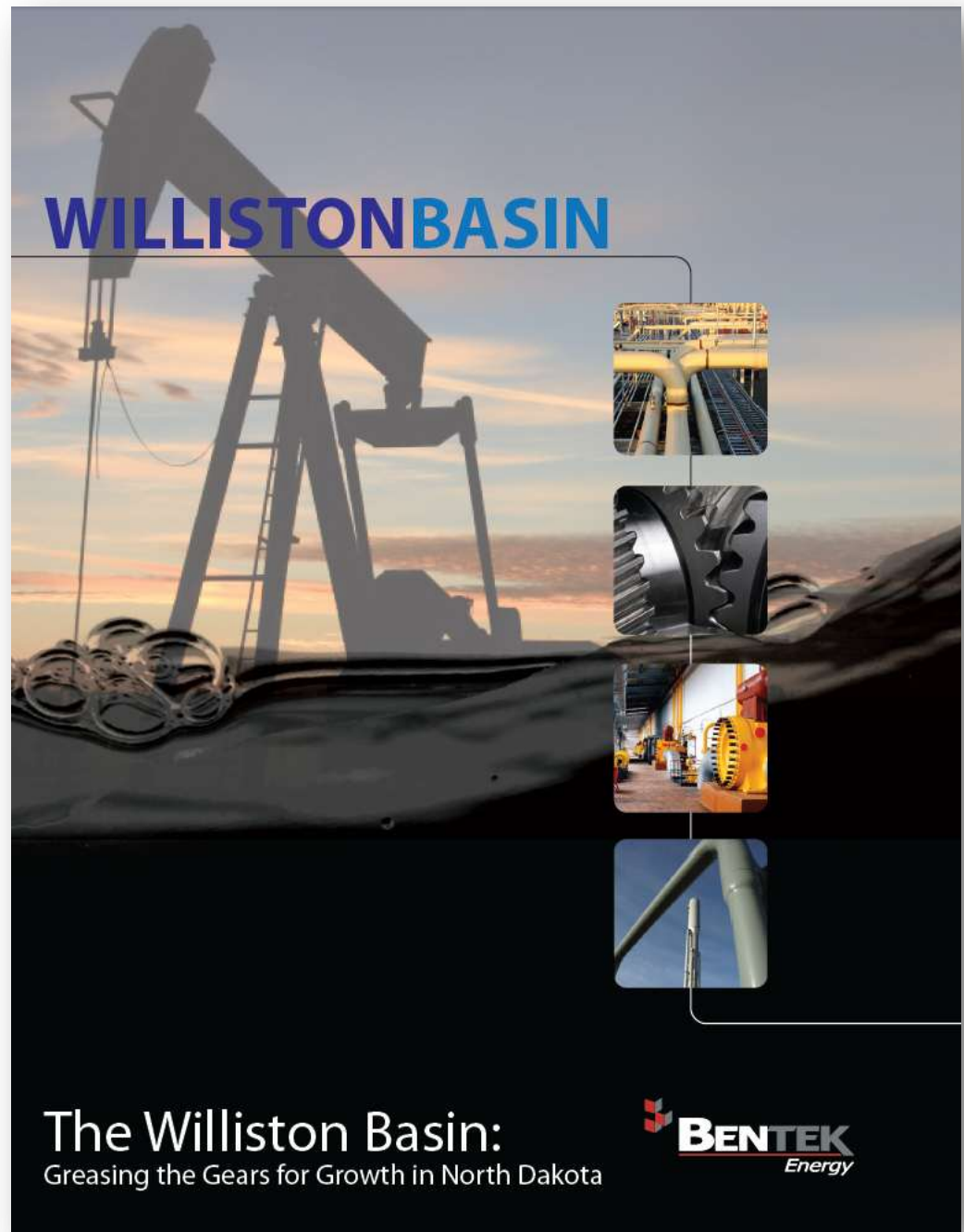


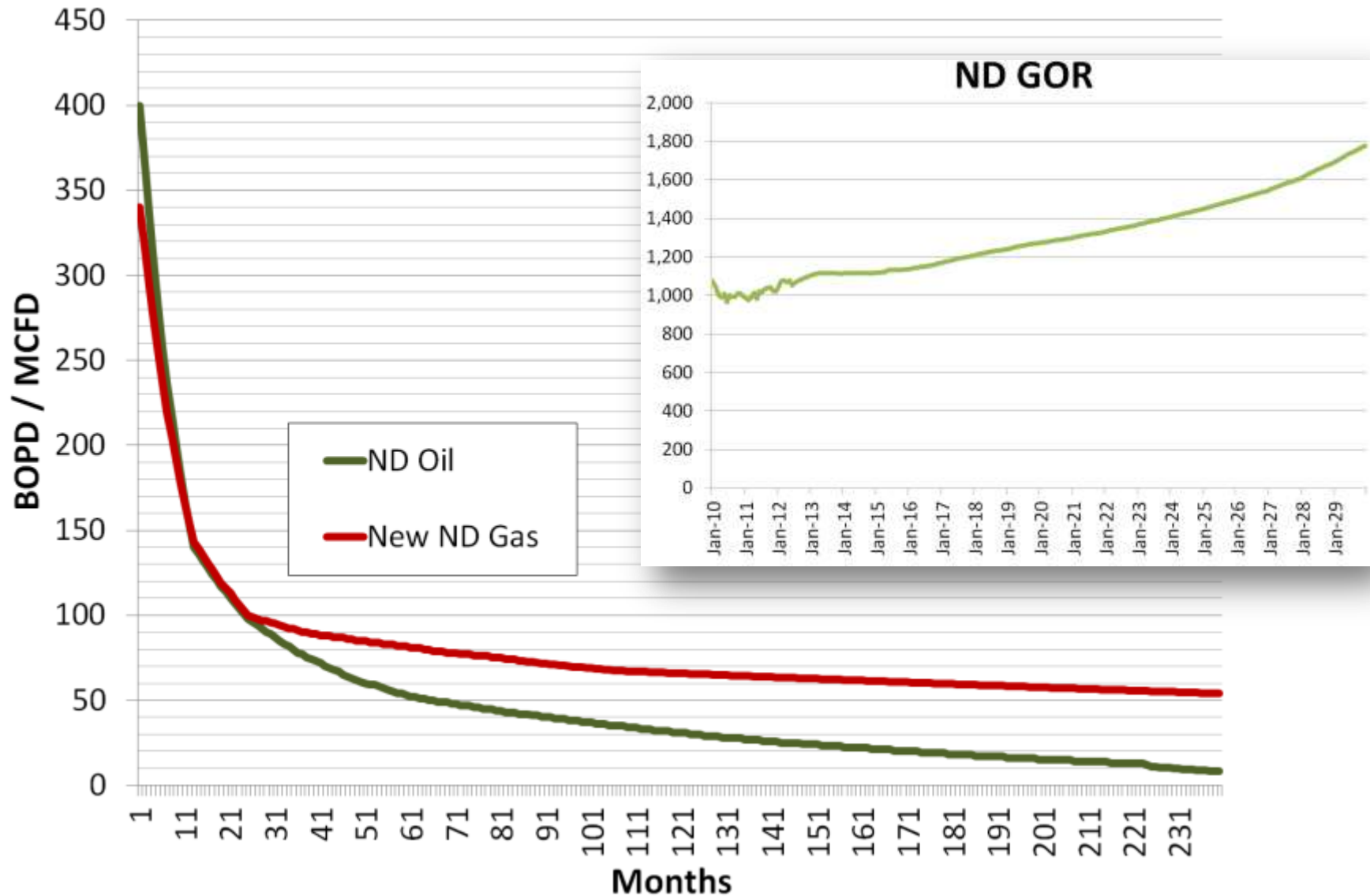


**North Dakota Pipeline Authority**  
**North Dakota Petroleum Council Annual Meeting**  
**September 20, 2012 – Medora, ND**

# Natural Gas Study

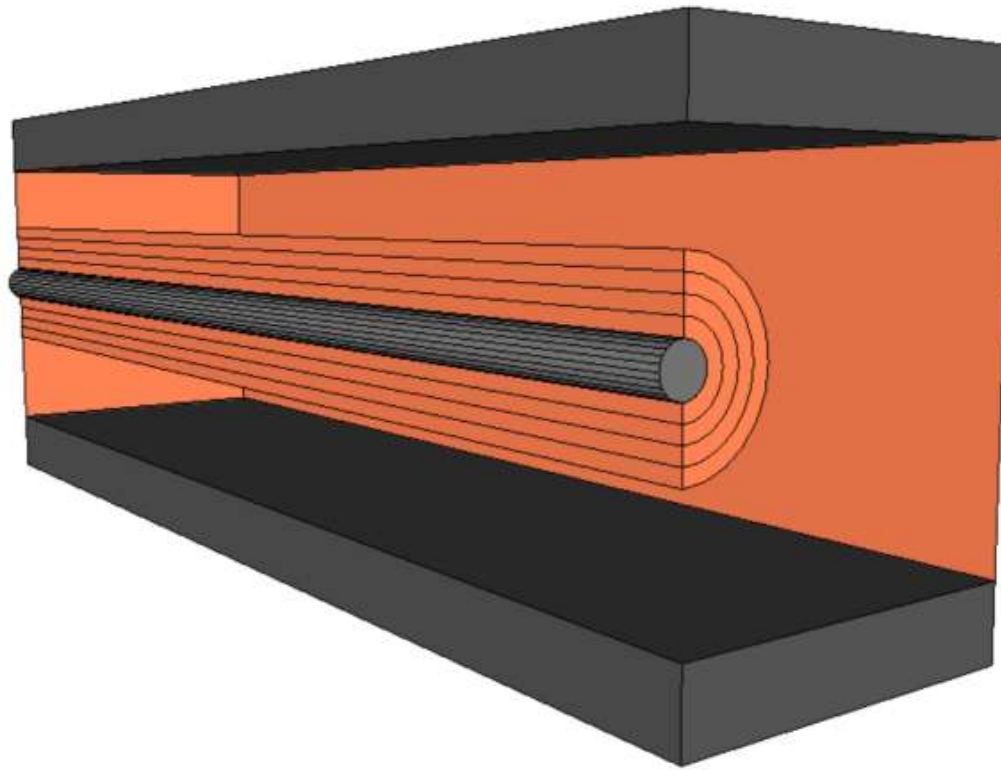


# North Dakota Type Curves\*

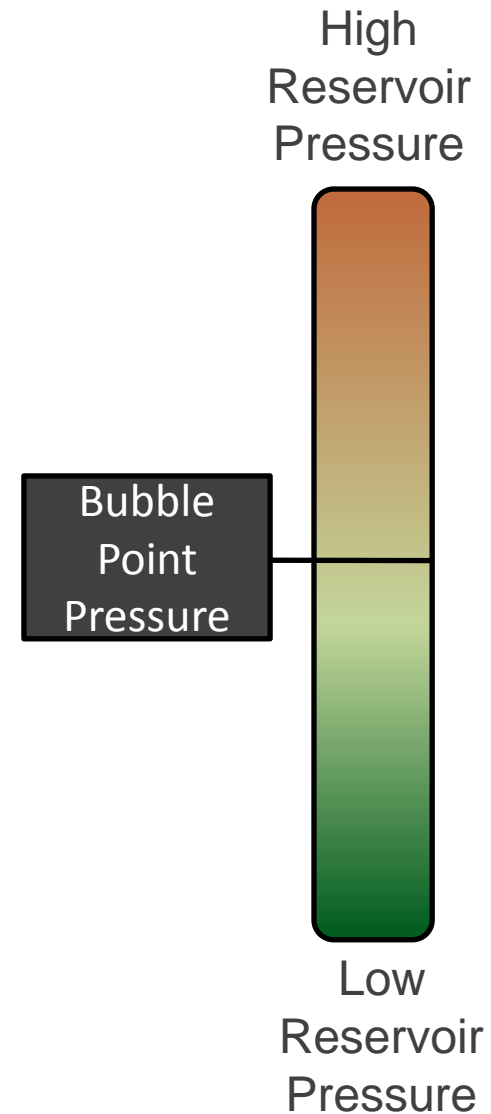


\*Based on the July 2012 BENTEK Natural Gas Study

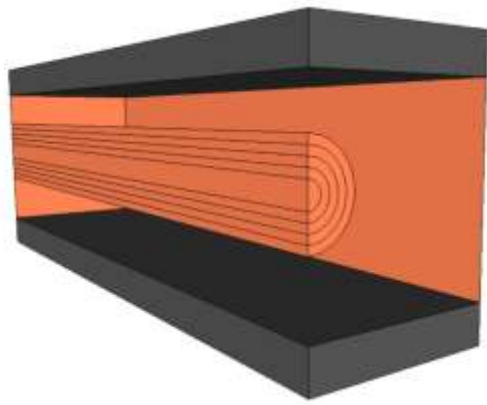
# Gas – Oil Ratio (GOR) Increasing Over Time



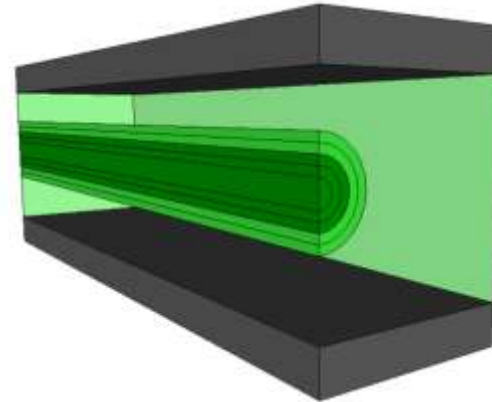
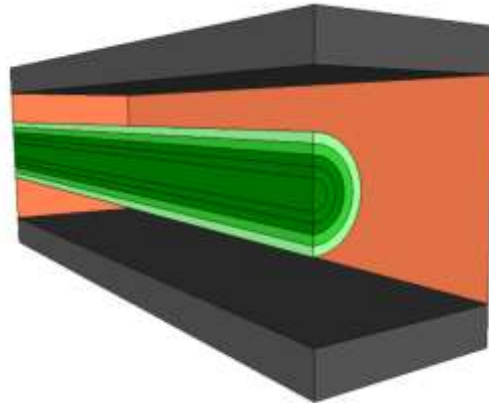
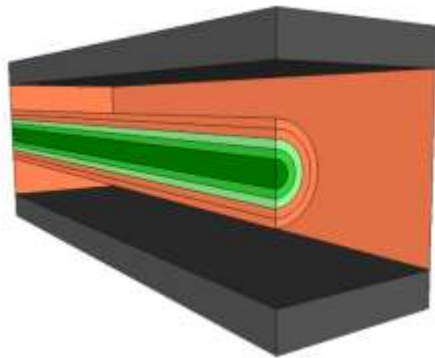
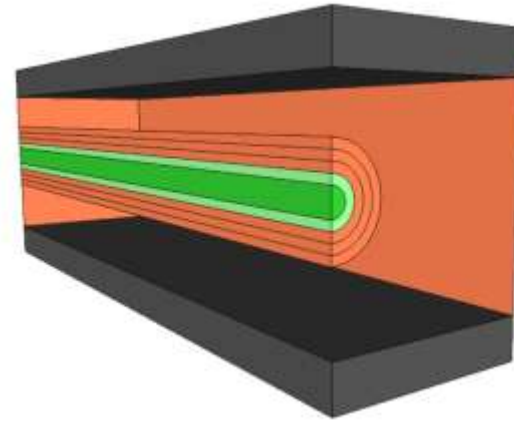
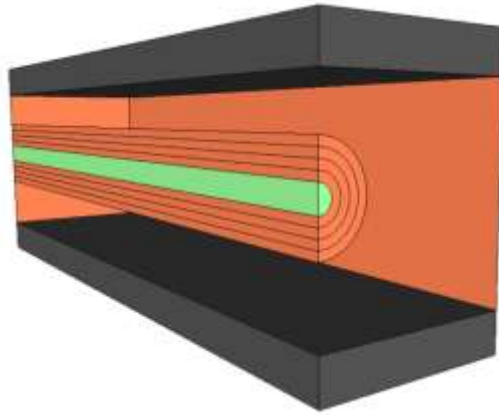
Horizontal Well Completed  
in Target Reservoir



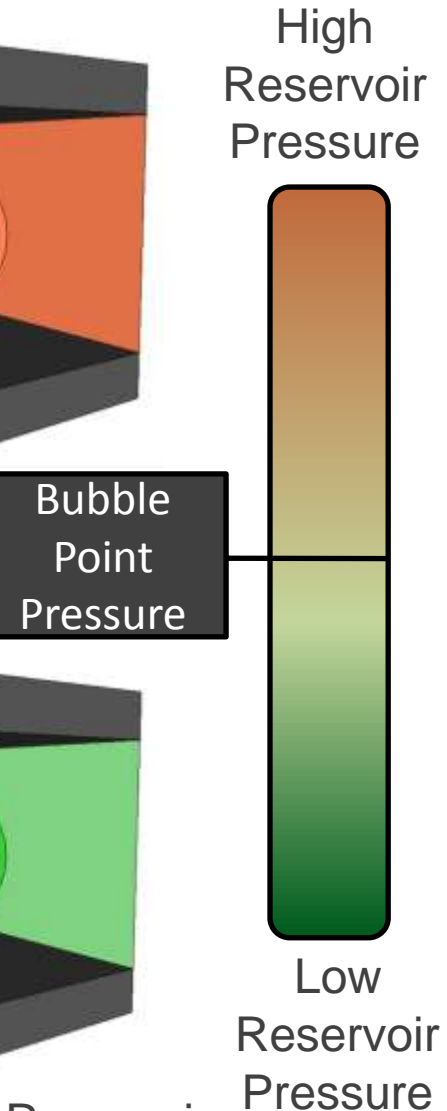
# Gas – Oil Ratio (GOR) Increasing Over Time

