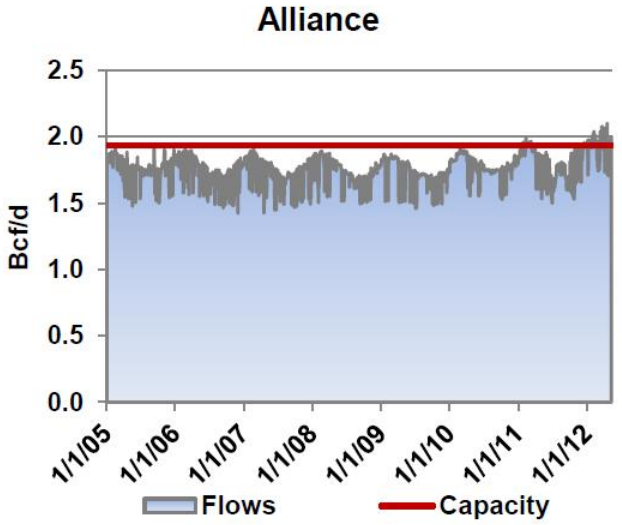
Natural Gas Study



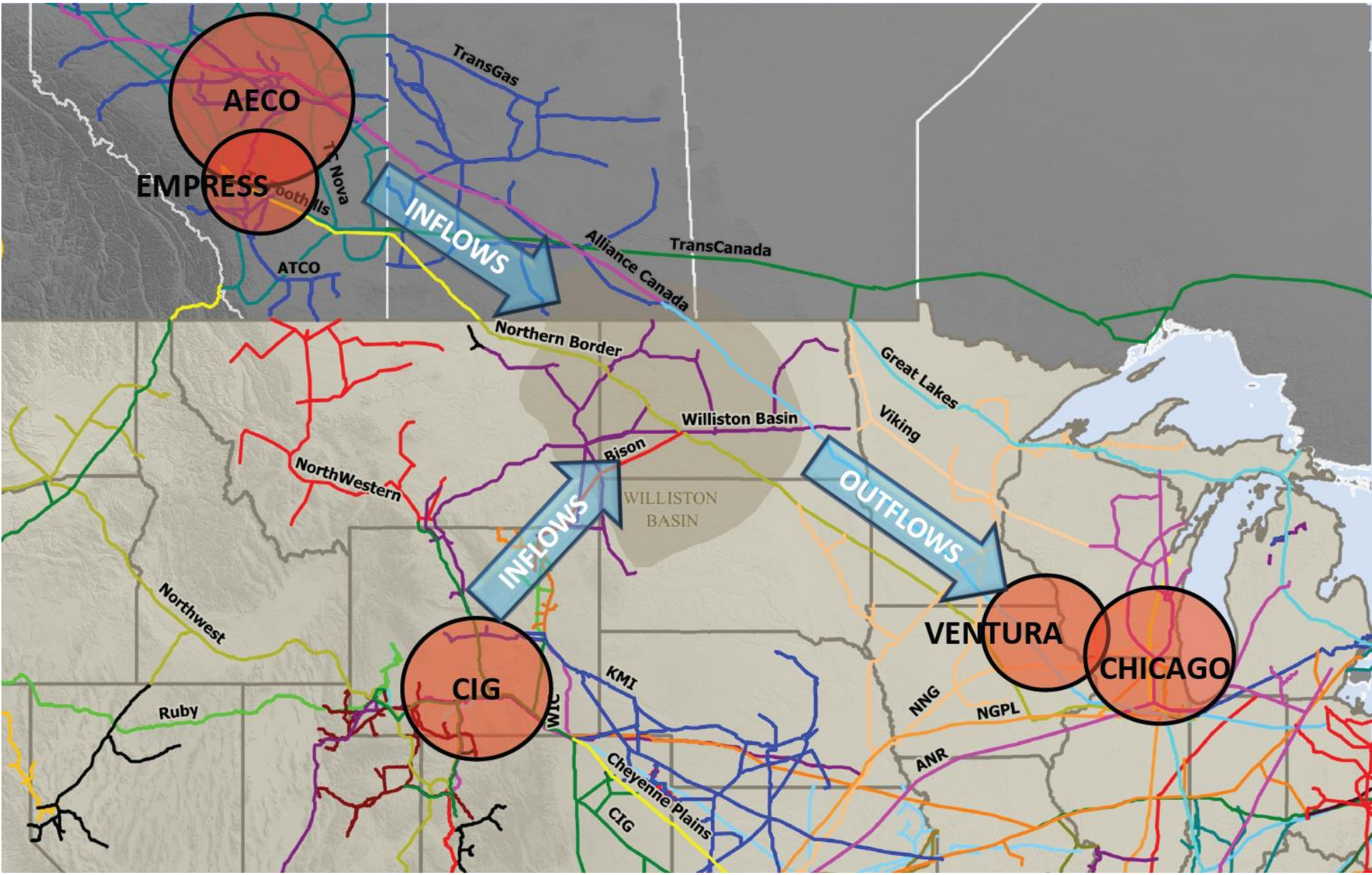
Open Capacity Leaving N. Dakota Is Tight