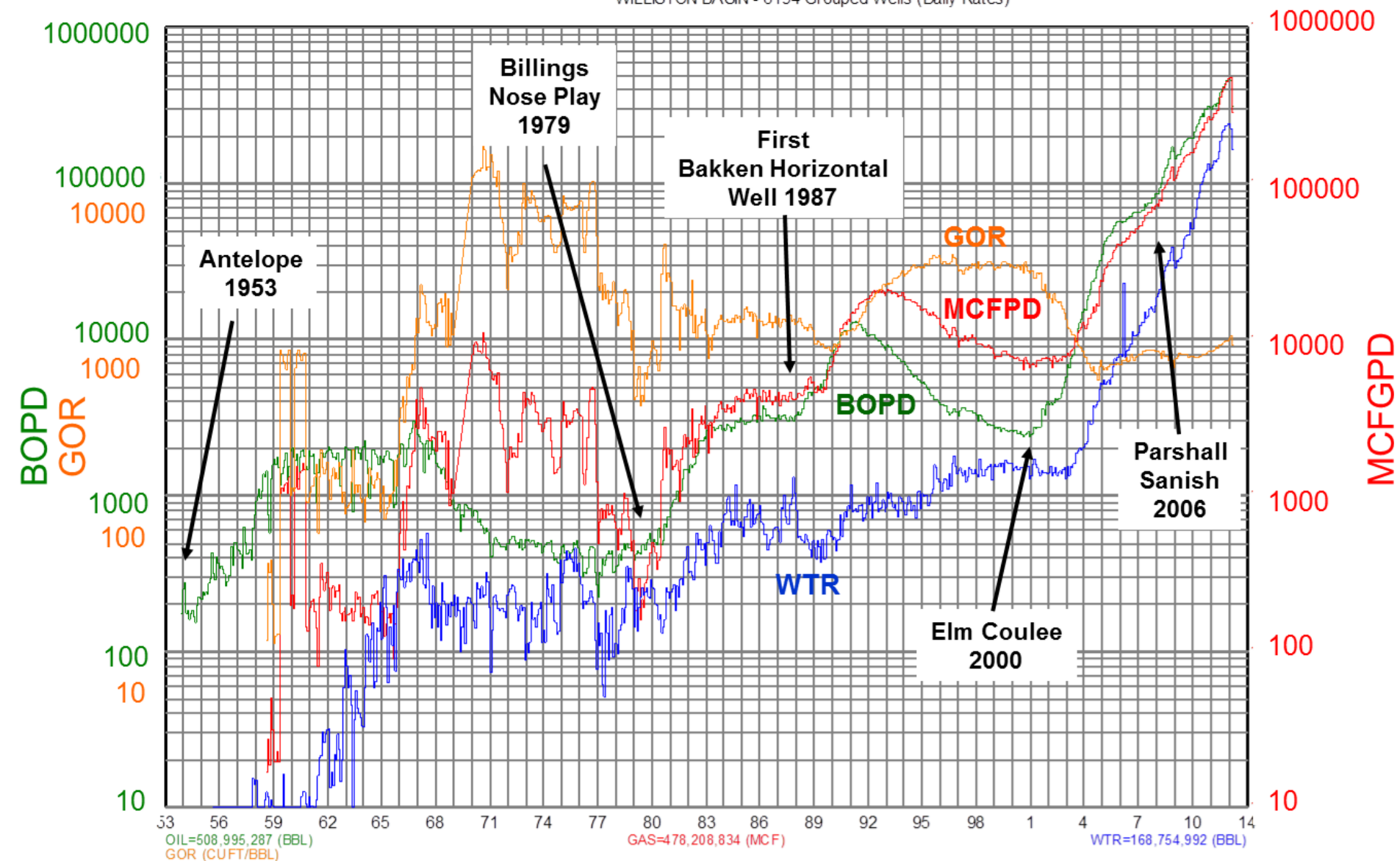


Youngest - Original Reservoir Pressure



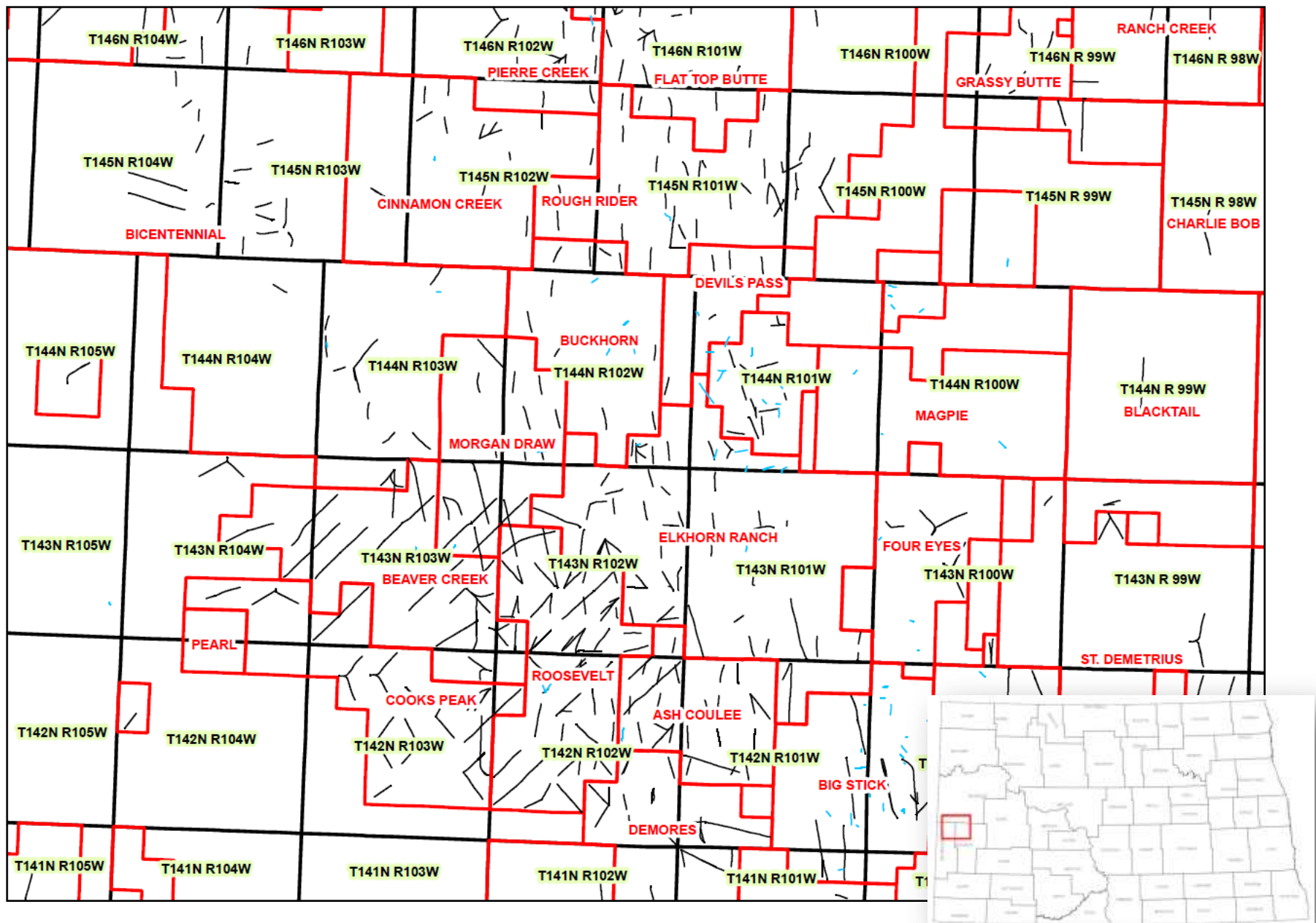
Oldest – Entire Reservoir Below Bubble Point





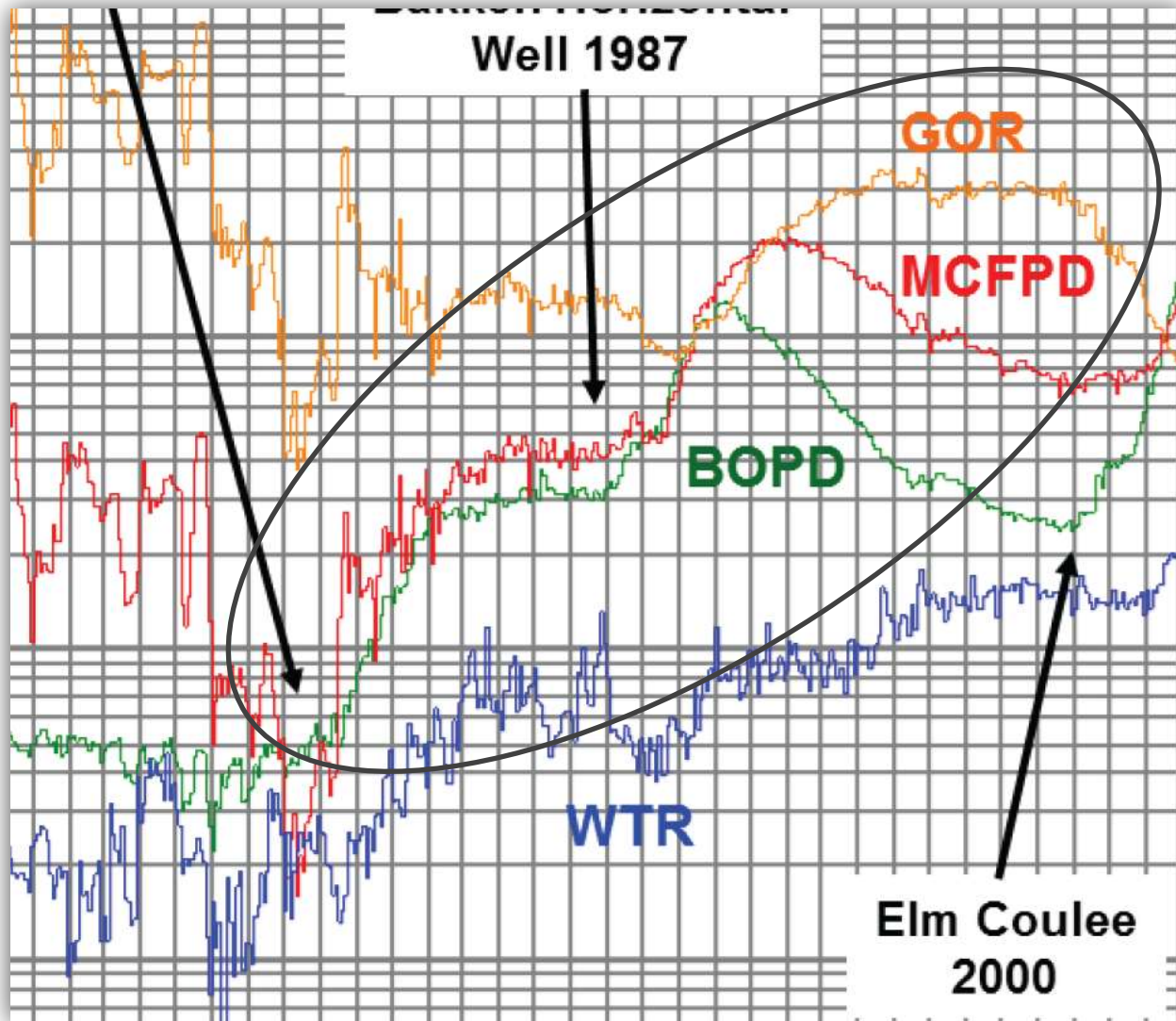
*Production curve for the Bakken and Three Forks, US Williston Basin.*

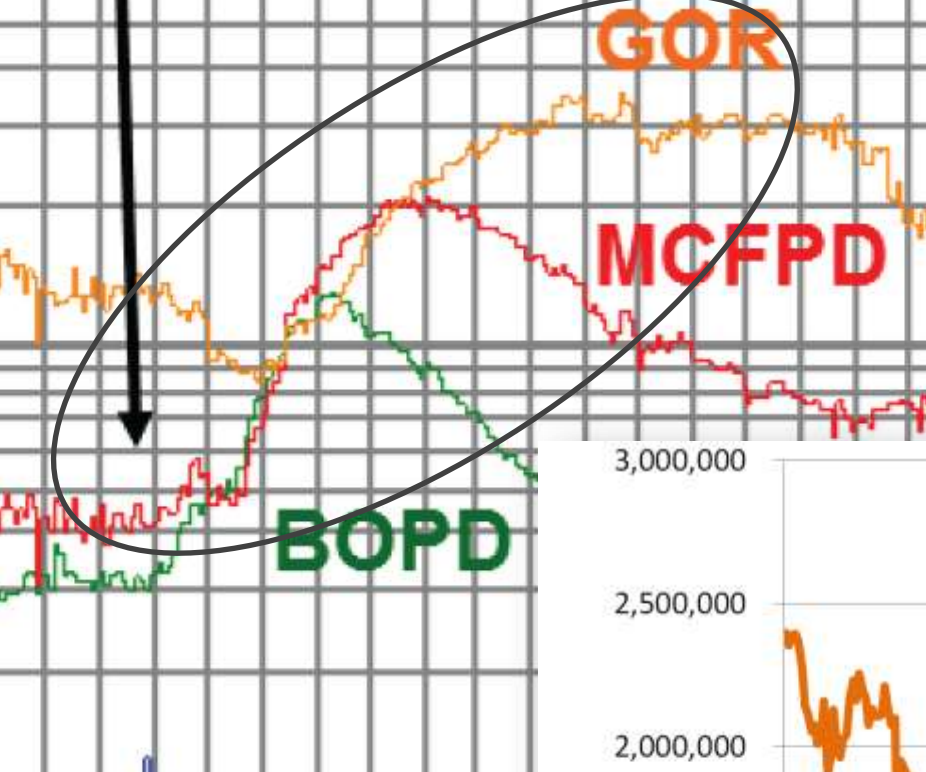
*Source: BENTEK Energy July 2012 Report*



*Only horizontal wells shown on map*

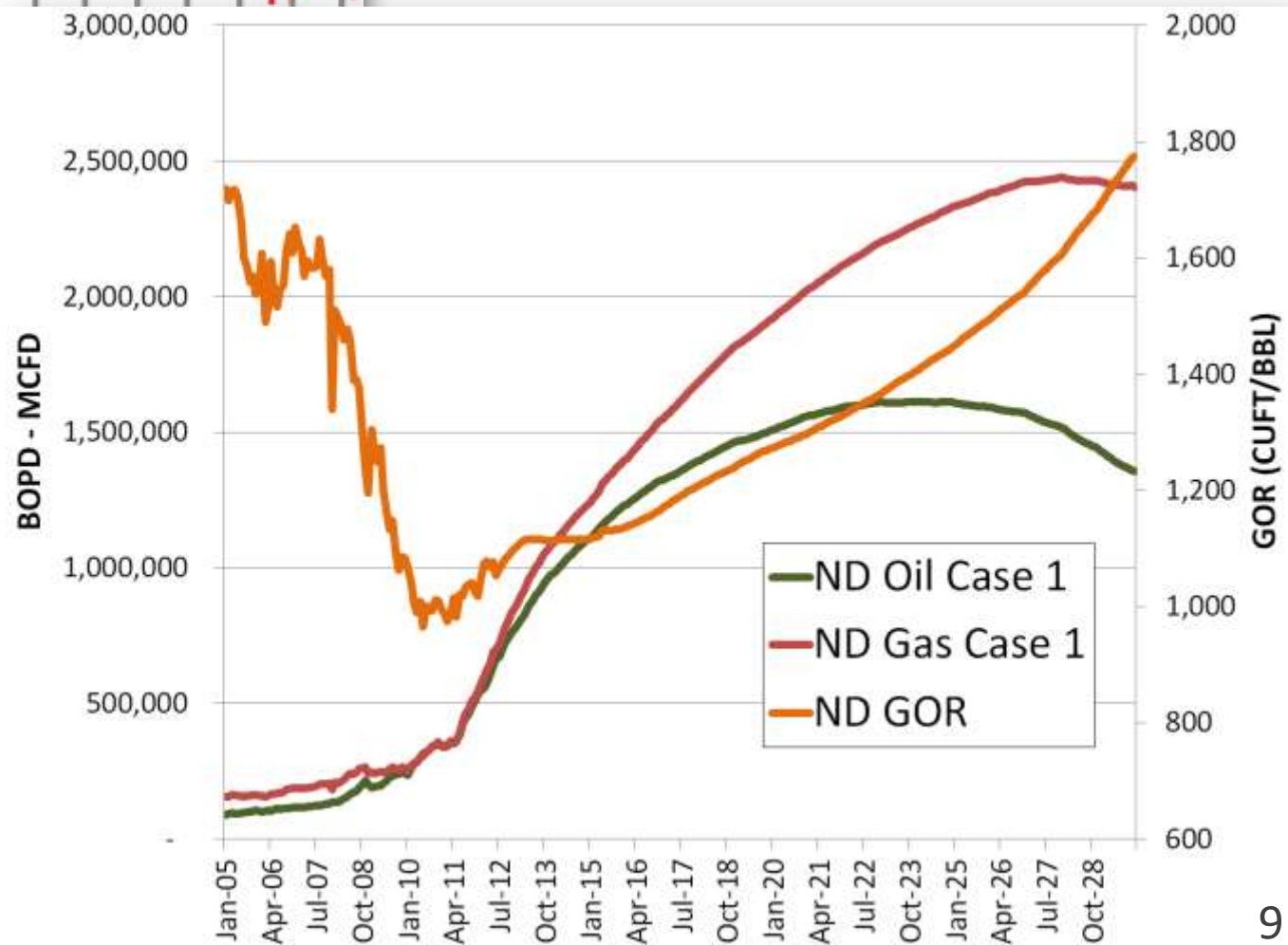
# 1980's-90's Bakken Development



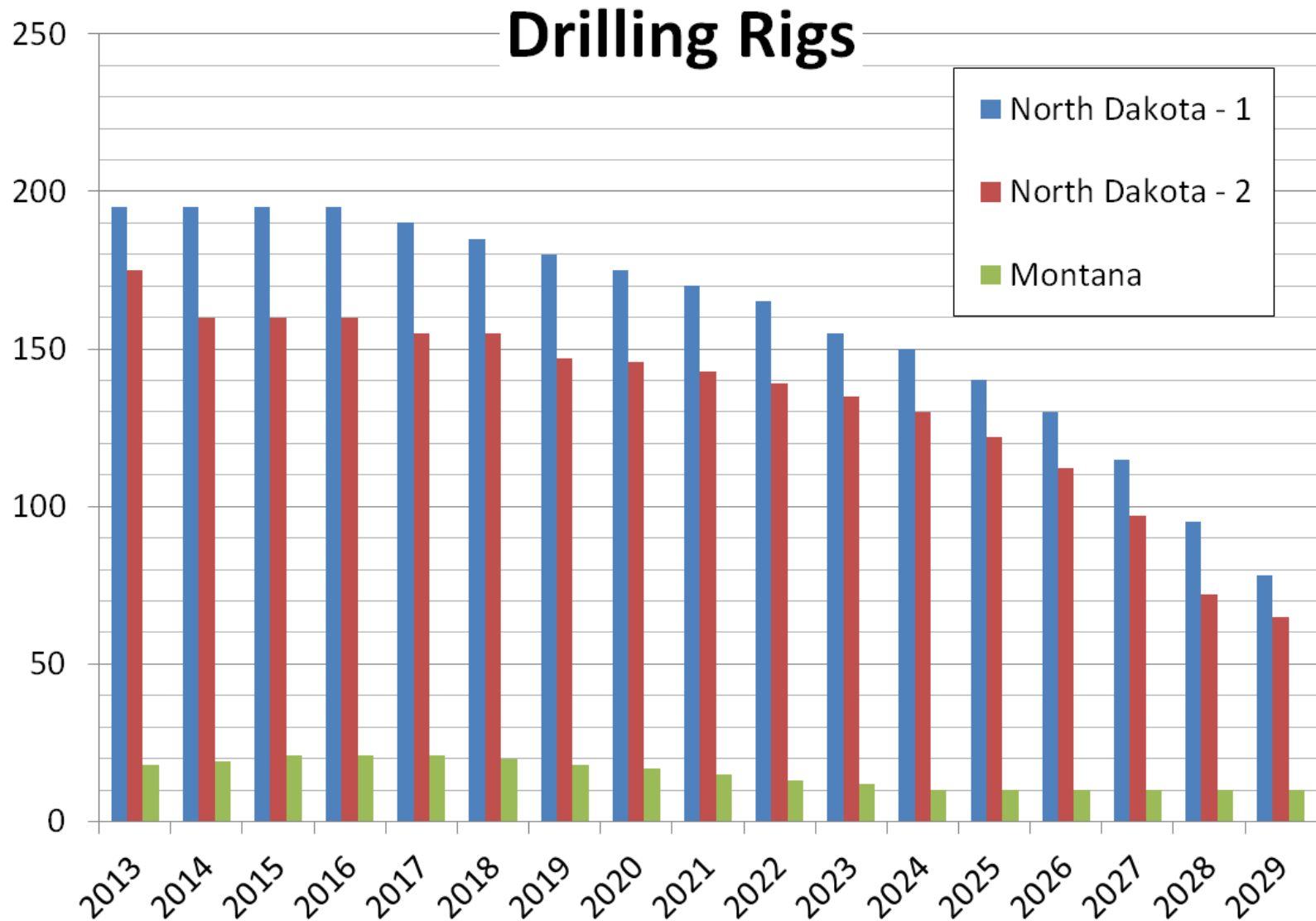


← GOR 3,000 CUFT/BBL

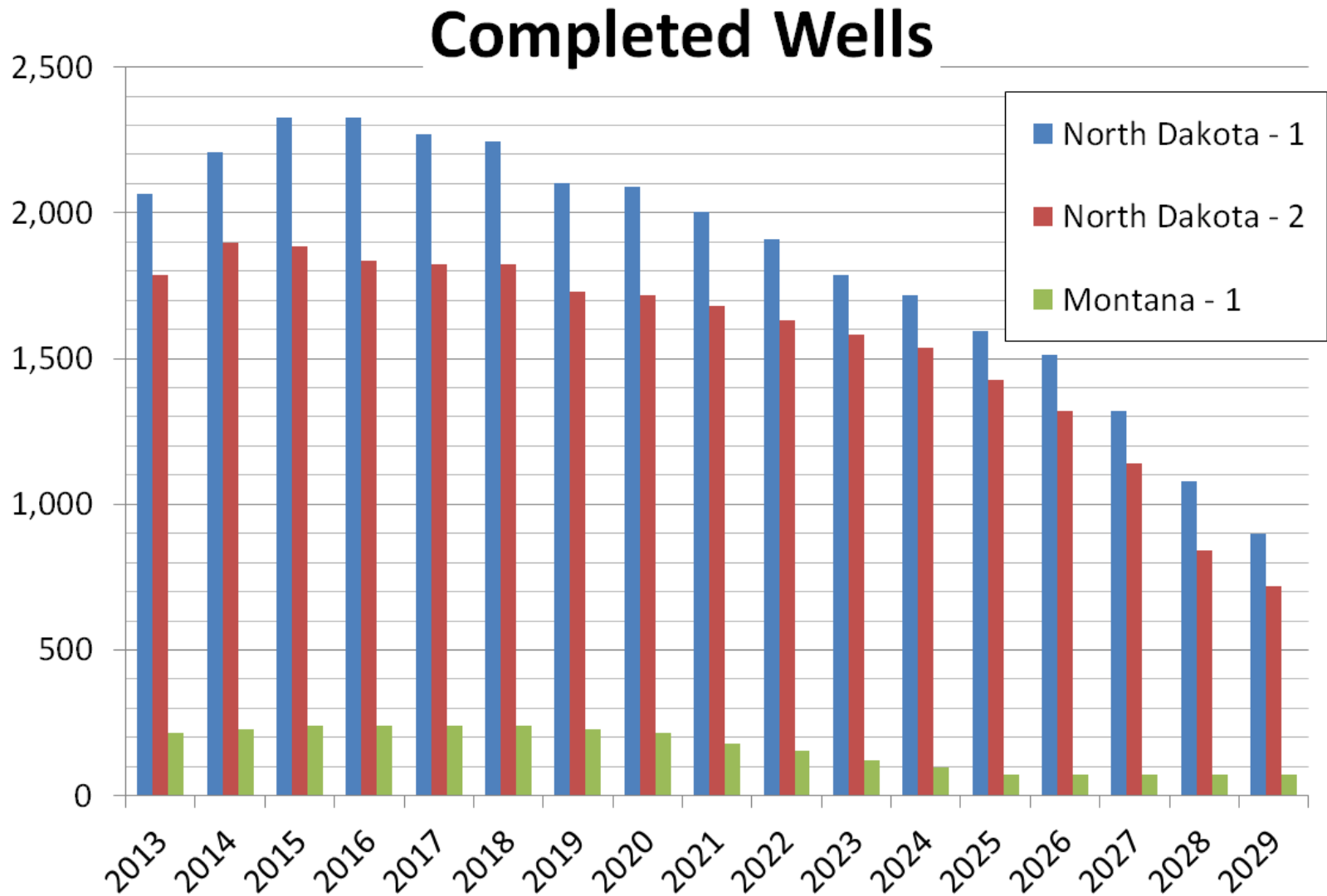
← GOR 1,000 CUFT/BBL



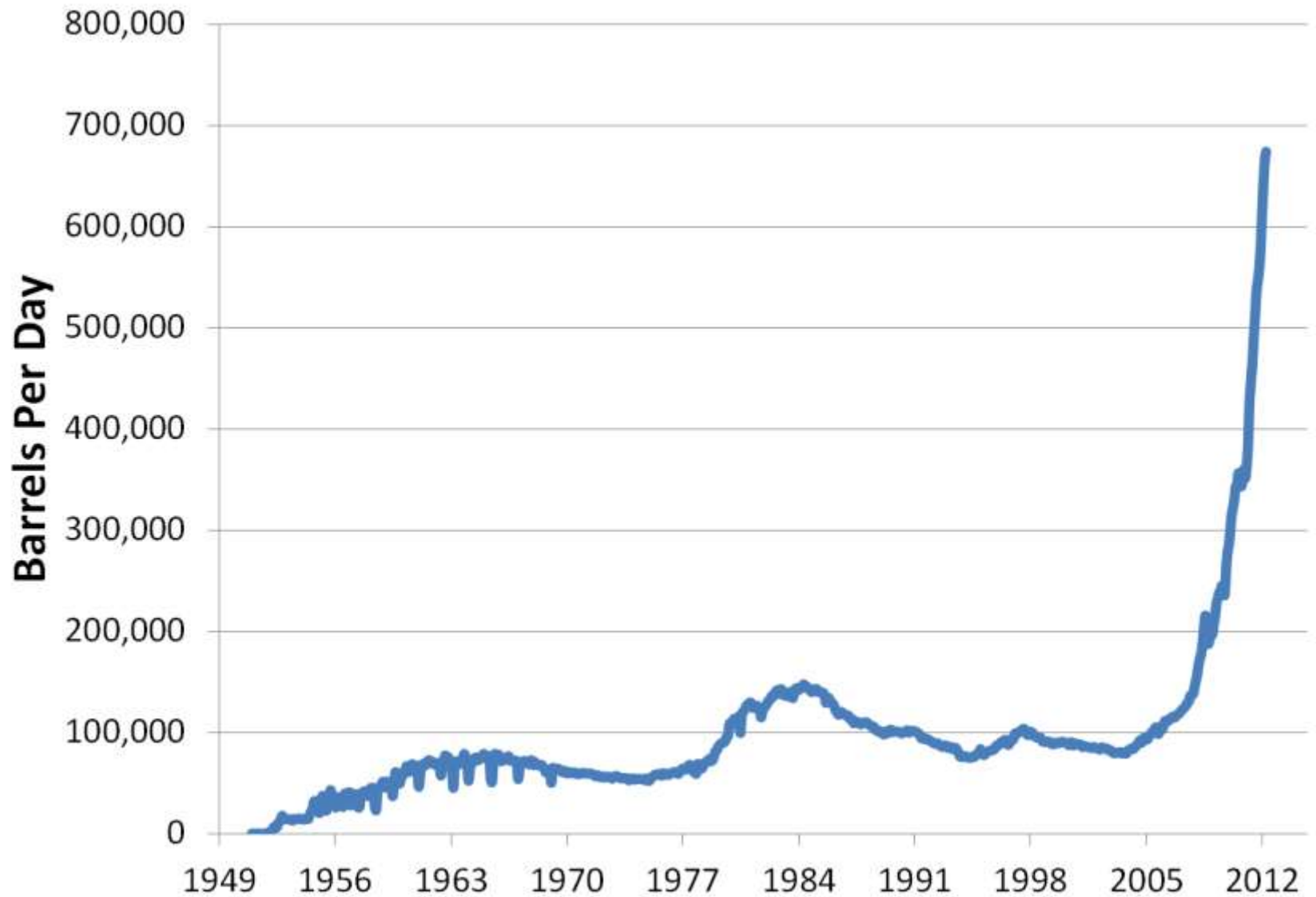
# September 2012 Forecast Assumptions



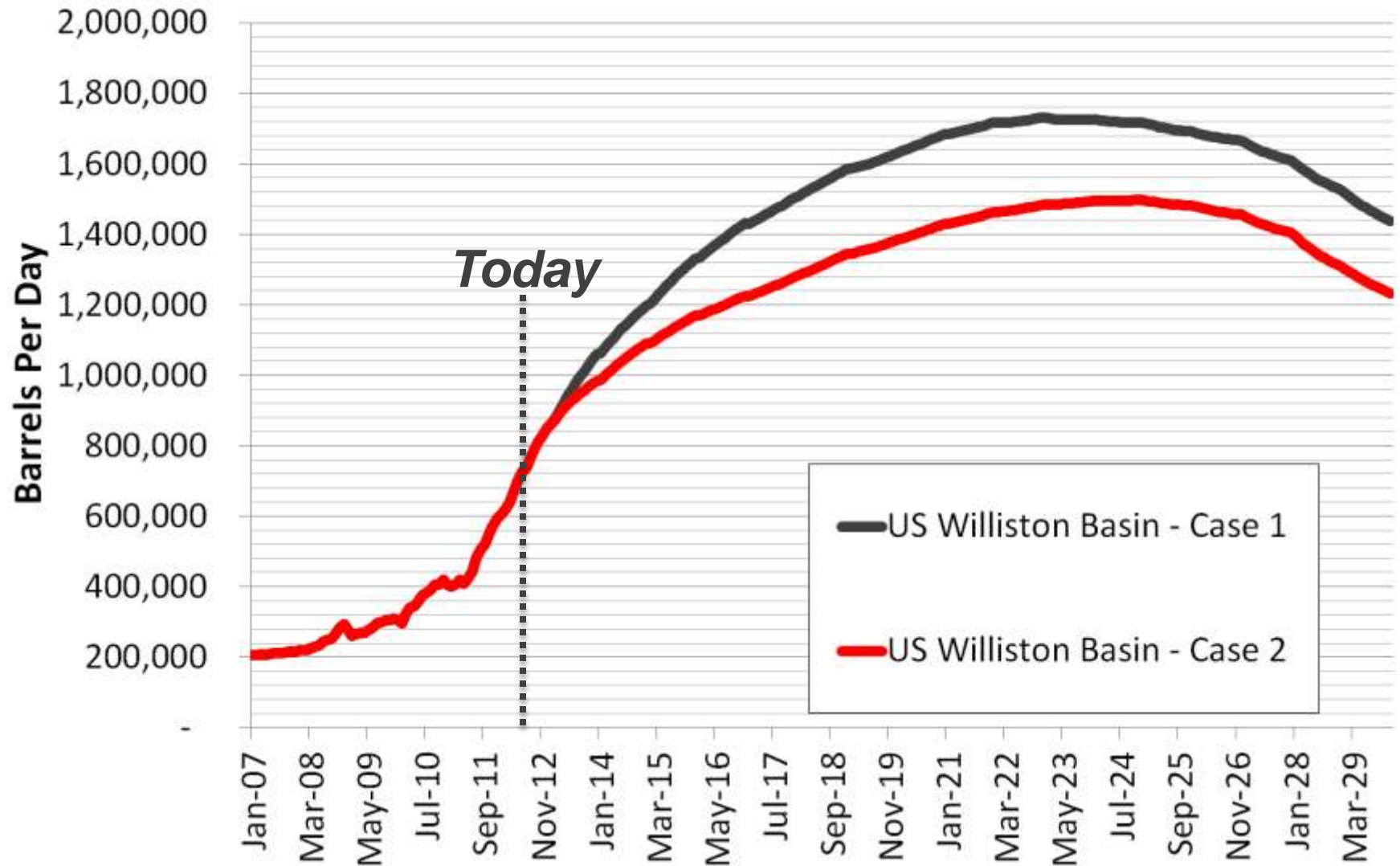
# September 2012 Forecast Assumptions



# North Dakota Crude Oil

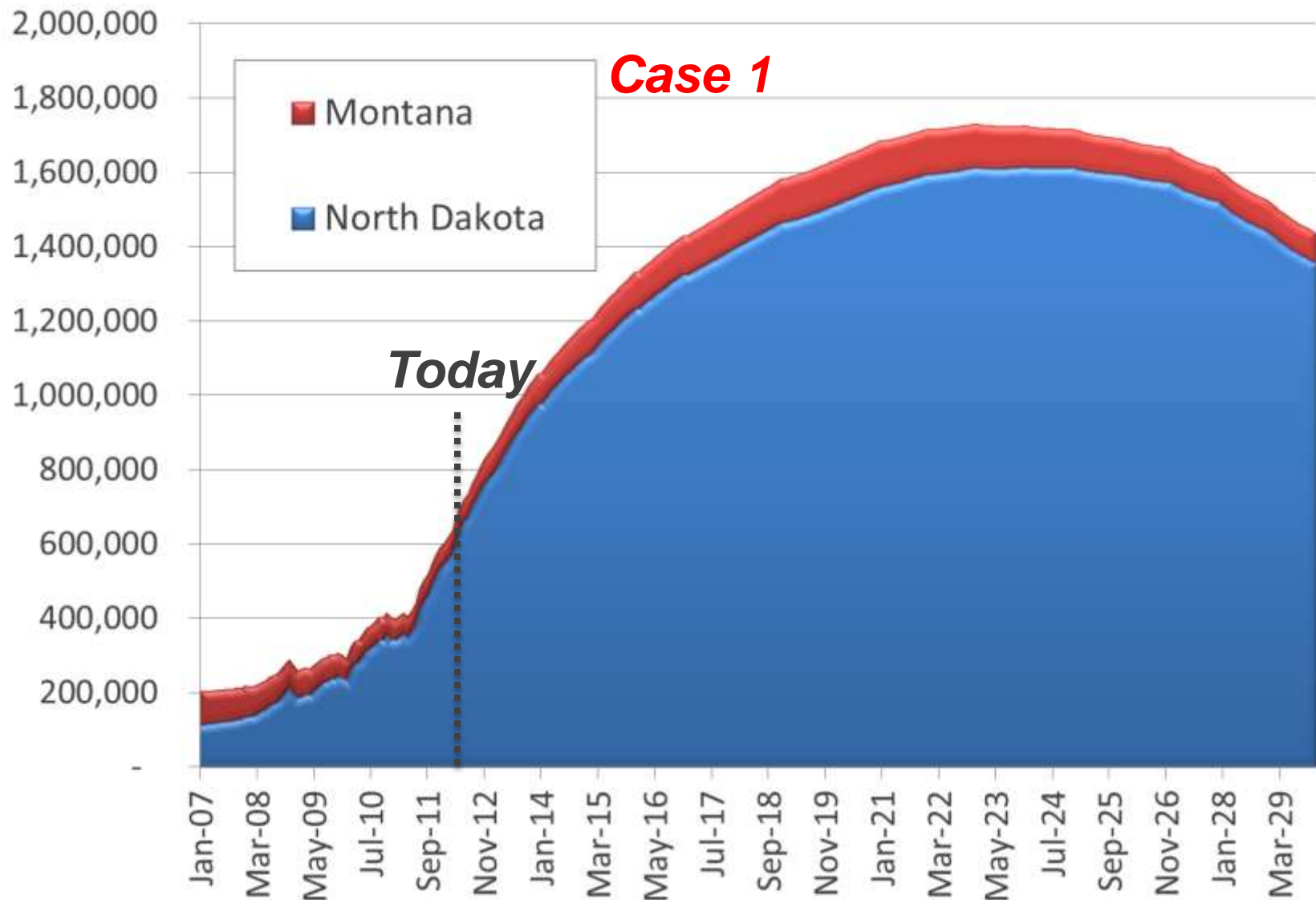


# Forecasting Williston Basin Oil Production, BOPD



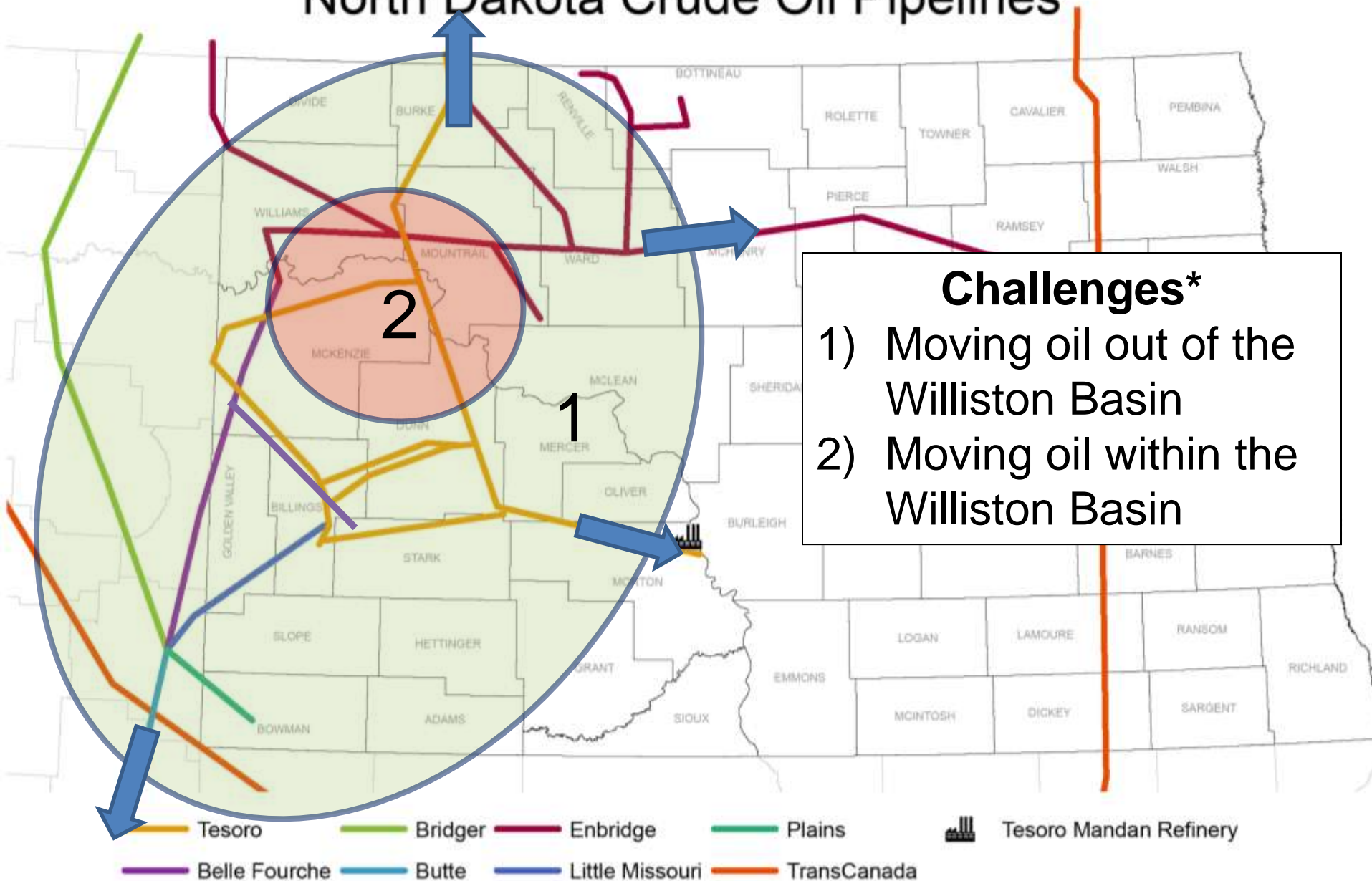
*Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.*

# Forecasting Williston Basin Oil Production, BOPD



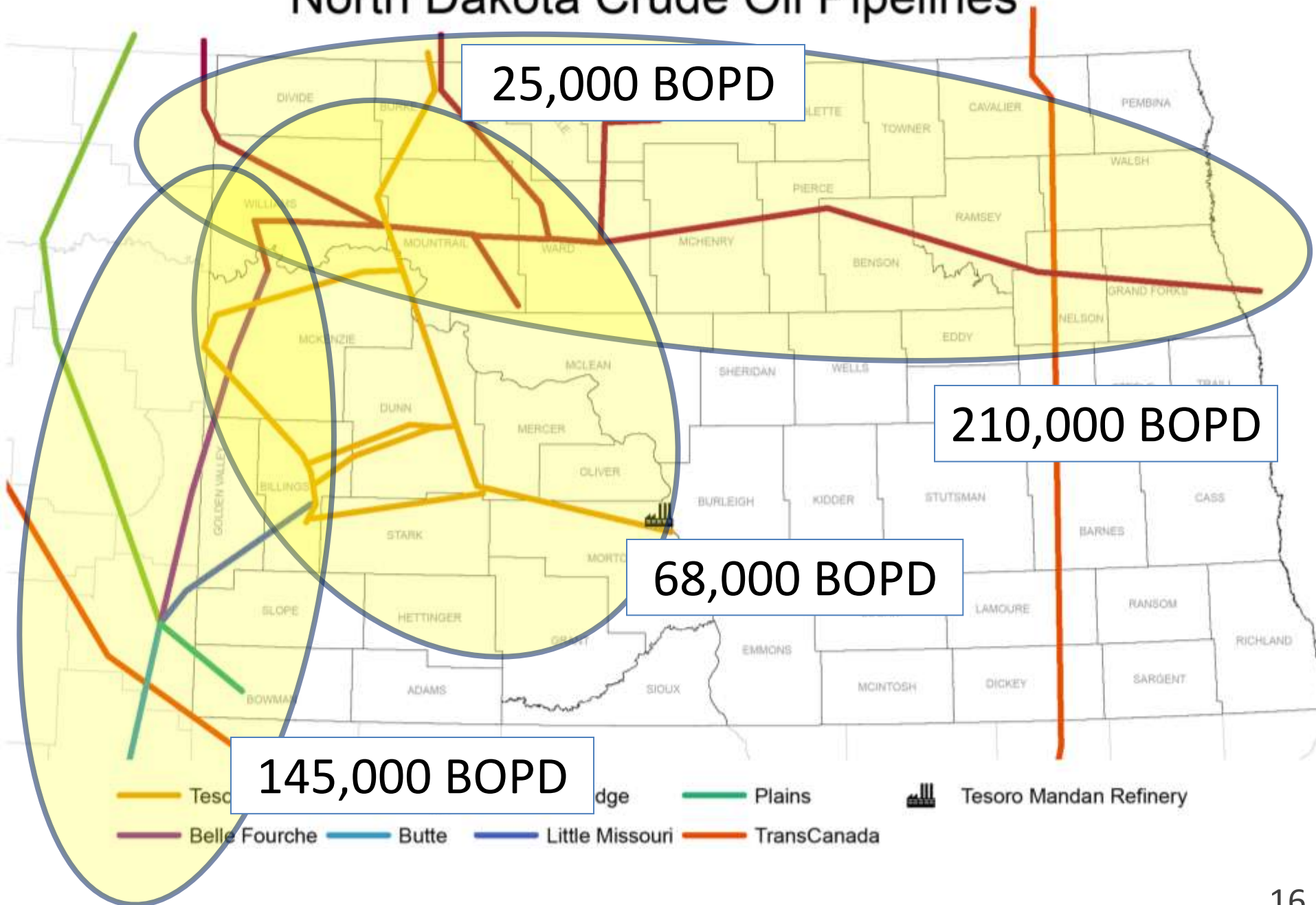
*Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.*

# North Dakota Crude Oil Pipelines



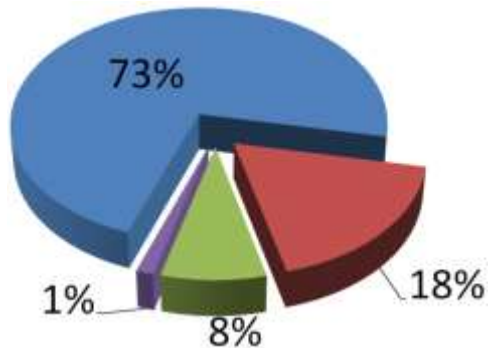
\*Modified from Bridger and Belle Fourche Pipelines