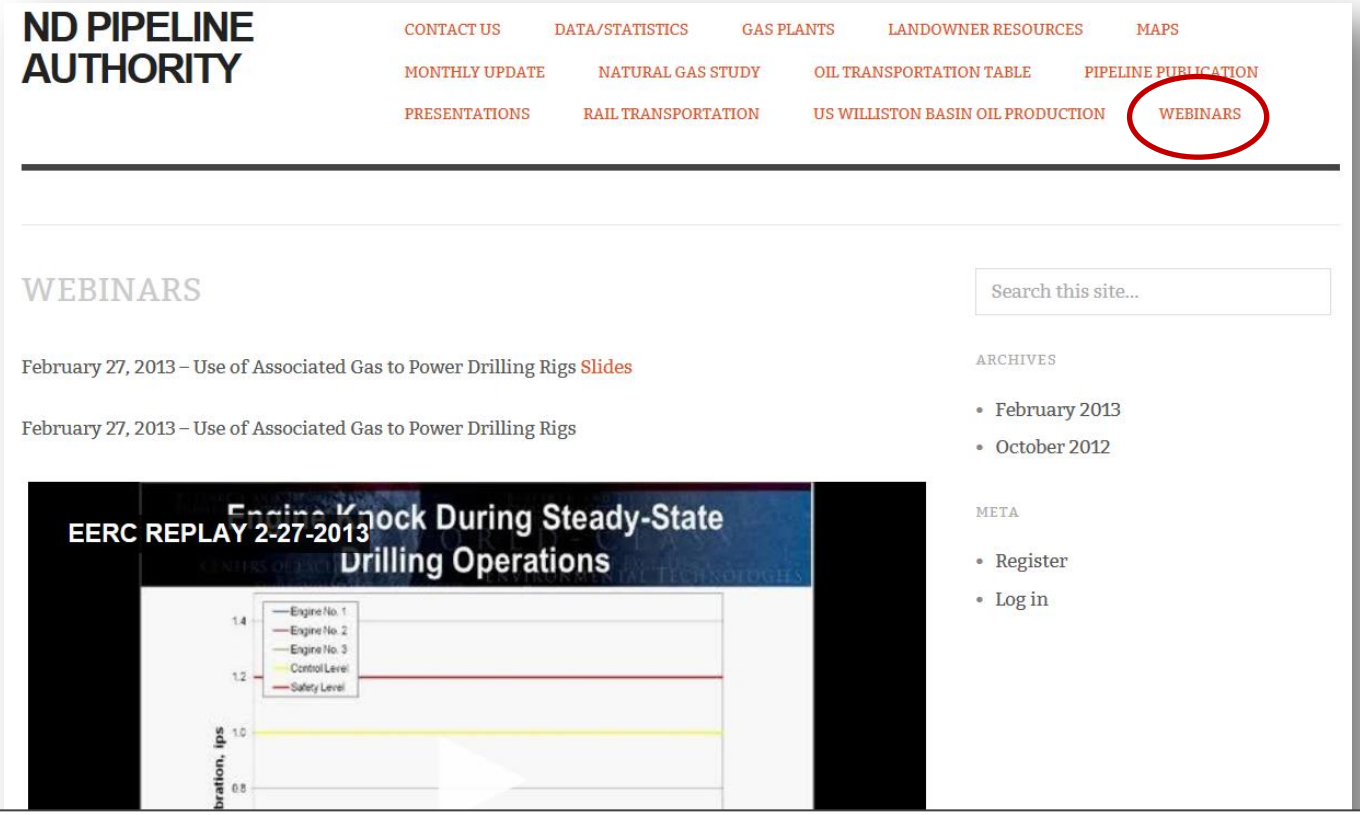


- **Northern Border and Alliance Serve As the Primary Routes to Transport Gas From the Region.**
- **Each Have Limited Open Mainline Capacity to Carry Additional Williston Supply.**



Source: BENTEK Energy July 2012 Report

Flaring Alternatives

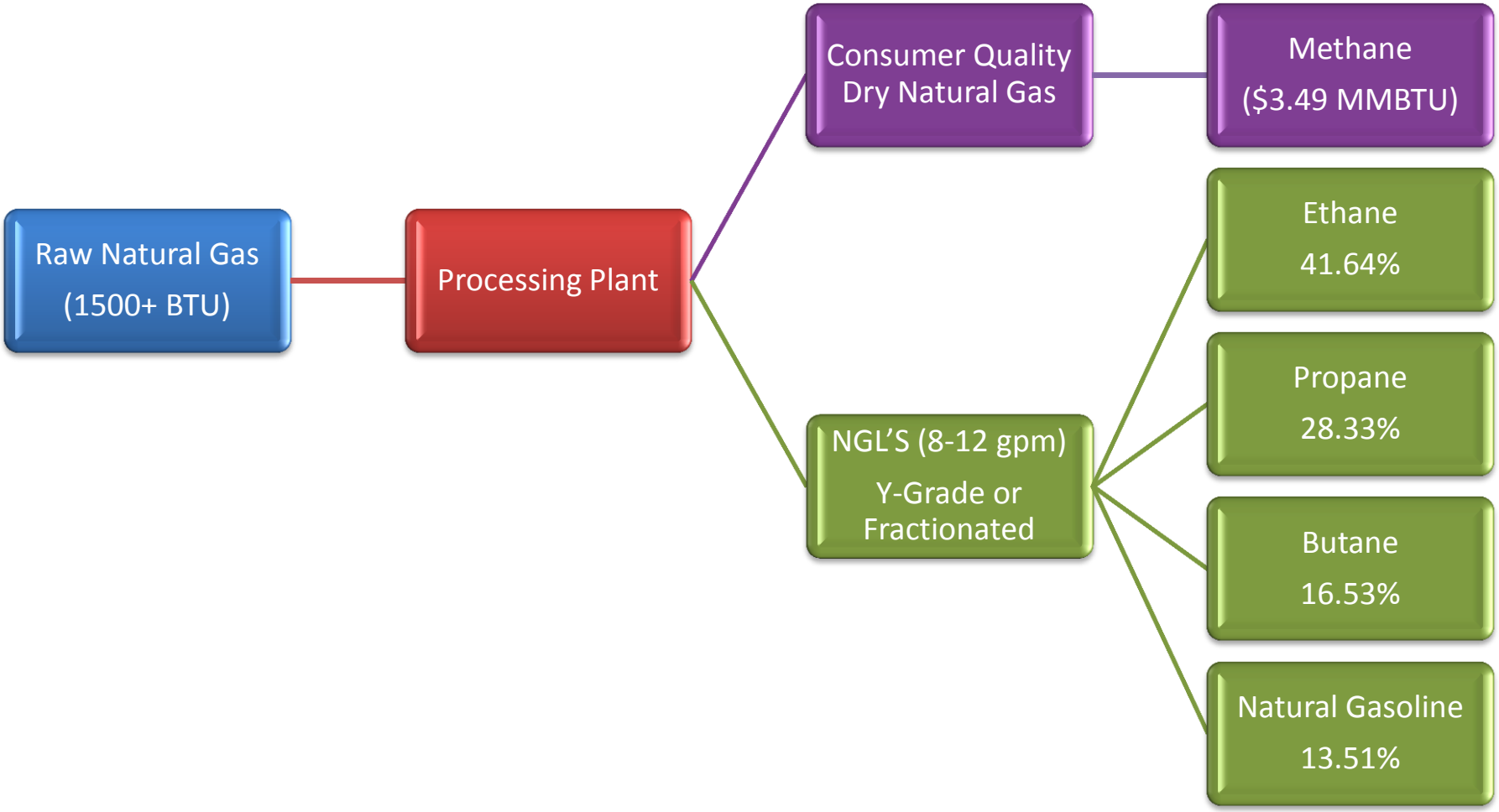


November 5, 2012 – EERC Associated Gas Use Study

December 18, 2012 – Natural Gas Flaring Alternatives (Company Presentations)