# North Dakota Crude Oil Pipelines

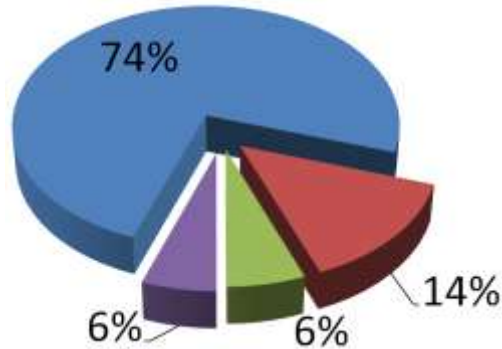


# Williston Basin Oil Transportation

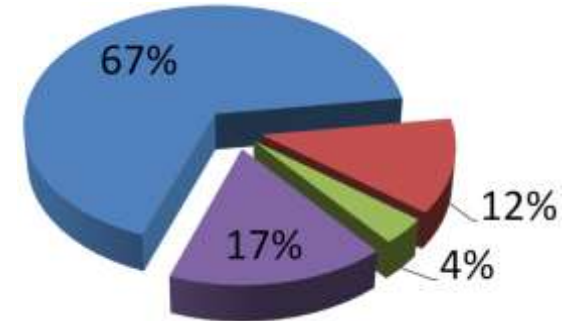
July 2009



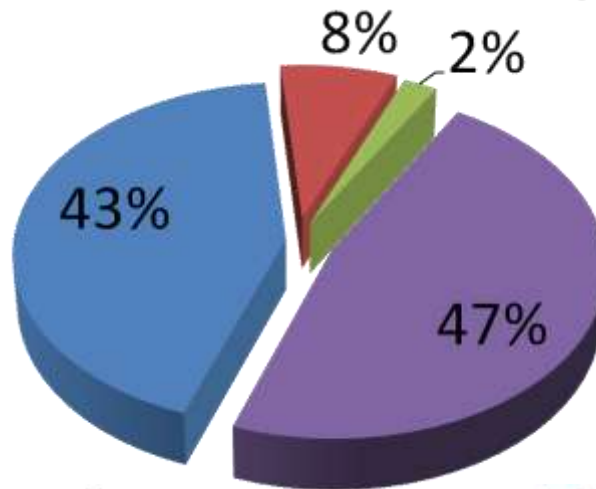
July 2010



July 2011



July 2012



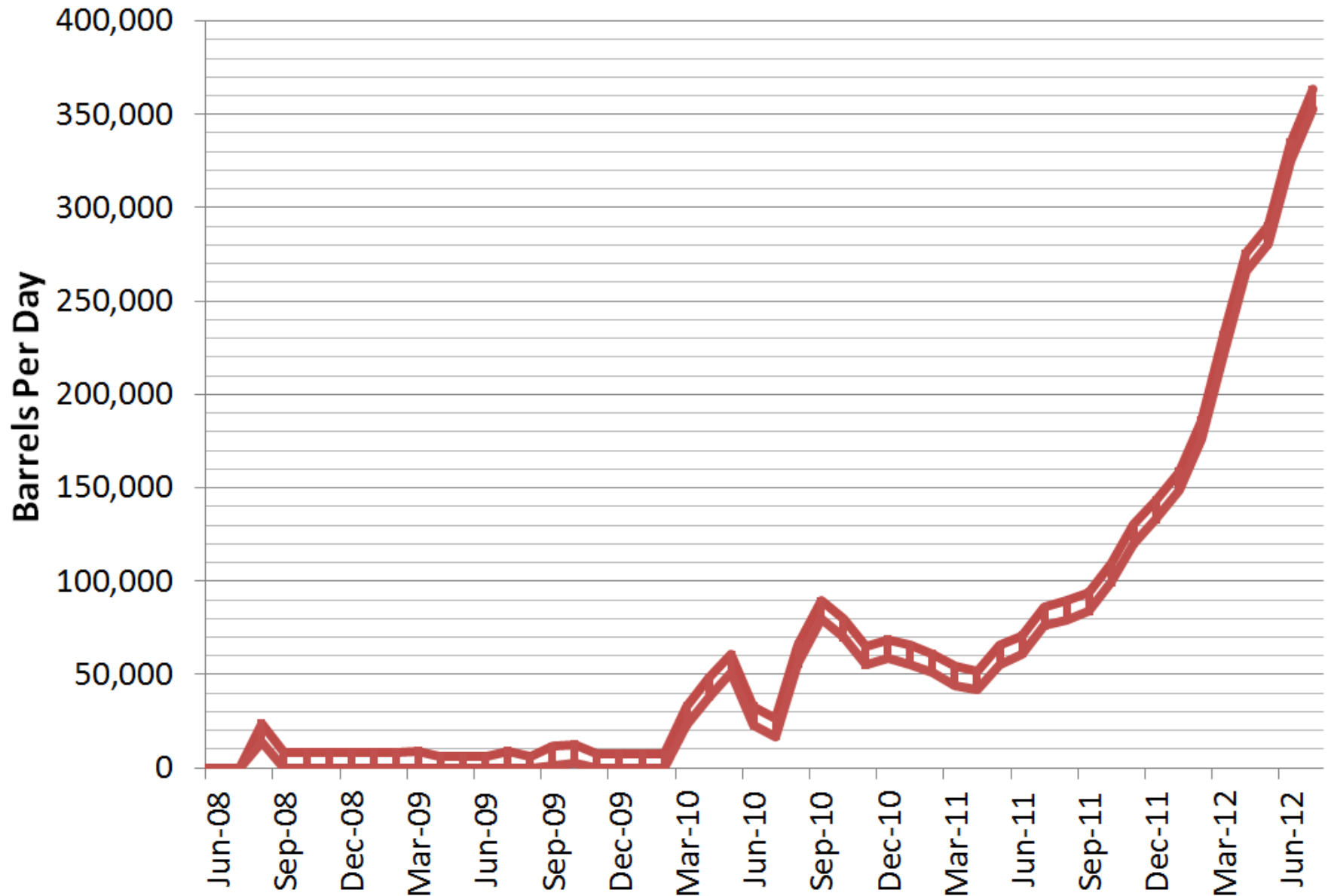
■ Pipeline Export

■ Tesoro Refinery

■ Truck to Canadian Pipelines

■ Estimated Rail

# Estimated ND Rail Export Volumes



# BNSF Crude Rail Locations



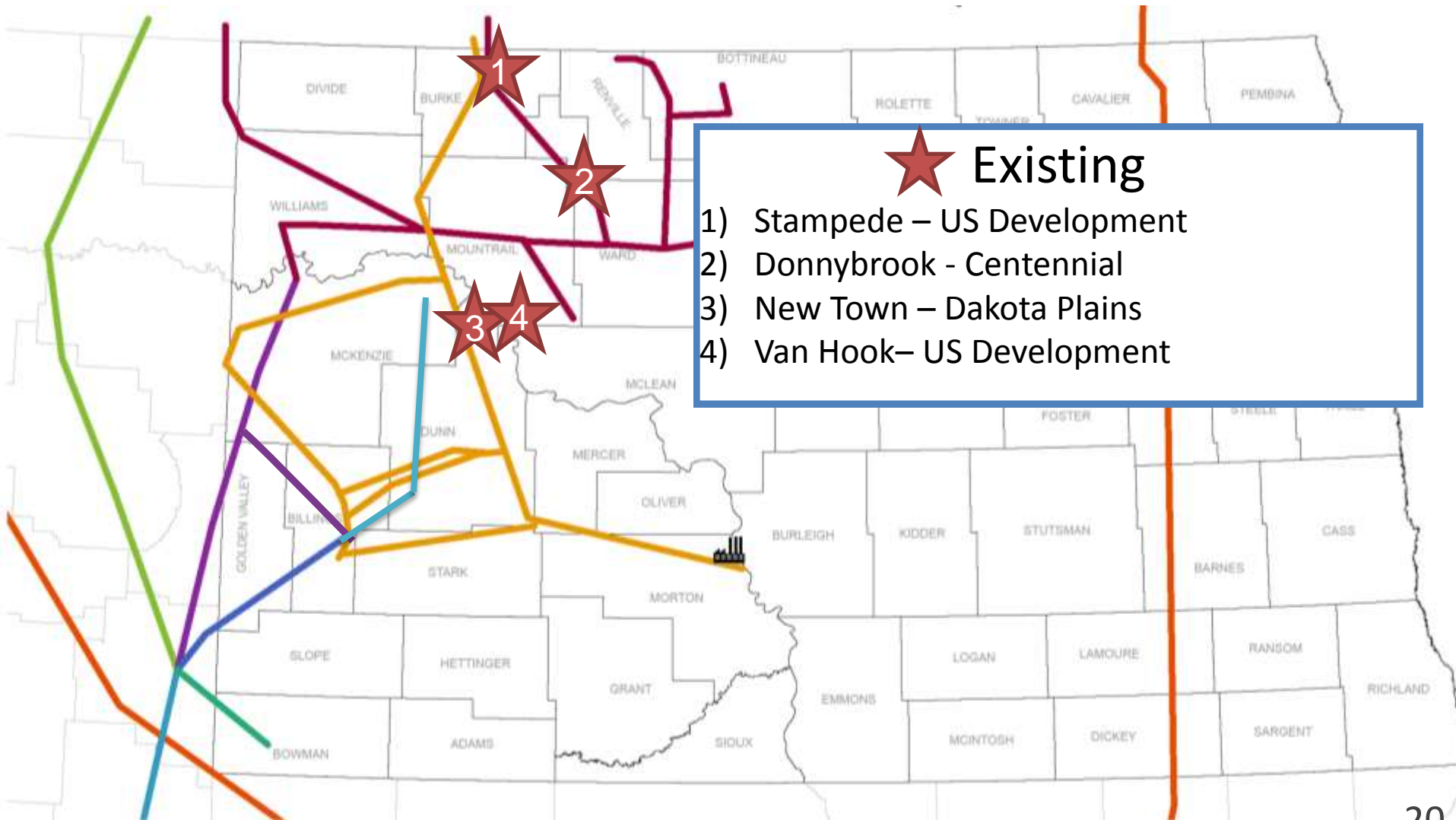
## ★ Existing

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

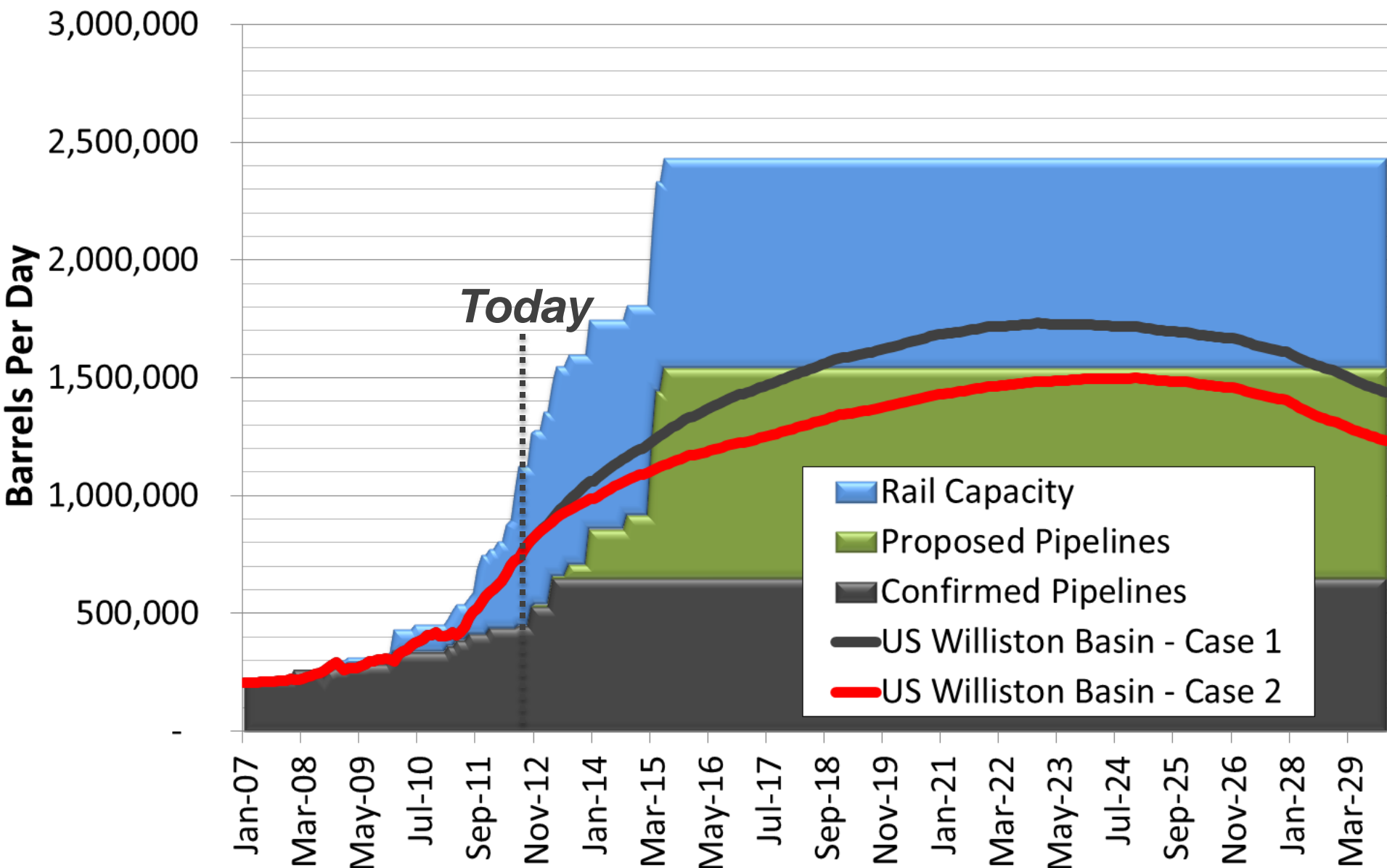
## ★ Planned

- 1) Fryburg – Great Northern - Unit

# CP Crude Rail Locations

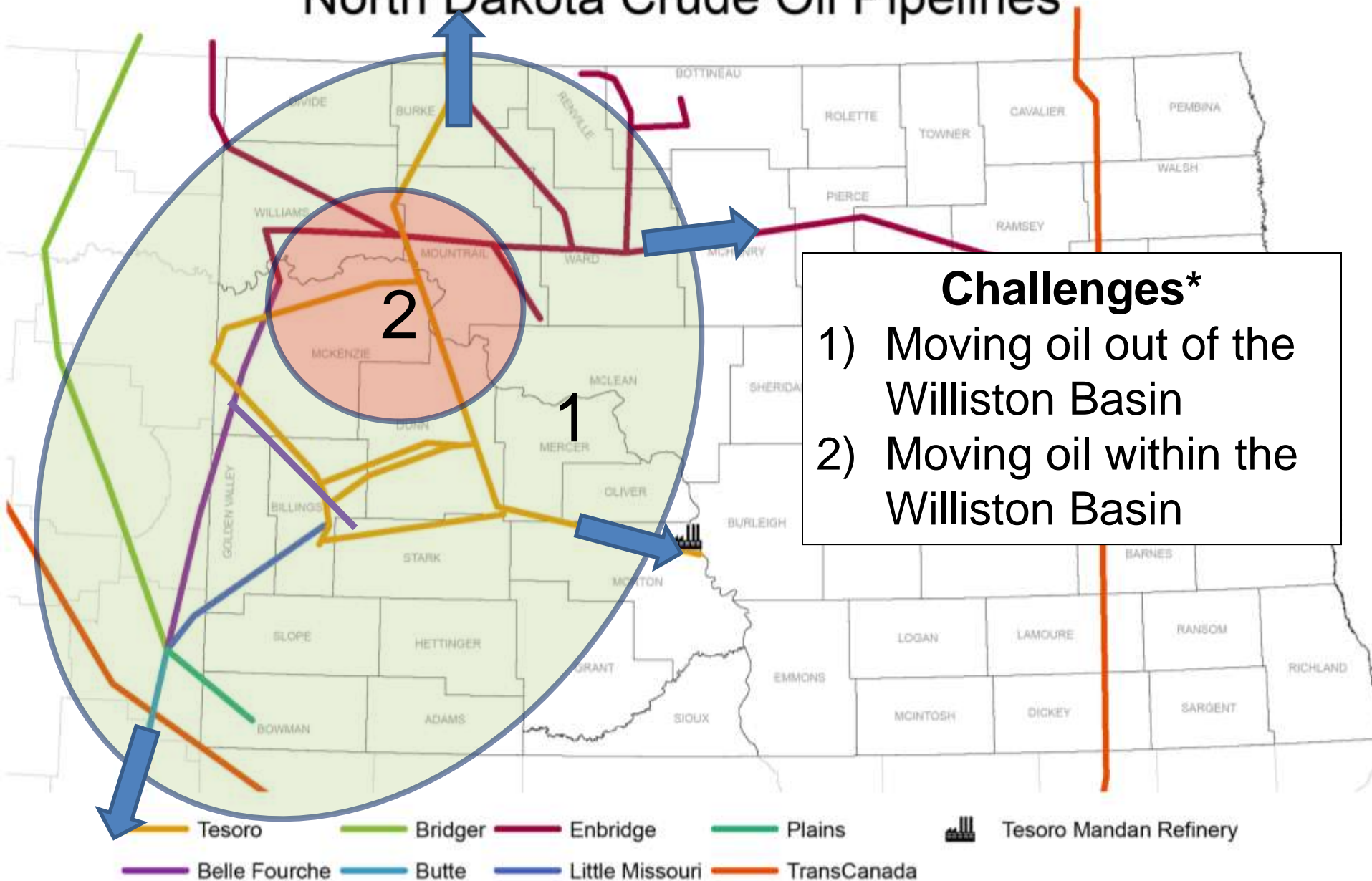


# Williston Basin Oil Production & Export Capacity, BOPD



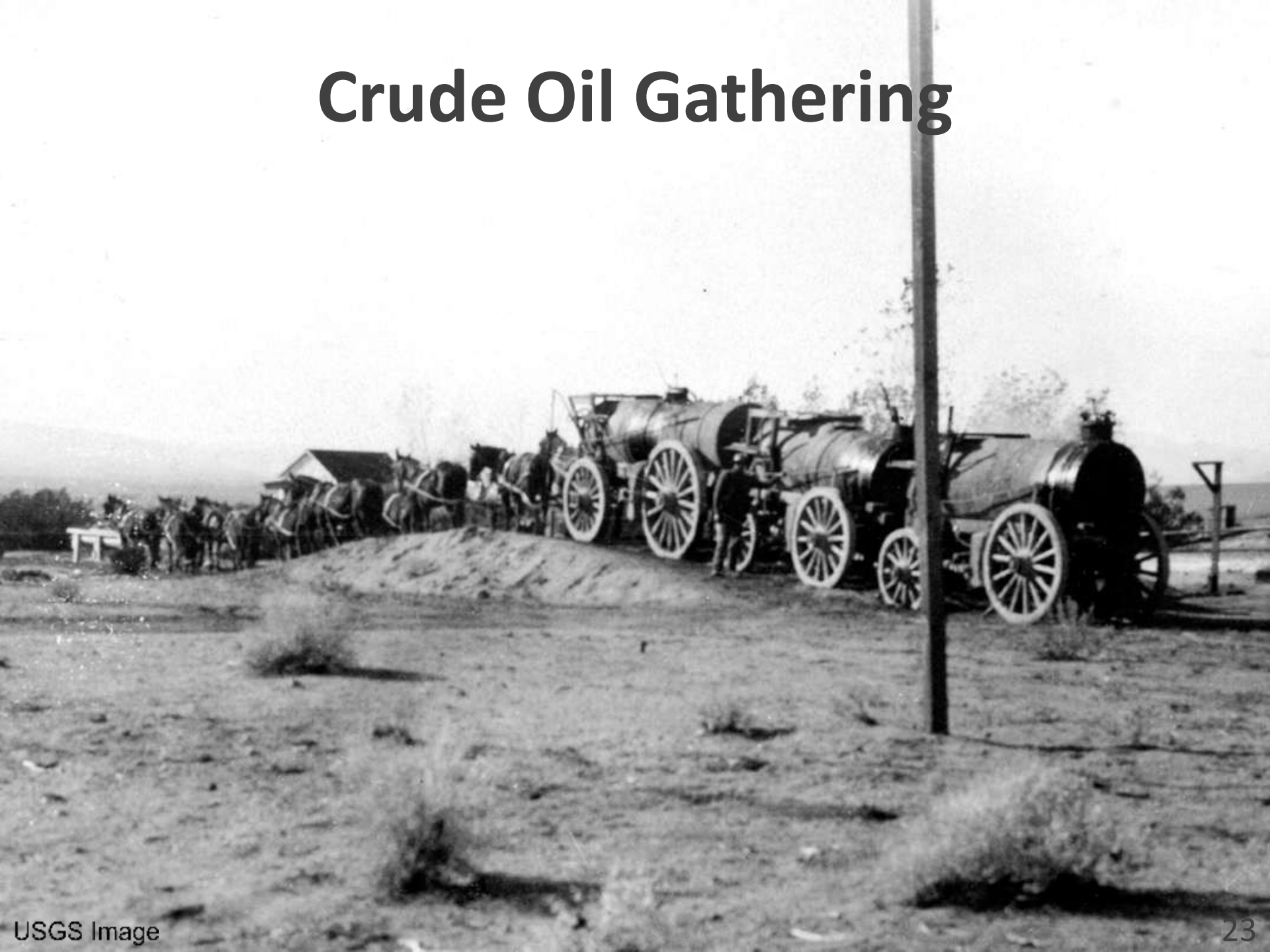
Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.