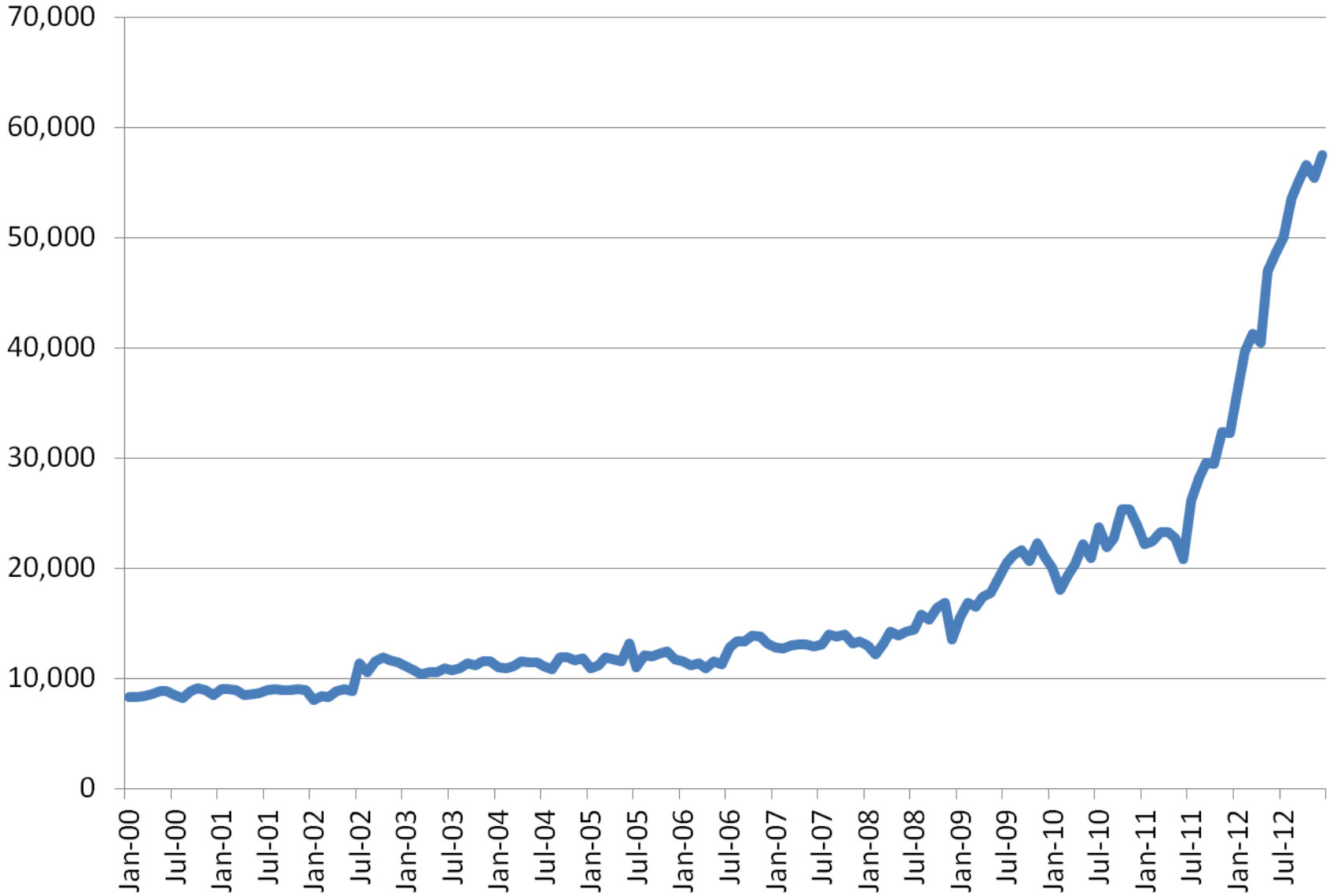
February 27, 2013 – EERC Use of Associated Gas to Power Drilling Rigs