# North Dakota Crude Oil Pipelines

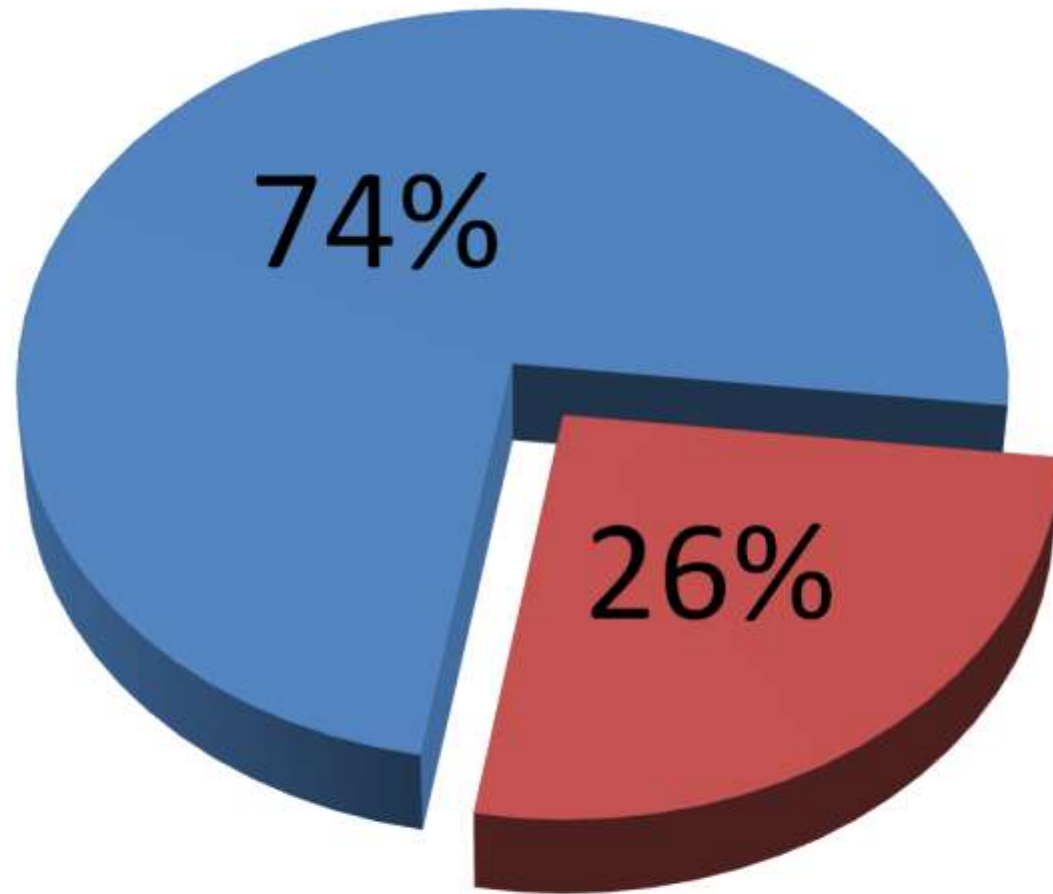


\*Modified from Bridger and Belle Fourche Pipelines

# Crude Oil Gathering

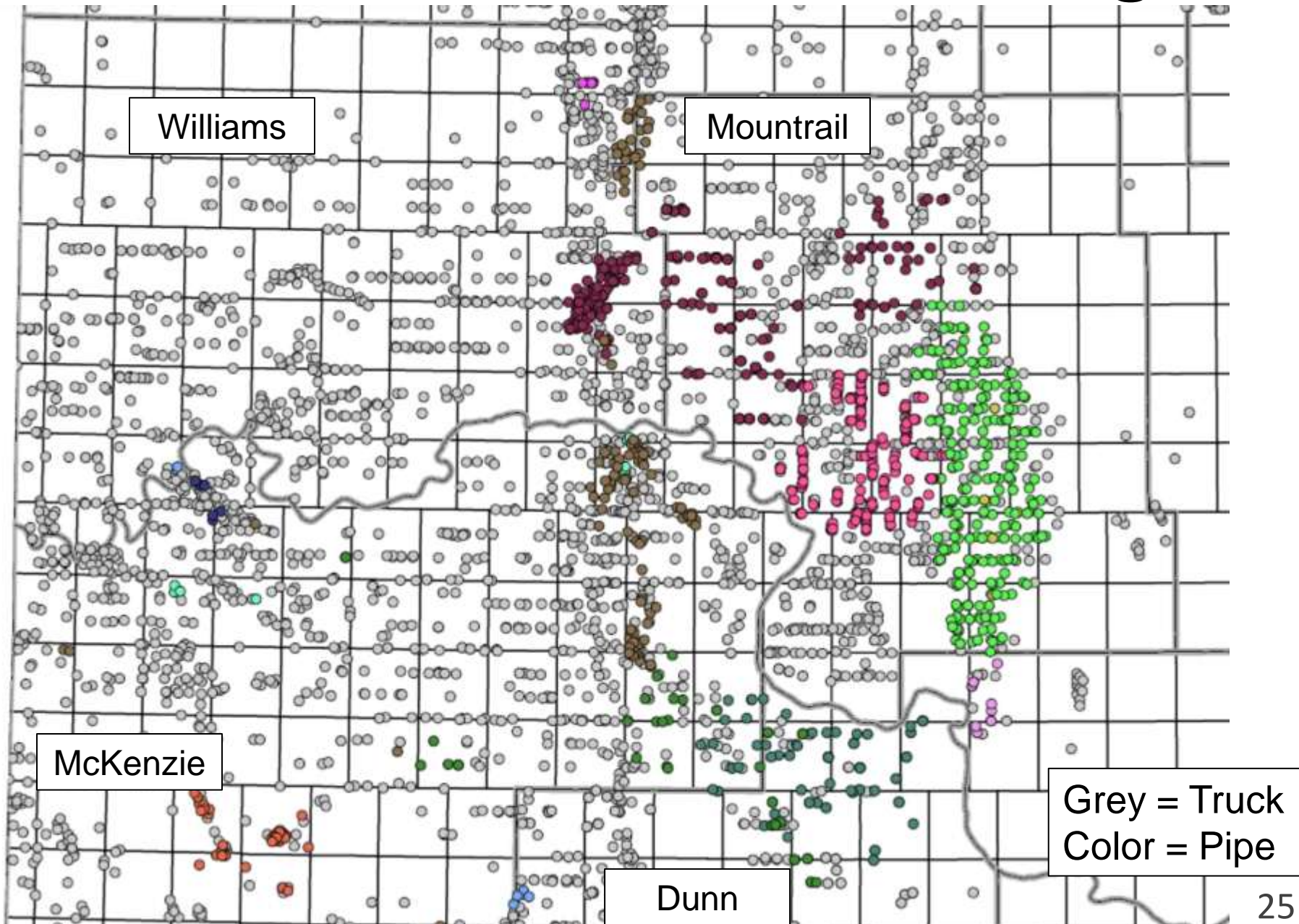


# North Dakota Crude Gathering

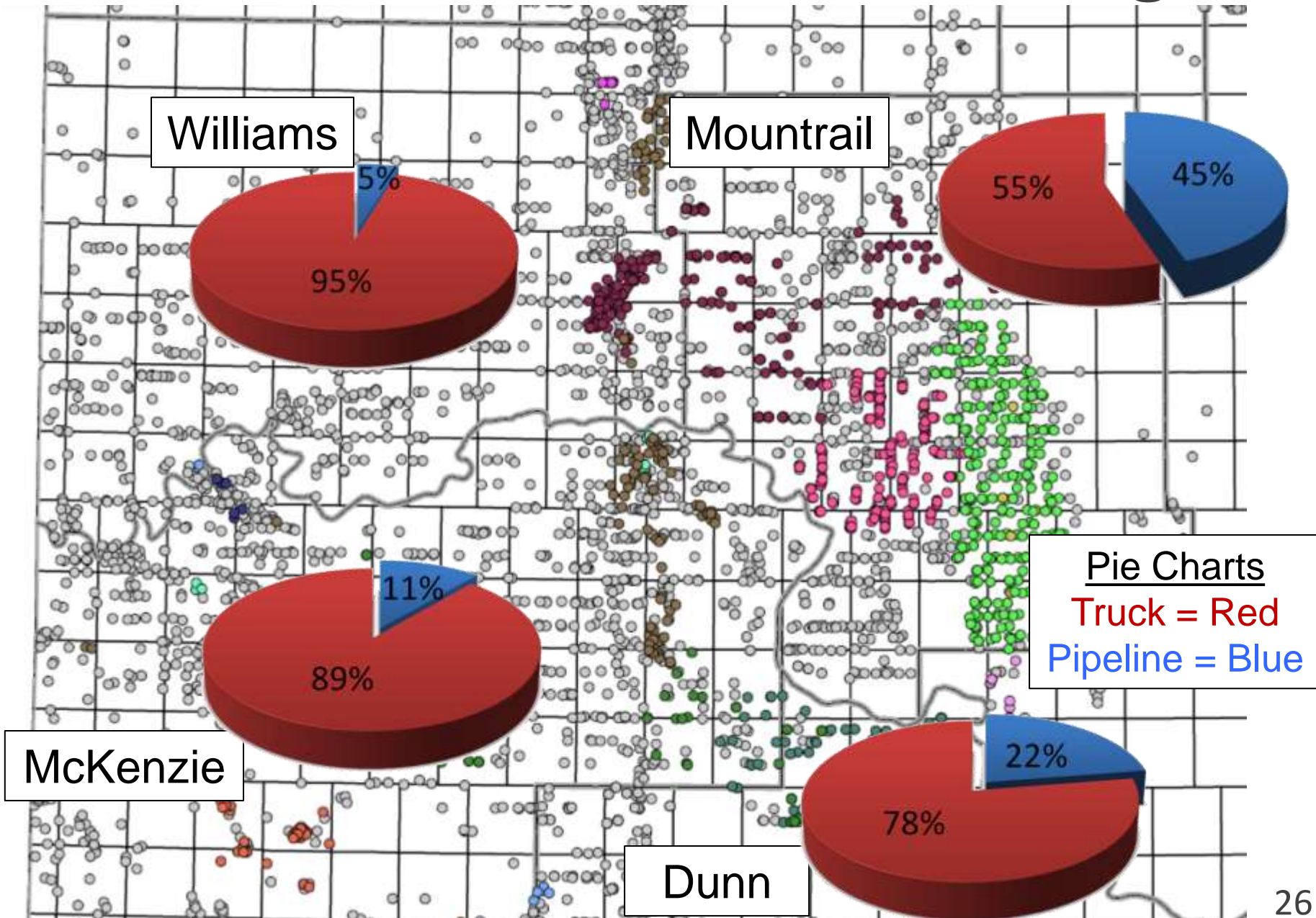


■ Truck ■ Pipeline

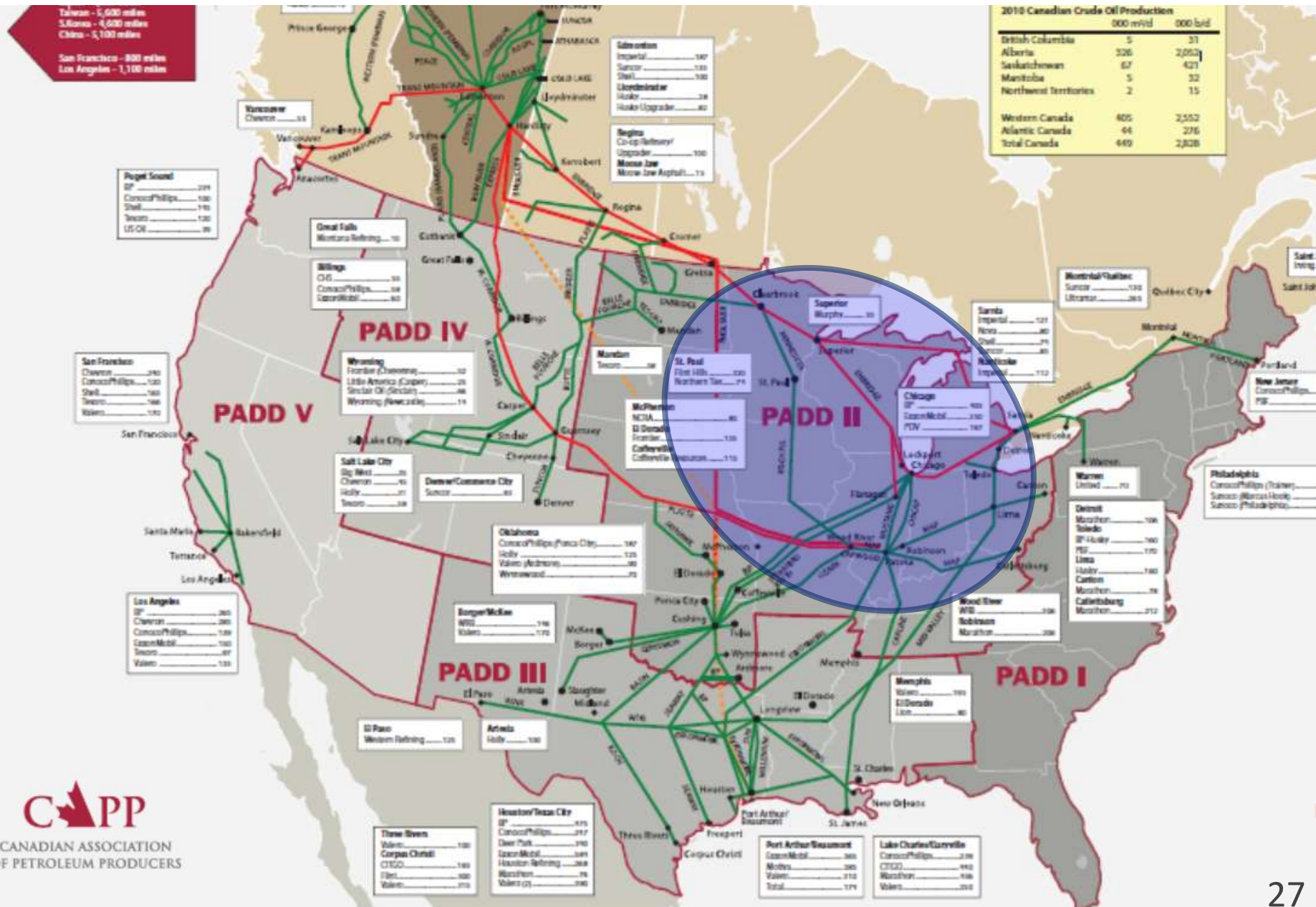
# North Dakota Crude Gathering



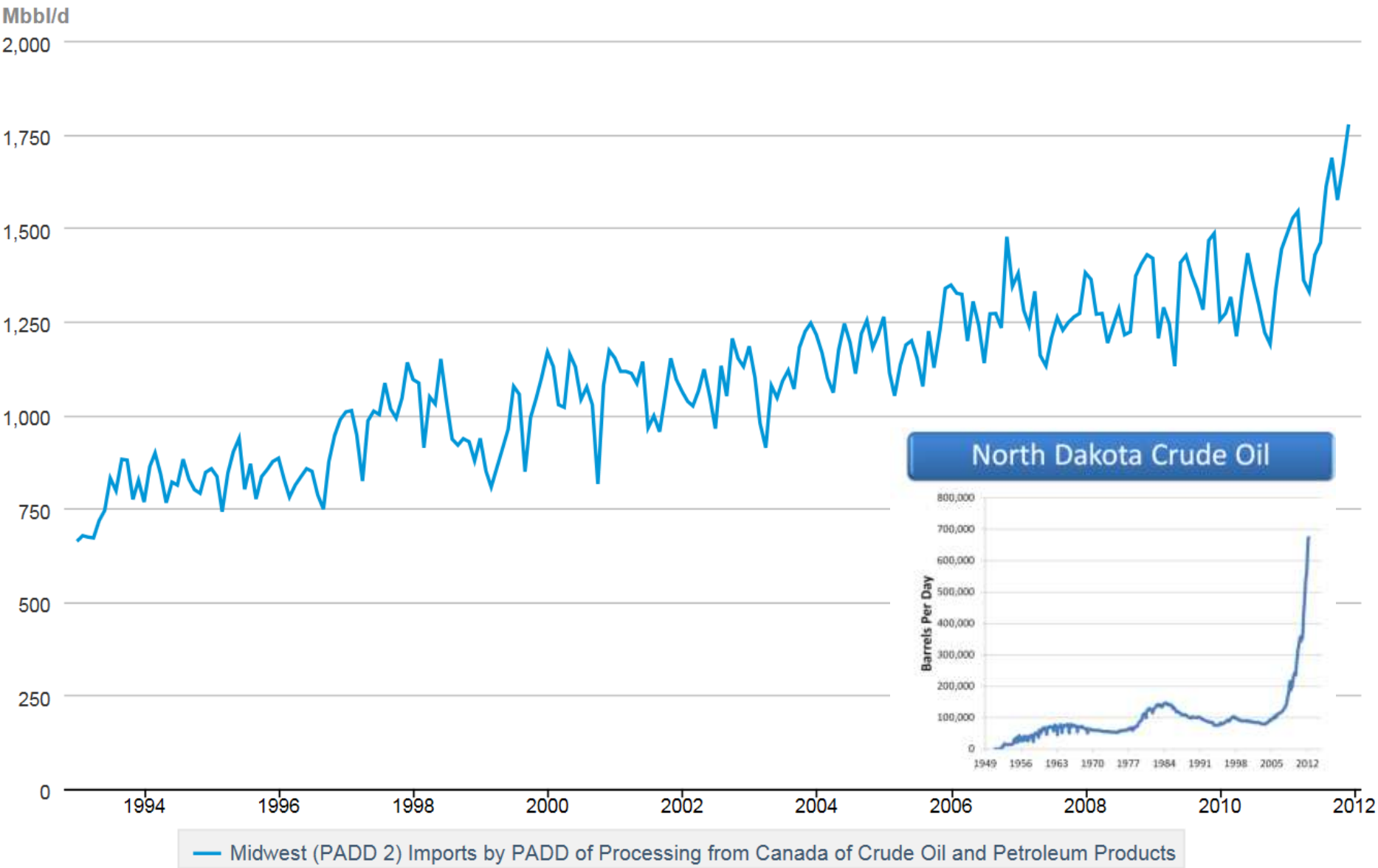
# North Dakota Crude Gathering



# Pipeline Challenges Outside ND



# PAD District Imports by Country of Origin



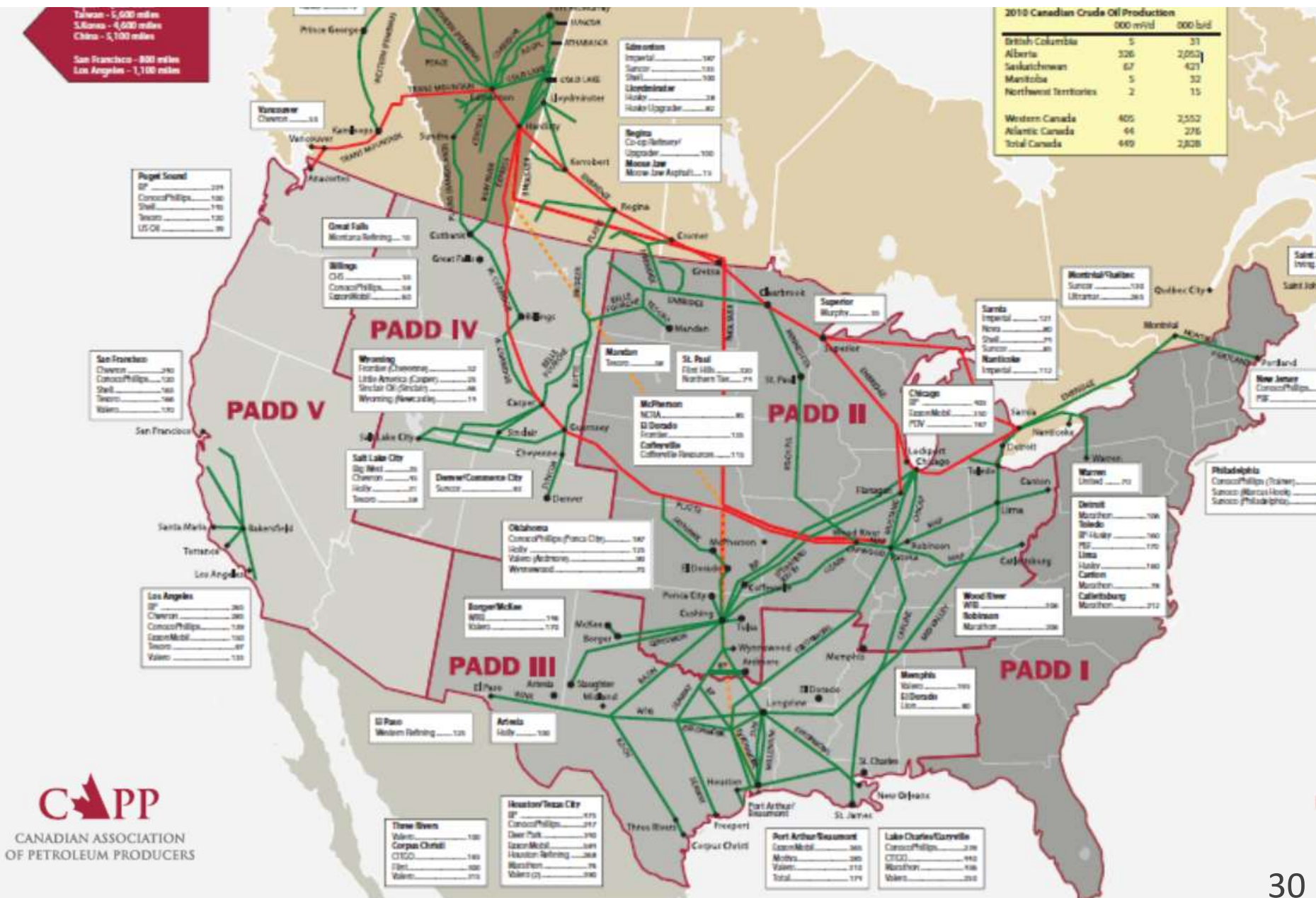
# Snapshot for Bloomberg Bakken (Clearbrook MN) Crude Oil Differential

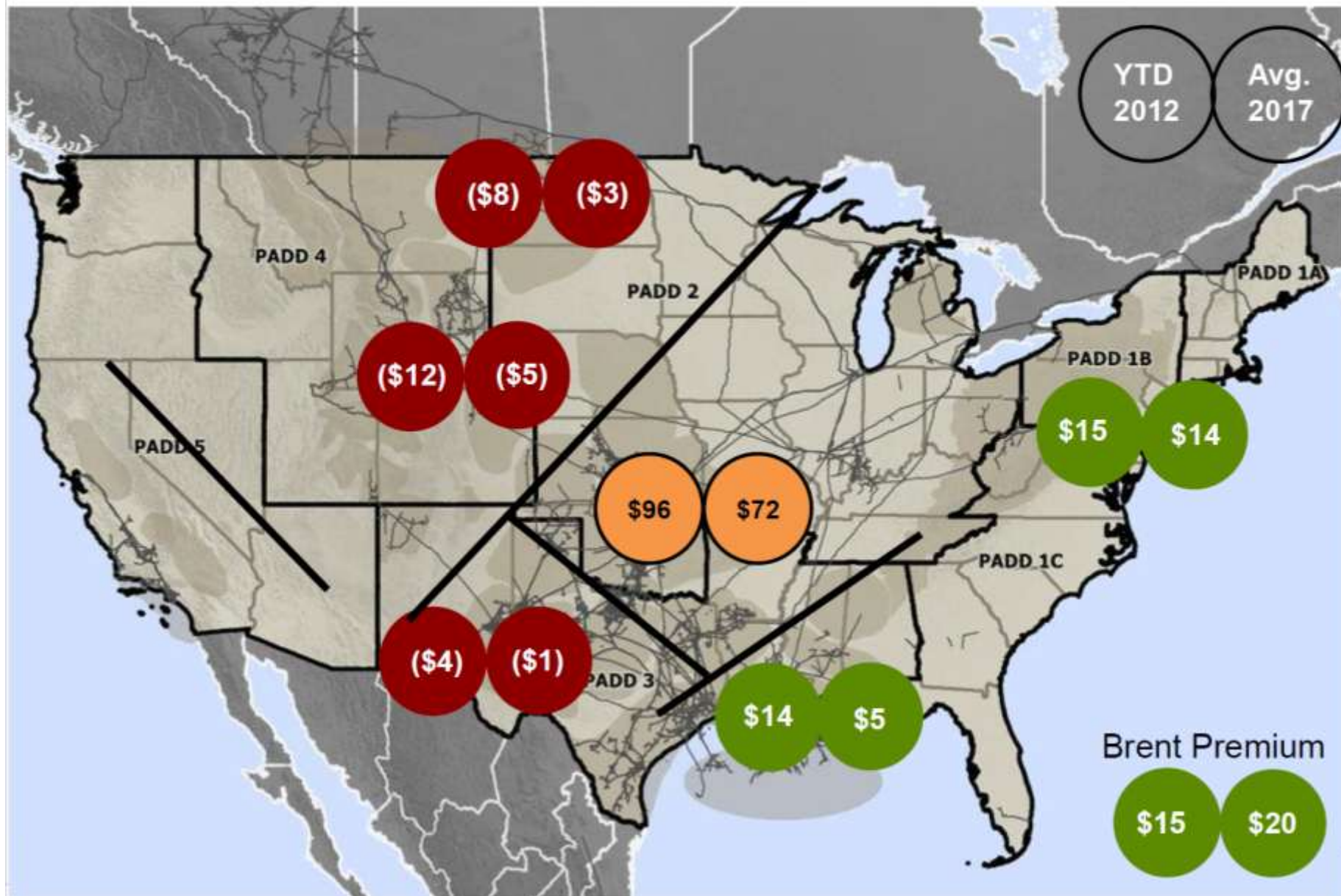
Open:	5.50000	High:
-------	---------	-------

## Rate Chart for USCSUHC1 >>



# Pipeline Challenges Outside ND





Source: Jodi Quinnell, BENTEK Energy - Sept 12, 2012 "Crude Awakening"

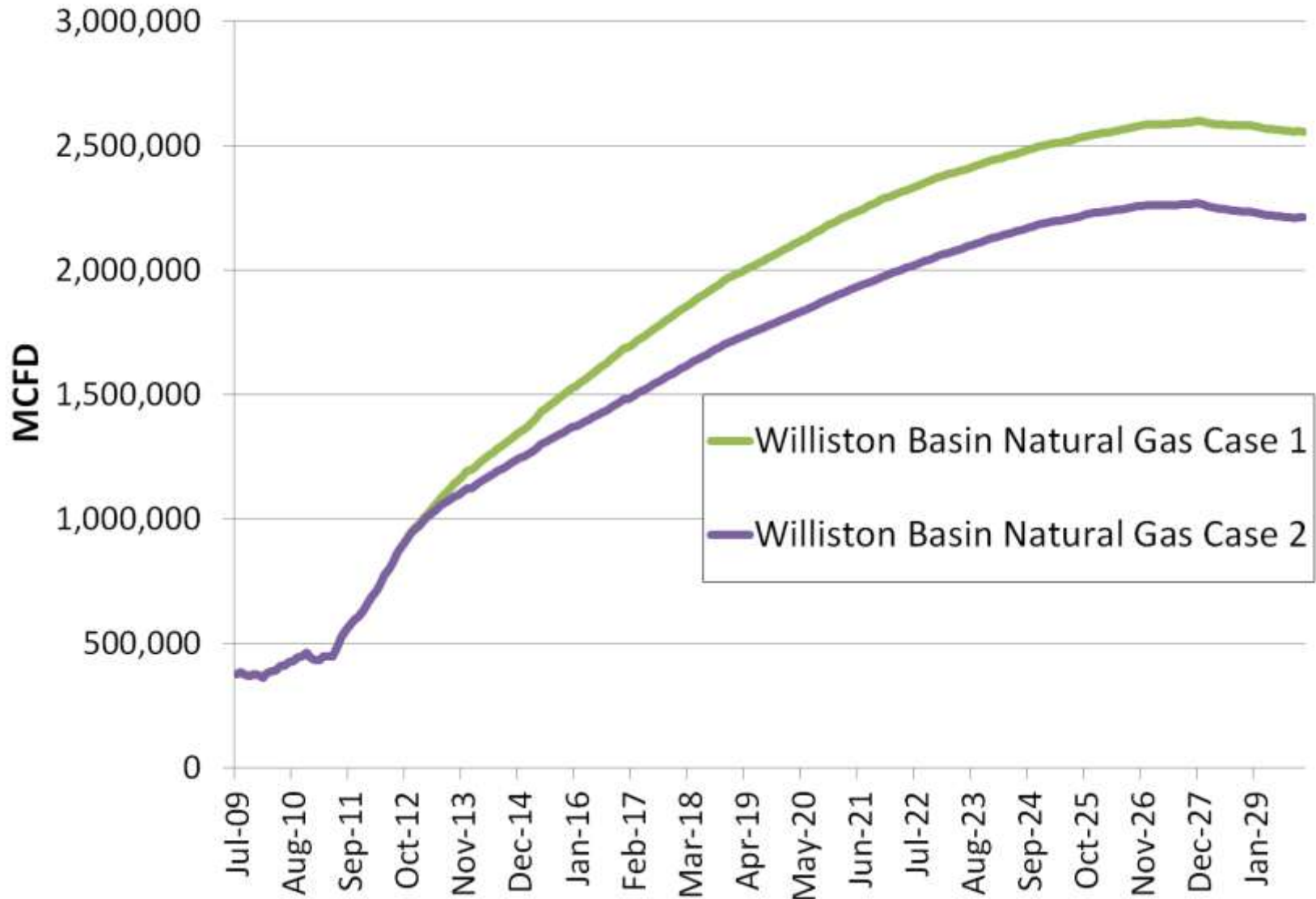
# Strengthening Landowner Relations



# Natural Gas

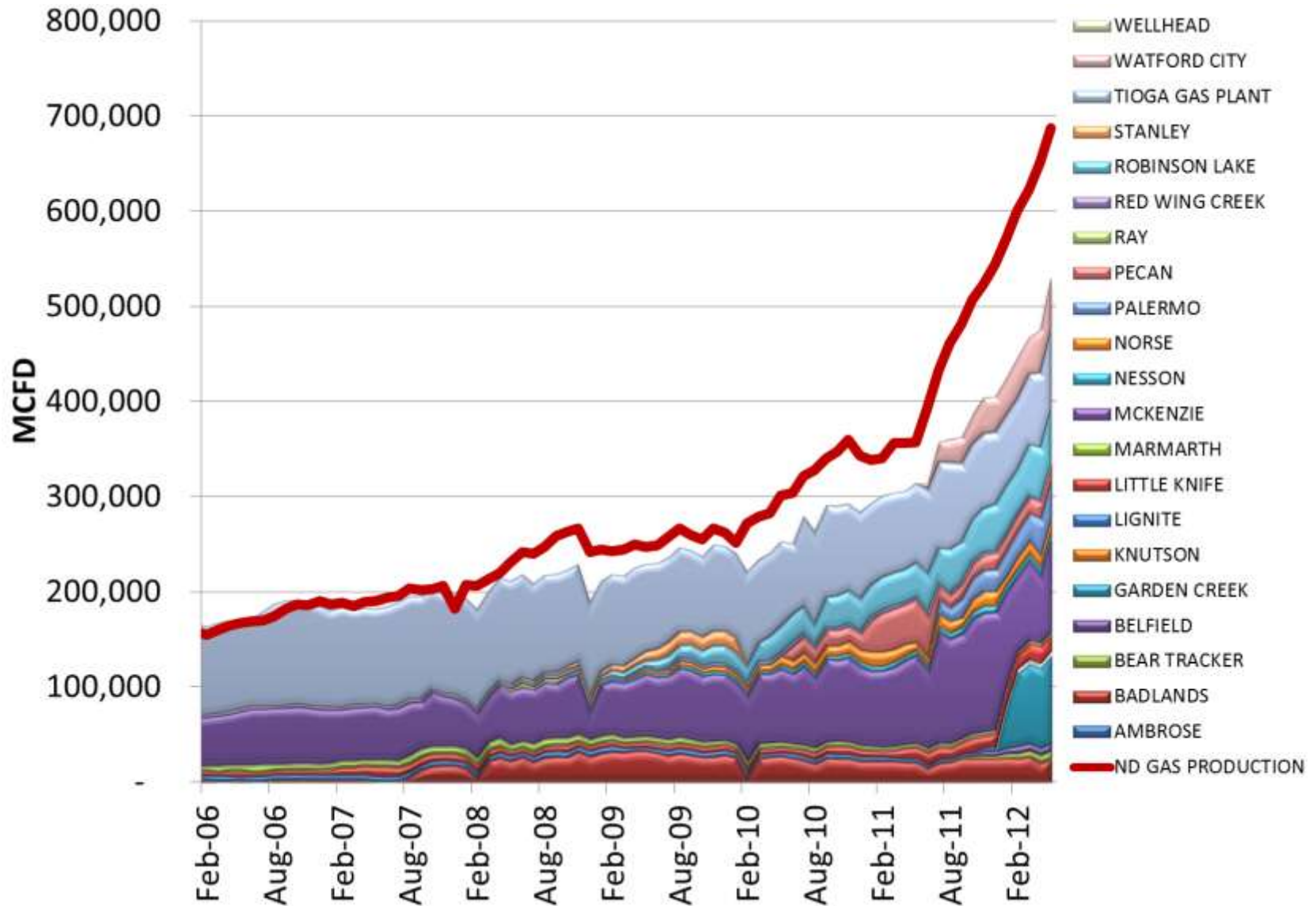


# Williston Basin Gas Production

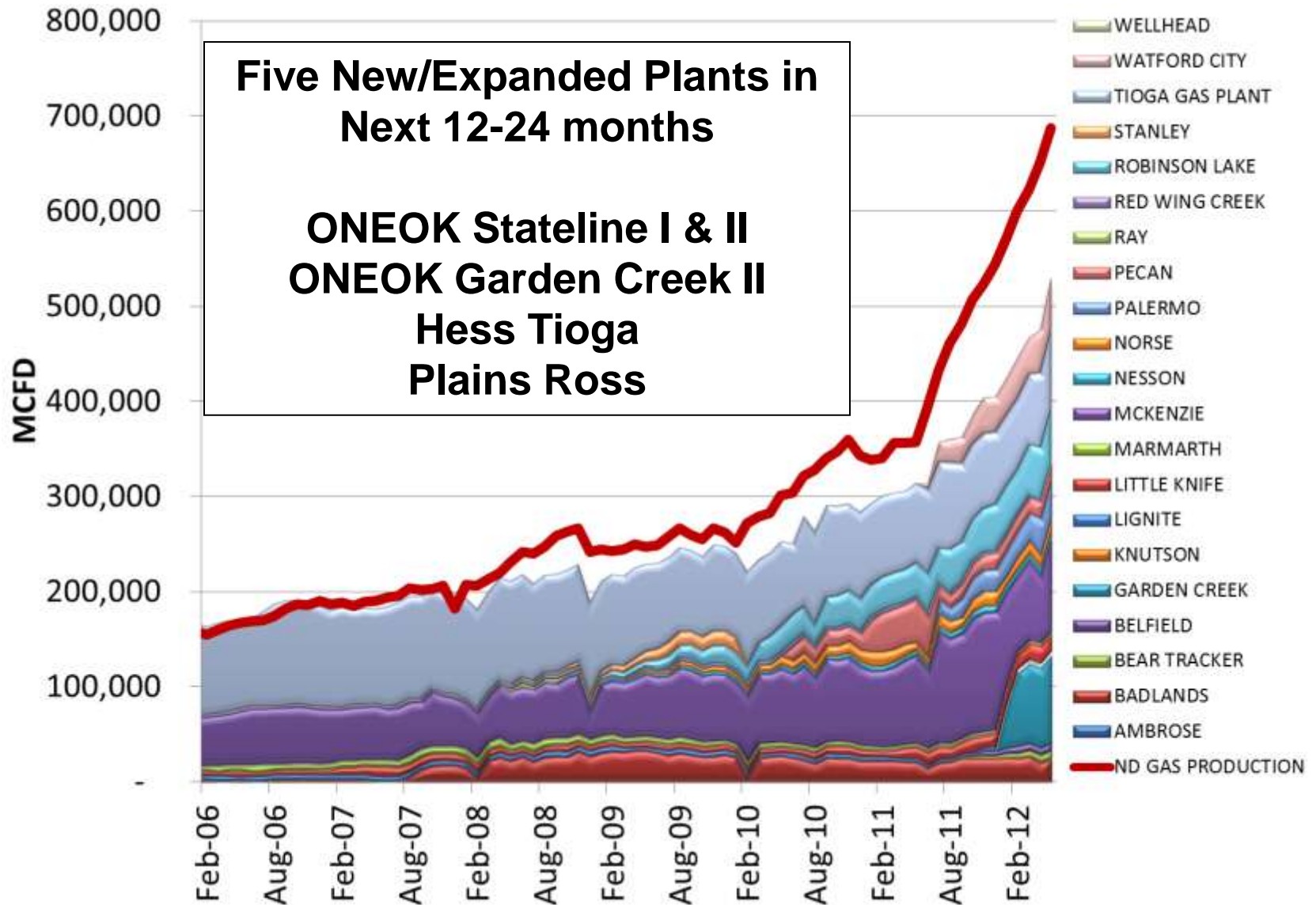


Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.