Rich Natural Gas

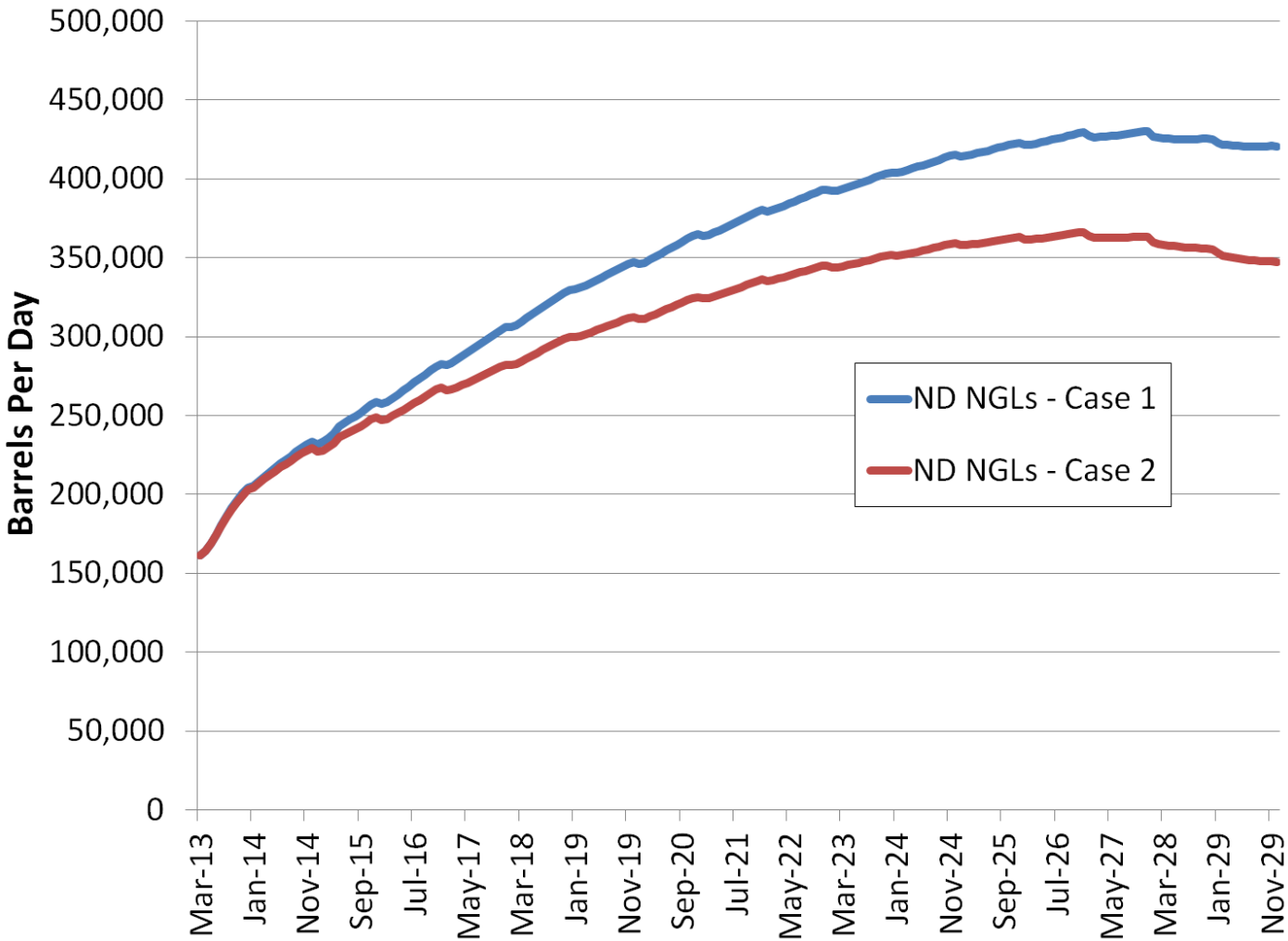


**Using NGL breakdown from the July 2012 BENTEK Natural Gas Study*

ND NGL Production, BPD



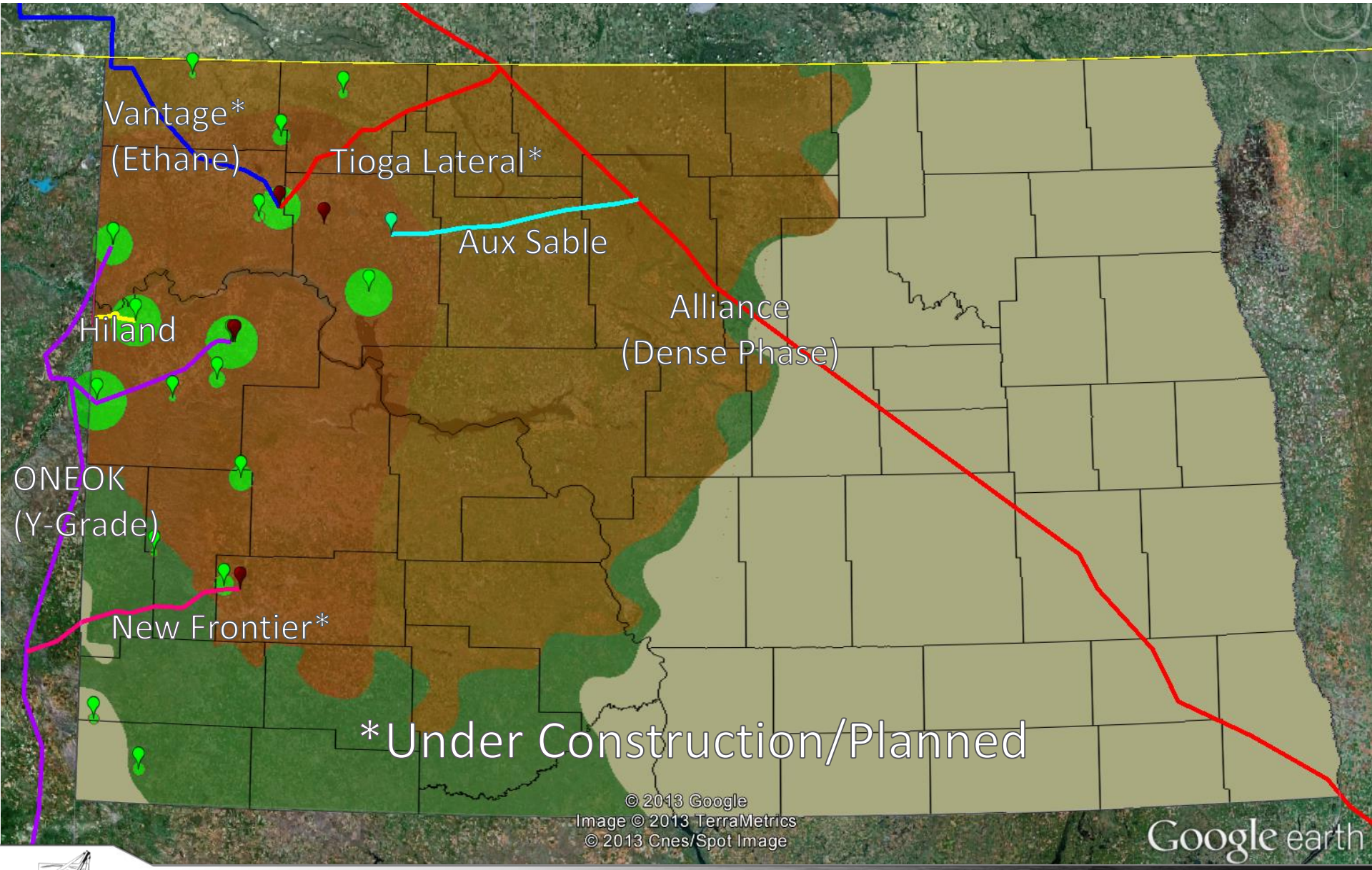