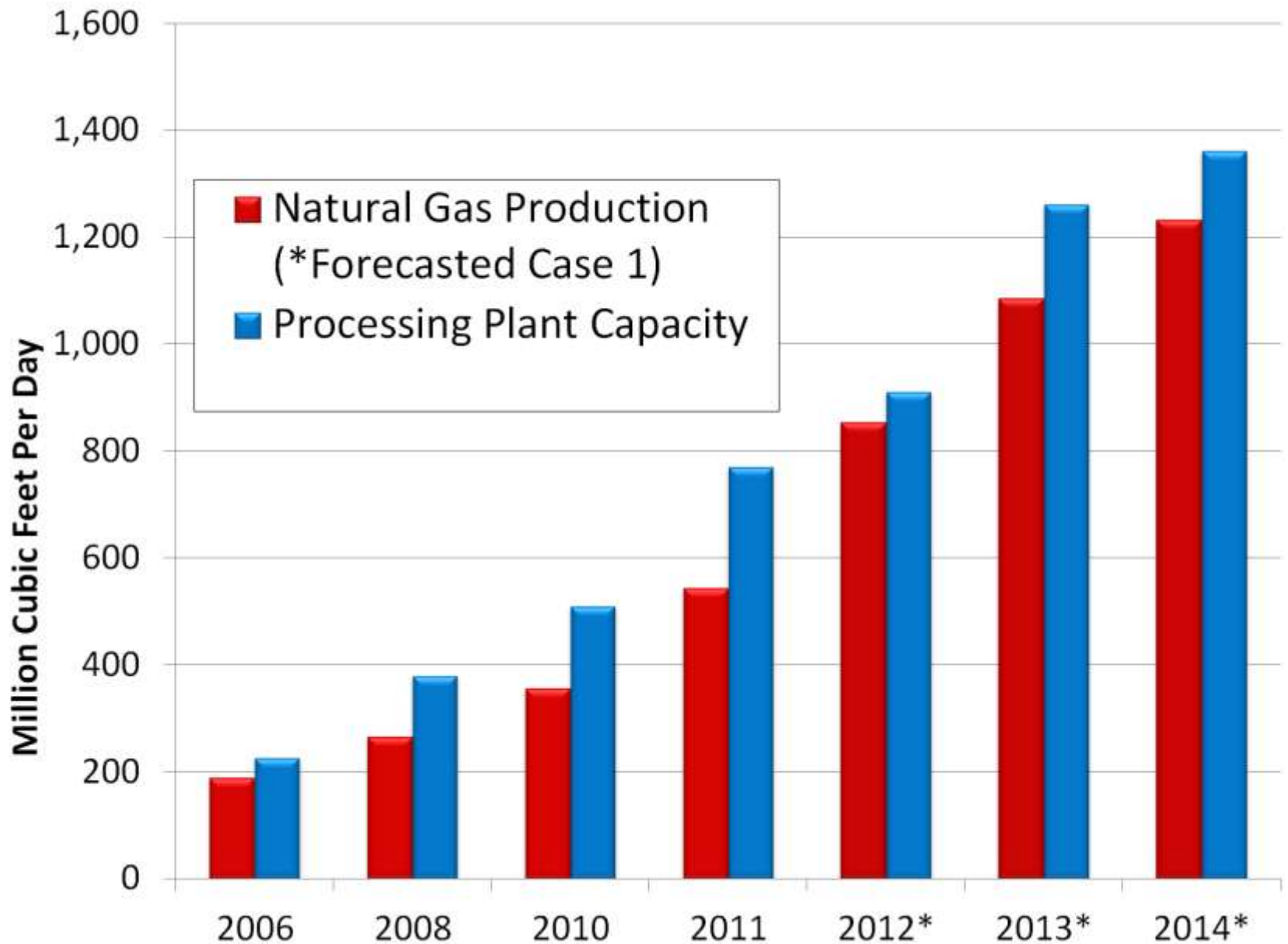
# ND Gas Facility/System Intake



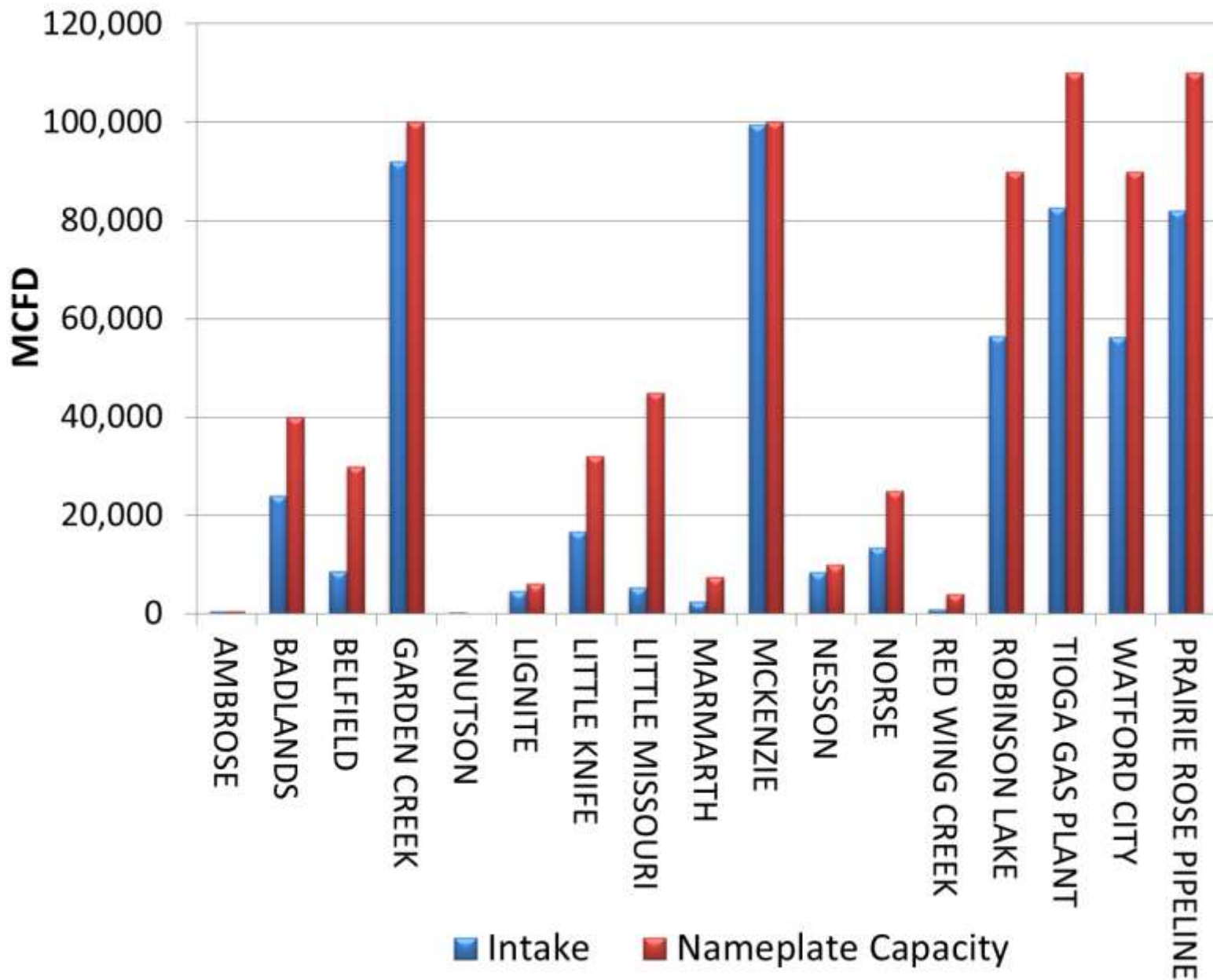
# ND Gas Facility/System Intake



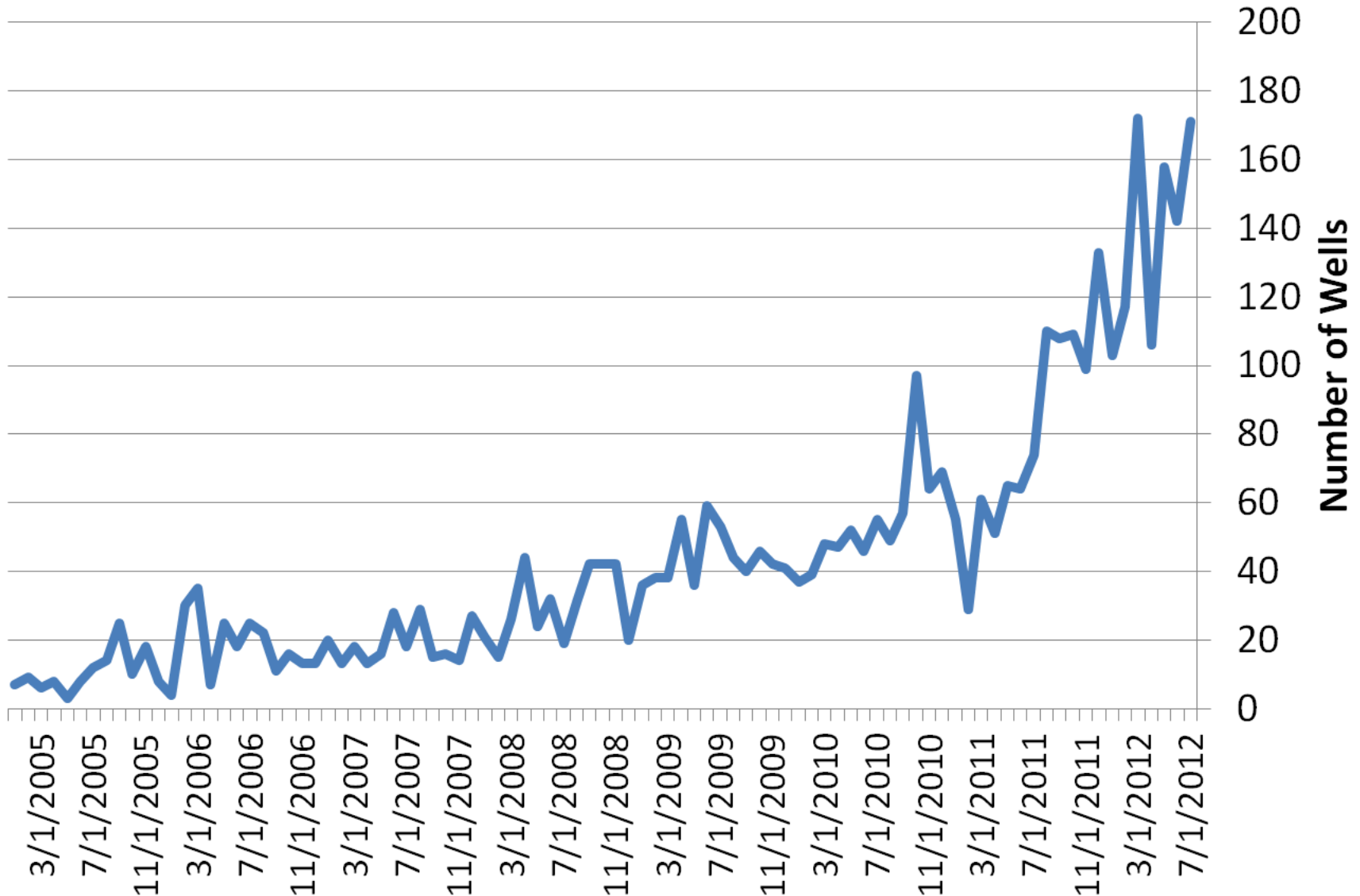
# ND Gas Plant Capacity



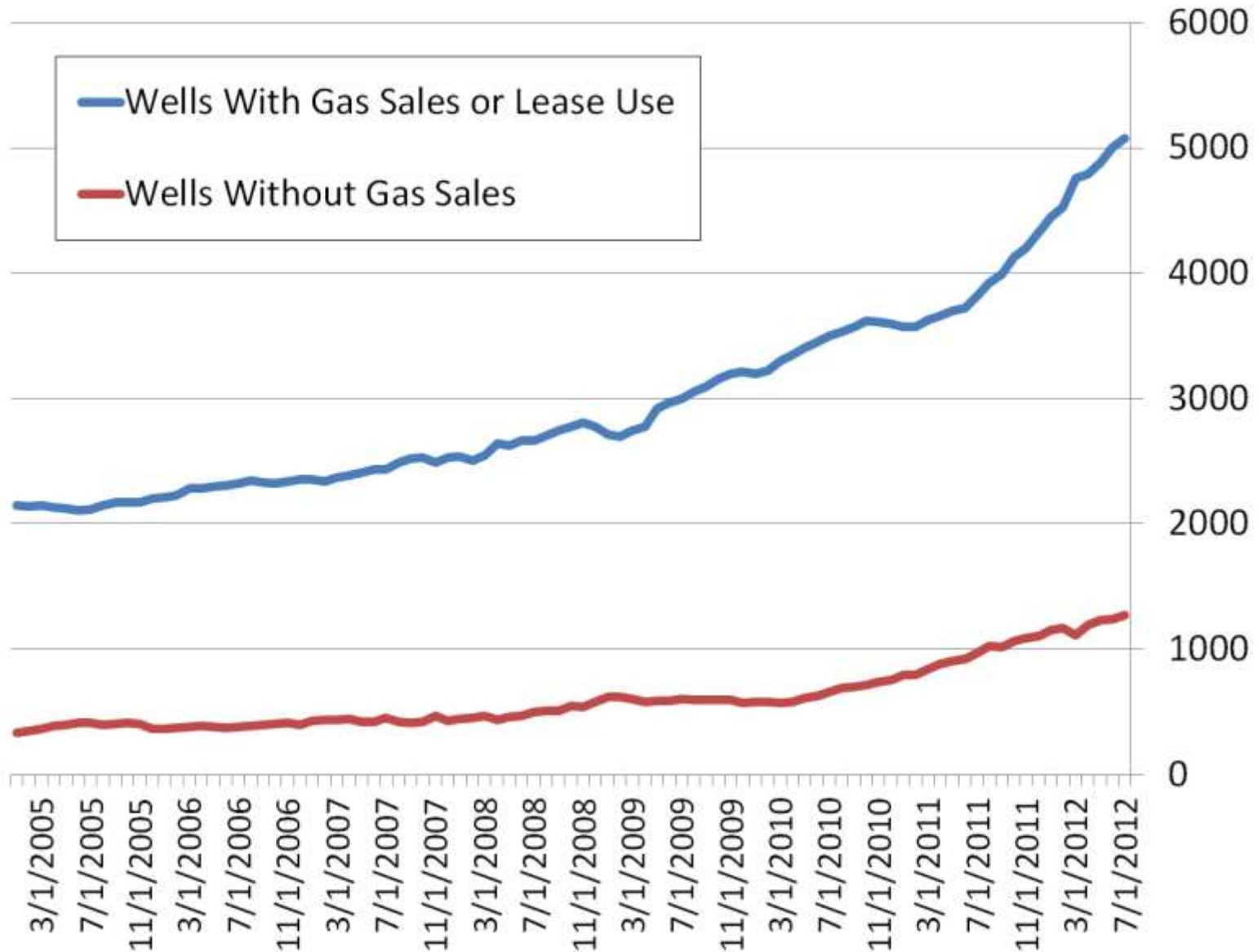
# May 2012 Gas Plant Volumes



# First Time Gas Sales Per Month



# ND Gas Gathering Statistics



# ND Natural Gas Pipelines

Williston Basin  
Interstate Pipeline

Alliance Pipeline

Northern Border  
Pipeline

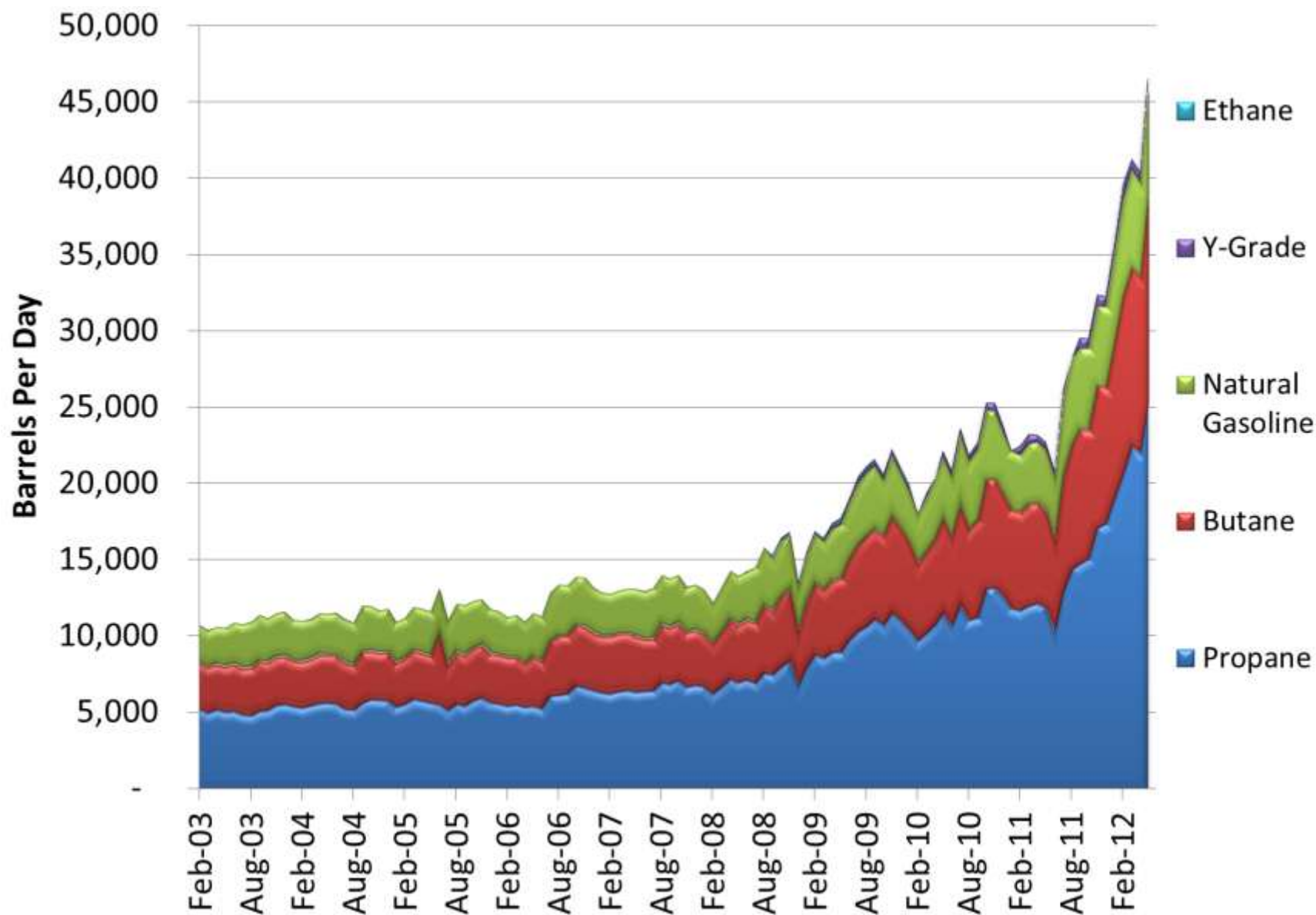
2.37 BCFD

1.51 BCFD

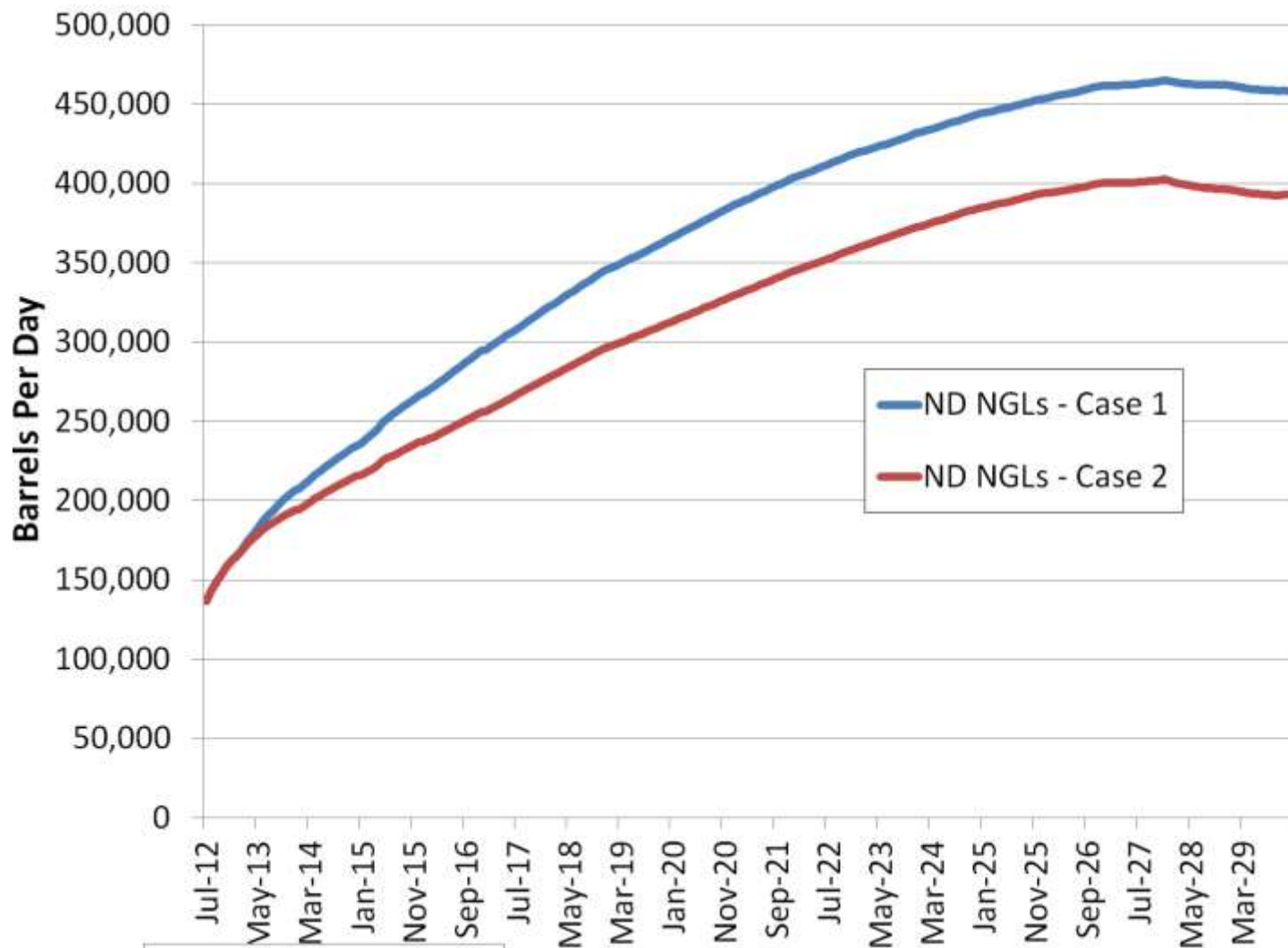
— Alliance — Hess

— Bear Paw — Northern Border — Whiting — Gas Processing Plant

# ND Gas Plant NGL Production



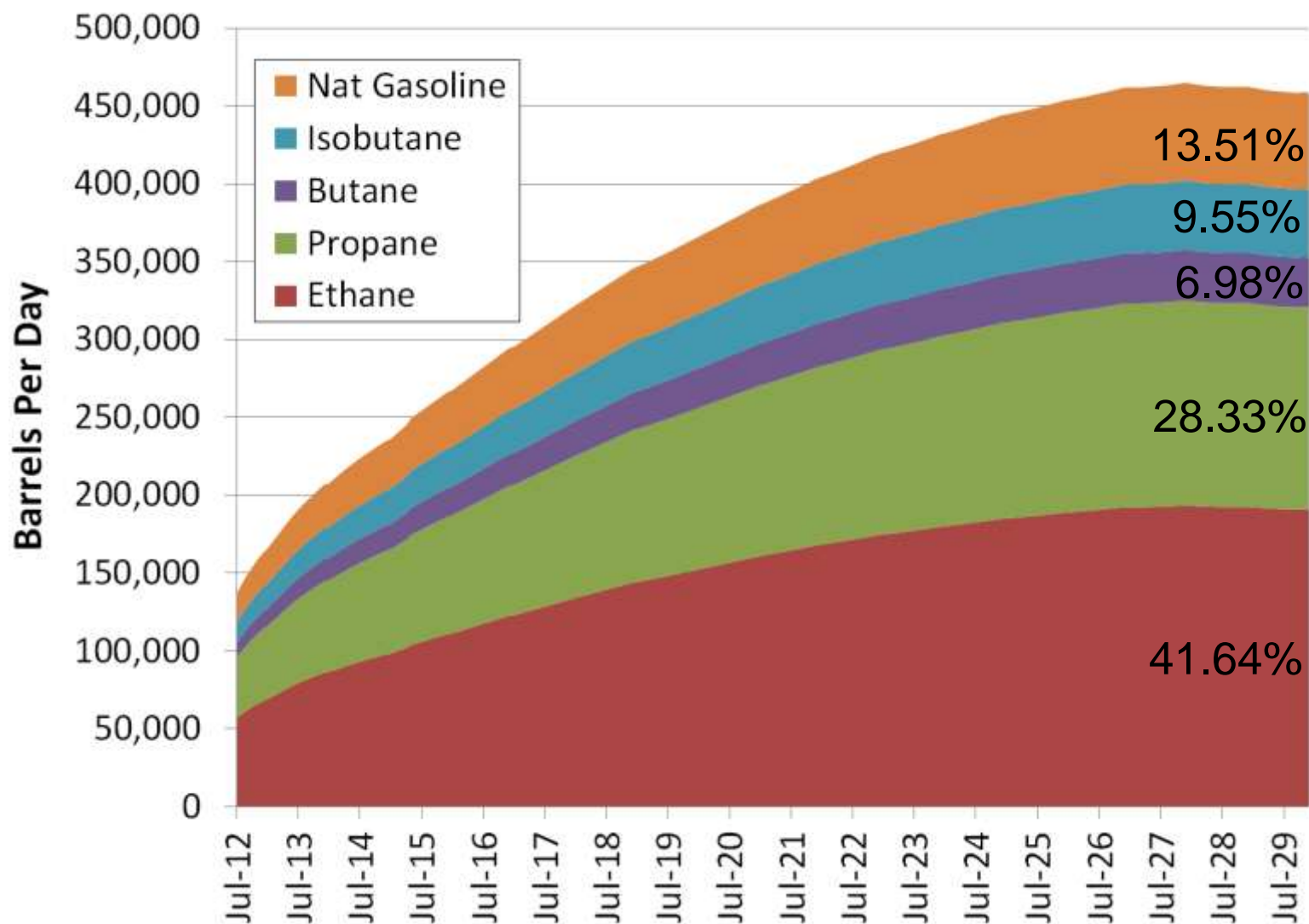
# North Dakota NGL Potential



## Assumptions

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

# Case 1: ND NGL Potential\*

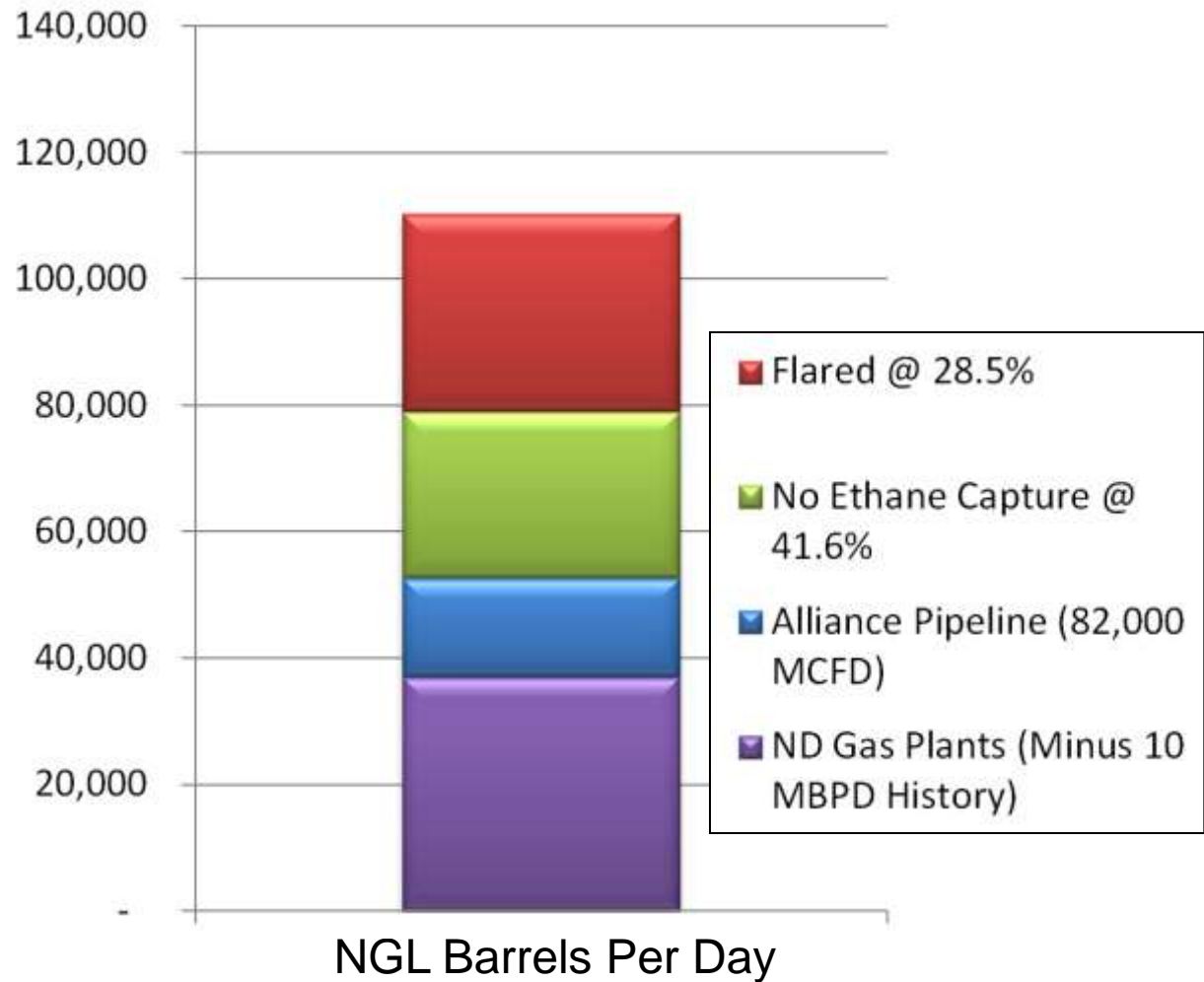


\*Using NGL breakdown from the July 2012 BENTEK Natural Gas Study

# May 2012 Bakken/TF NGL's

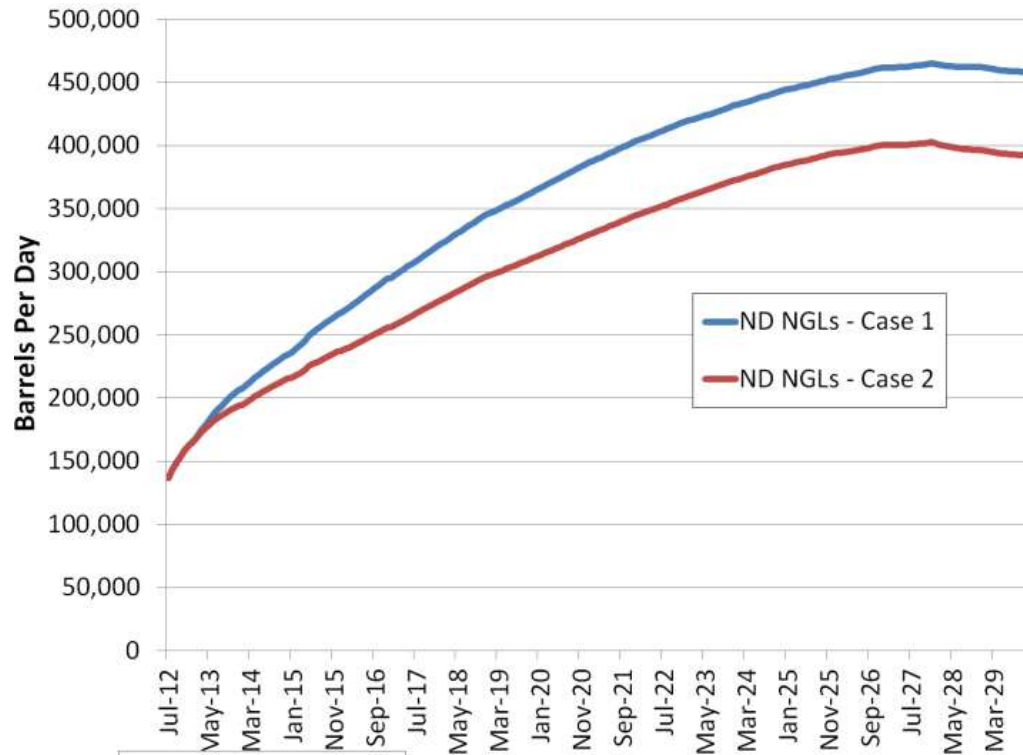
## Assumptions

- May Bakken Gas 579,000 MCFD
- 8 Gal/MCF
- $(8/42) * 579,000 = 110,286$  BPD



*\*This is an illustration only and should not be considered official industry data*

# Moving Future NGL Volumes

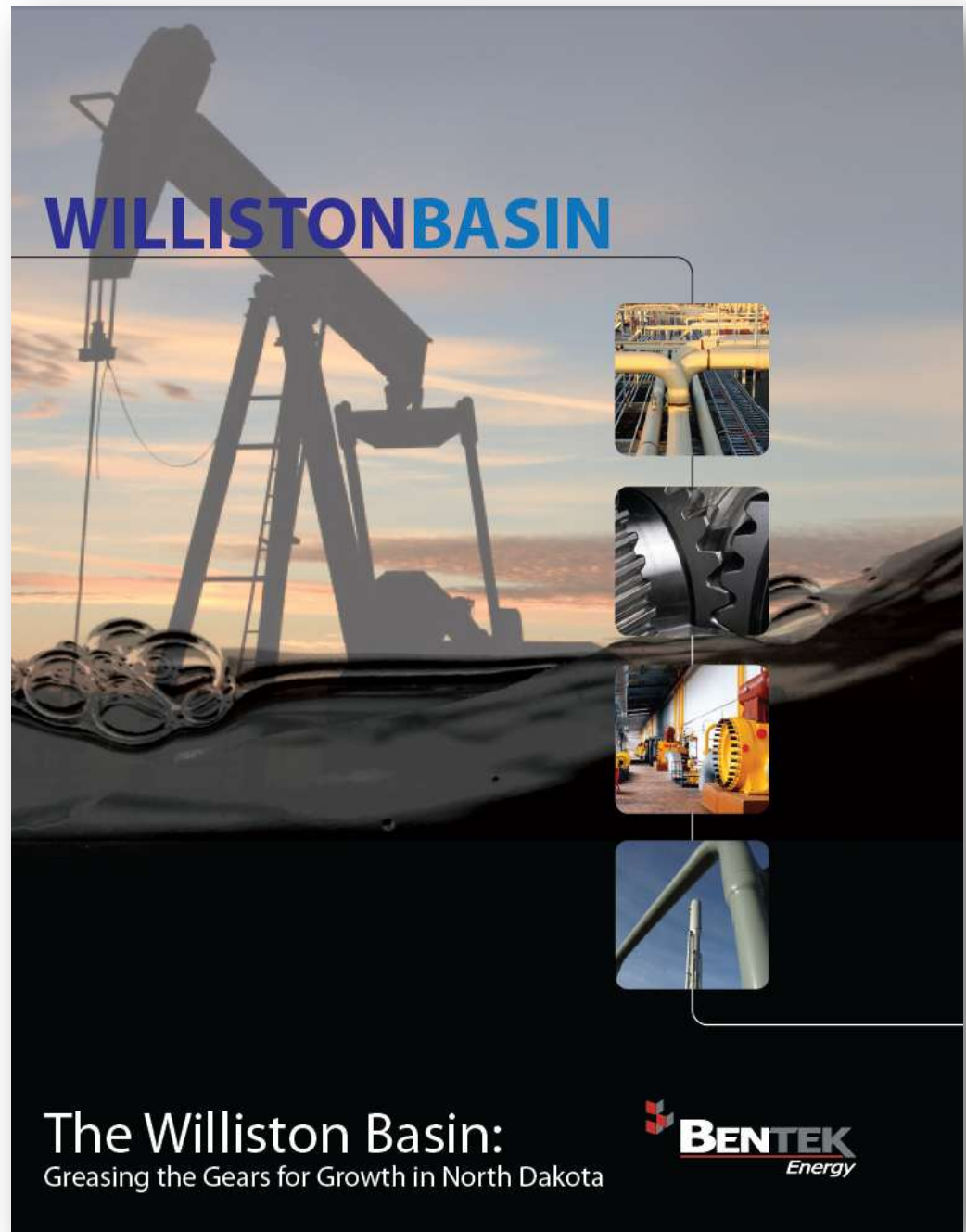


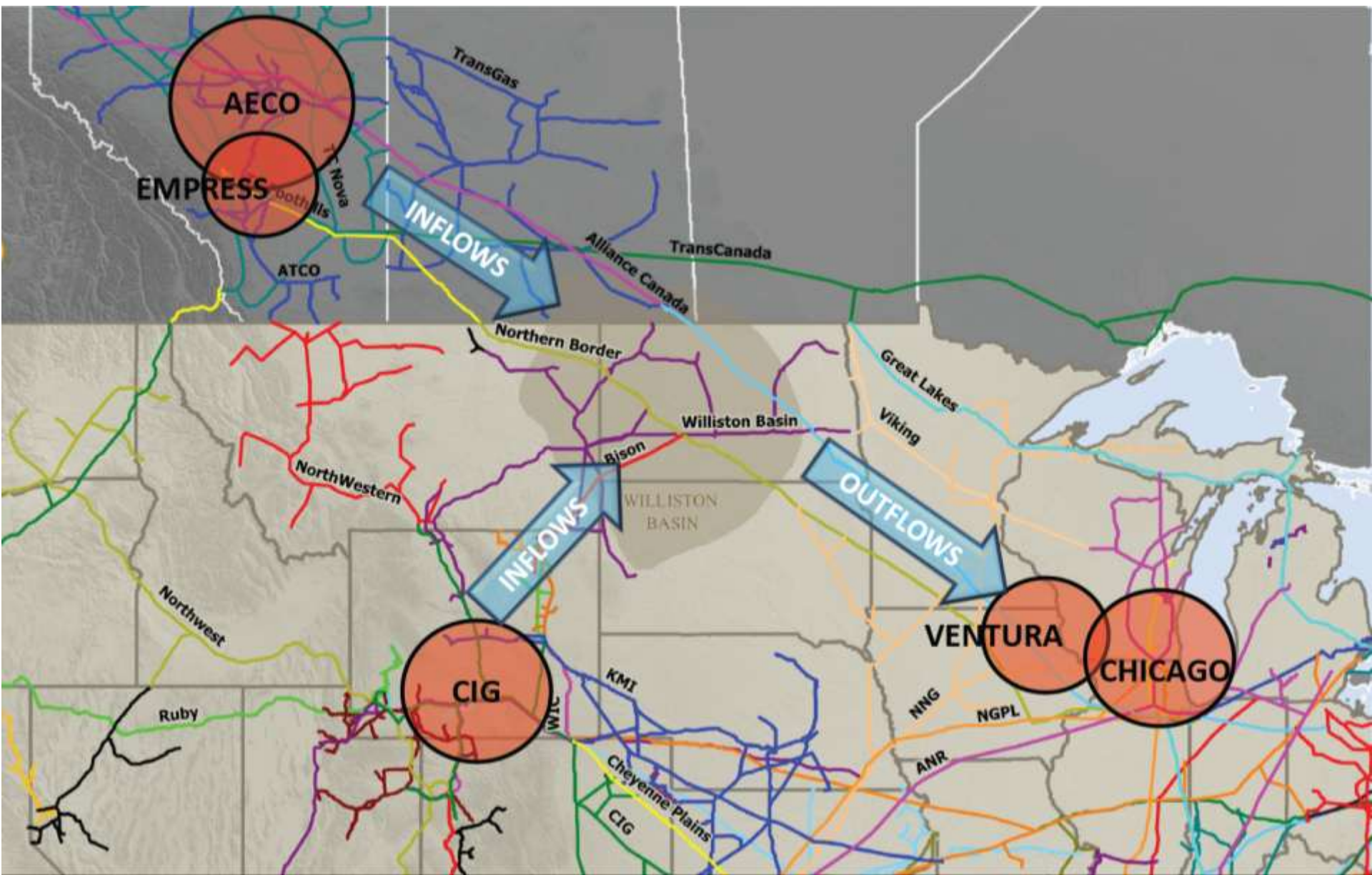
## Transportation Options

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

# Natural Gas Study

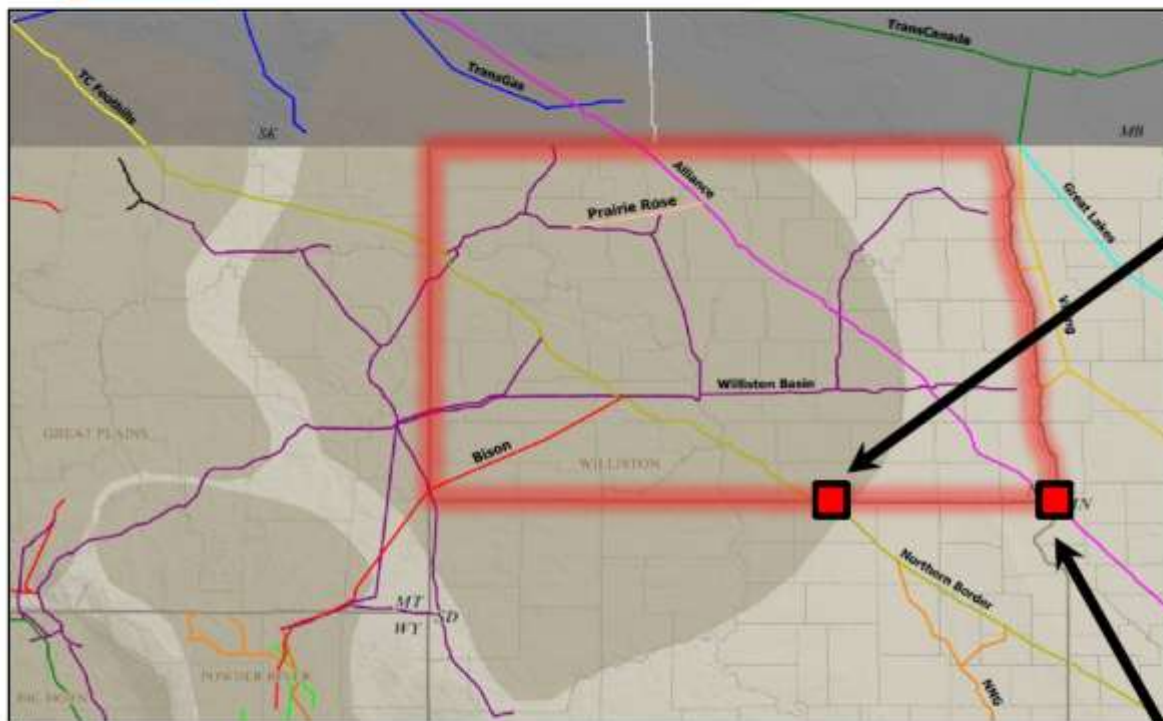
## Transmission Future



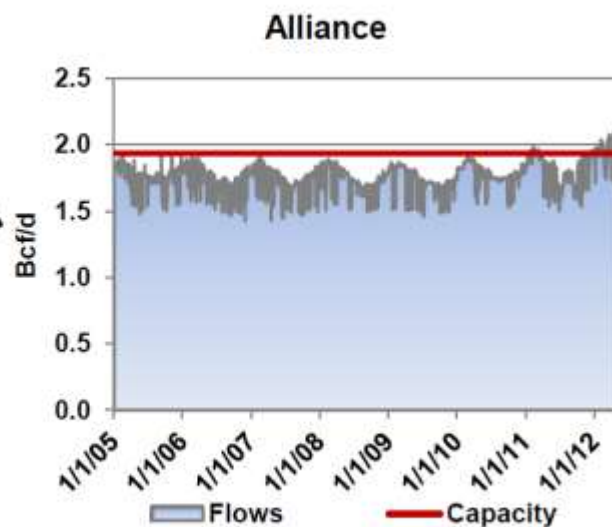
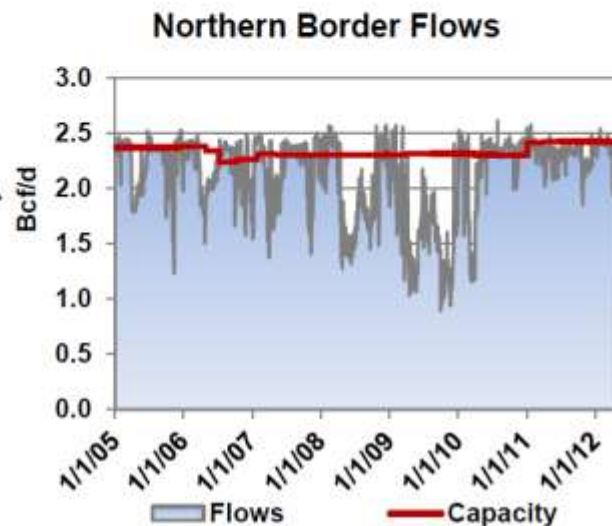


Source: BENTEK Energy July 2012 Report

# 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.





## NORTH DAKOTA GOVERNOR'S PIPELINE SUMMIT

Bismarck, ND – June 14, 2012



Full 2.5 Hours Replay: <http://www.governor.nd.gov/node/1459>

# Contact Information

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Bismarck, ND 58505-0840

Phone: (701)220-6227

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E-mail: [jjkringstad@ndpipelines.com](mailto:jjkringstad@ndpipelines.com)

Websites:

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

[www.ndpipelines.wordpress.com](http://www.ndpipelines.wordpress.com)



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**Call** before you dig.