ND NGL Production Potential



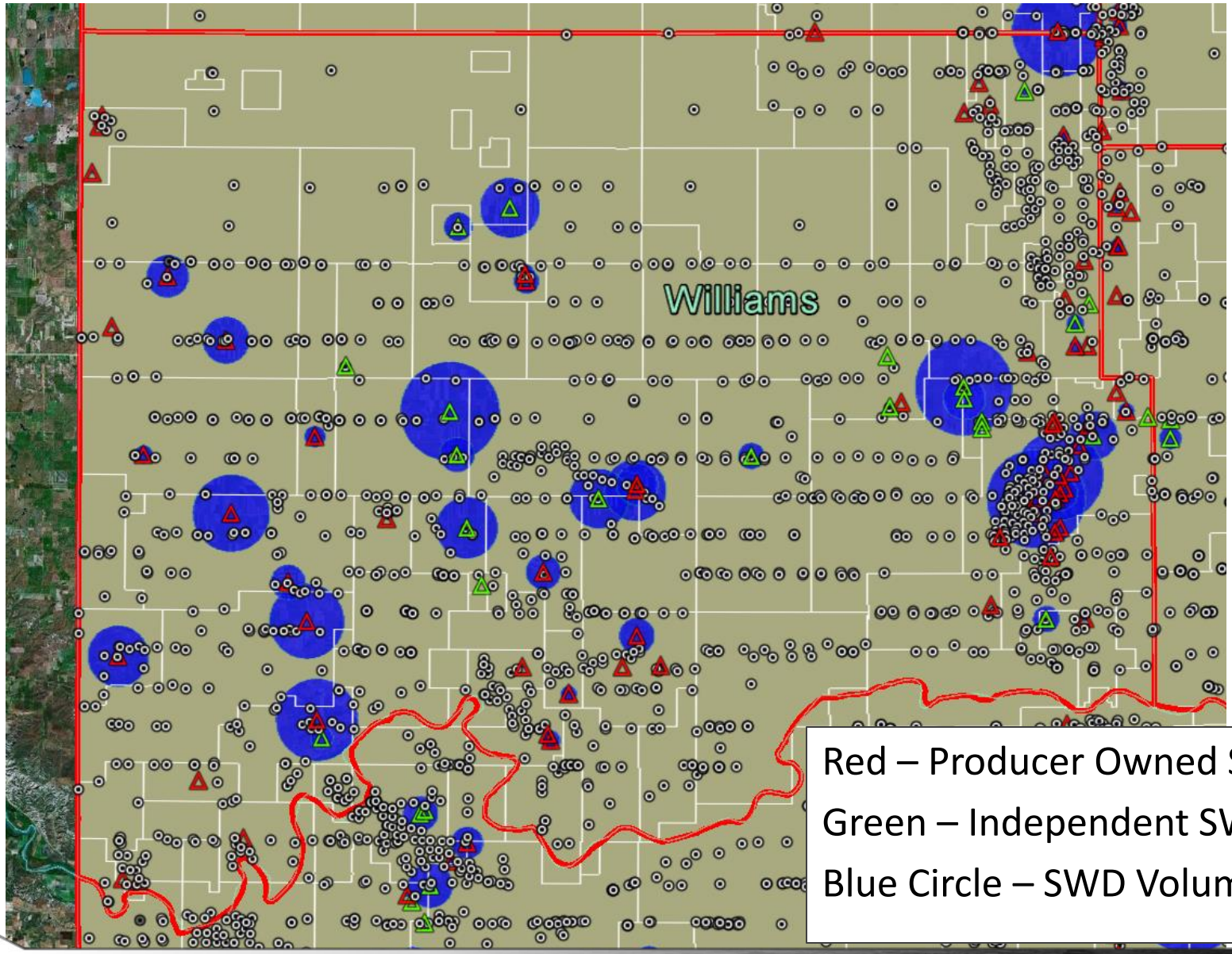
Assumptions

- No Flaring
- 8 Gal/MCF
- All liquids extracted

ND NGL Production & Pipelines



Produced Water Infrastructure



Red – Producer Owned SWD

Green – Independent SWD

Blue Circle – SWD Volume

Contact Information

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