North Dakota
Oil & Gas Research Council

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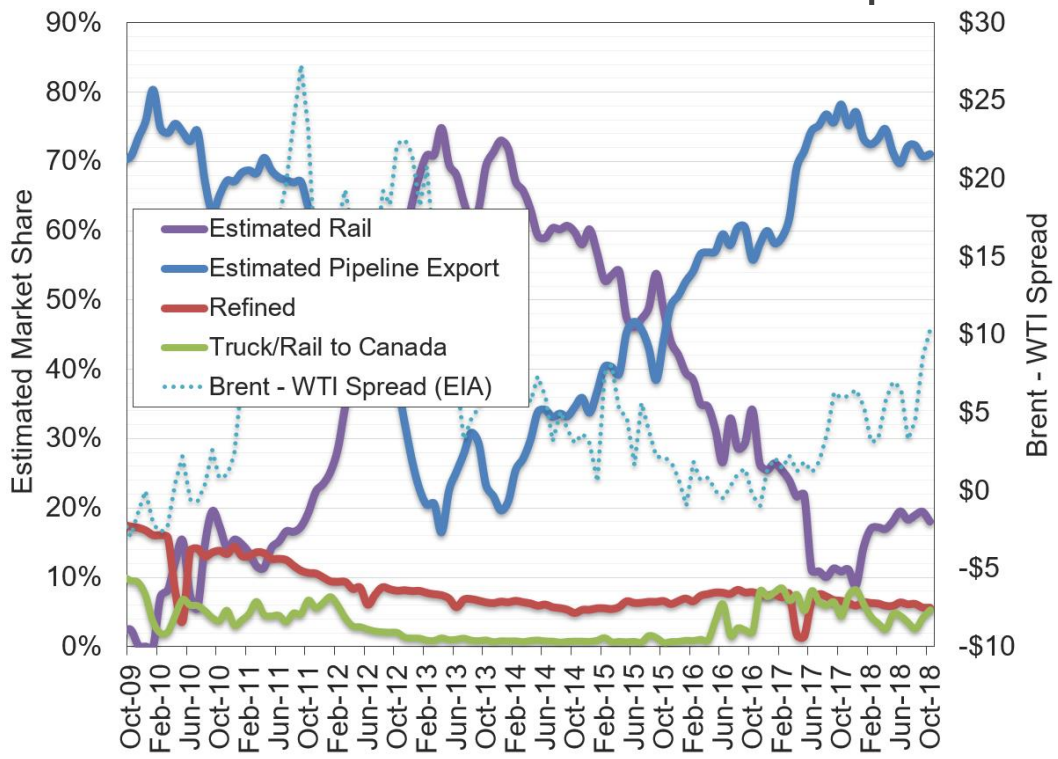
December 18, 2018

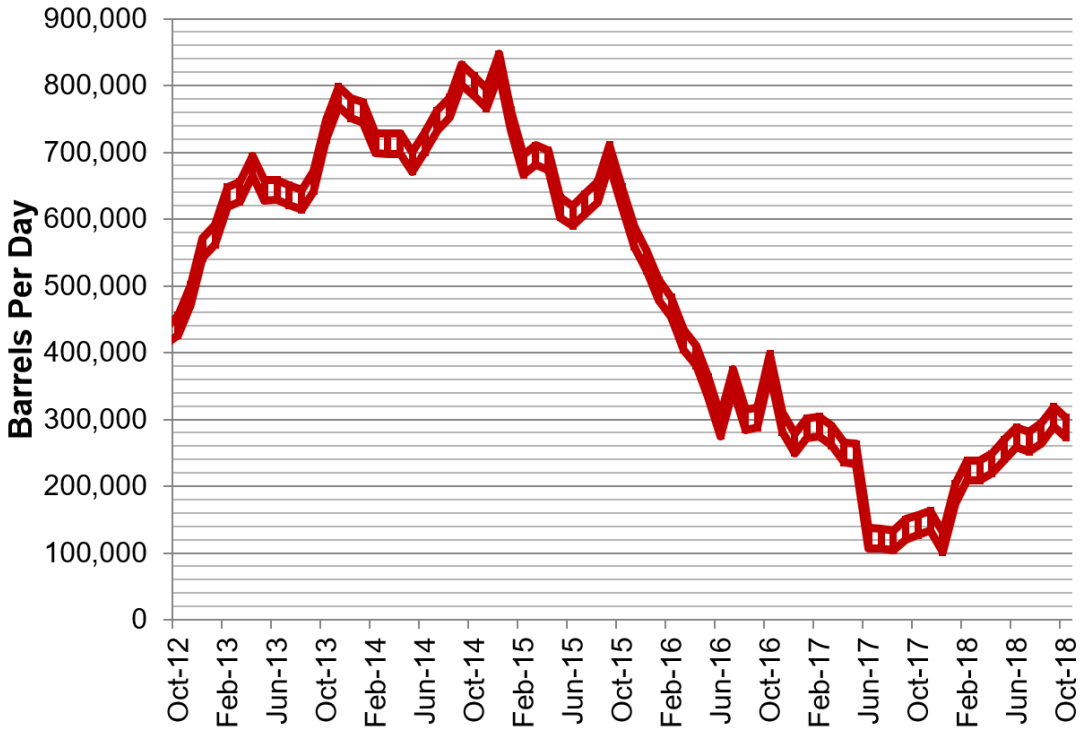
US Williston Basin Oil Production, BOPD

MONTH	ND	Eastern MT*	SD	TOTAL
January	1,177,679	50,110	3,555	1,231,343
February	1,175,307	50,861	3,628	1,229,795
March	1,162,354	49,837	3,502	1,215,693
April	1,227,238	52,426	3,515	1,283,179
May	1,248,202	53,717	3,471	1,305,390
June	1,227,436	53,987	3,443	1,284,866
July	1,269,297	53,194	3,377	1,325,868
August	1,292,533	55,599	3,471	1,351,603
September	1,359,282	54,516	3,475	1,417,273
October	1,391,877			
November				
December				

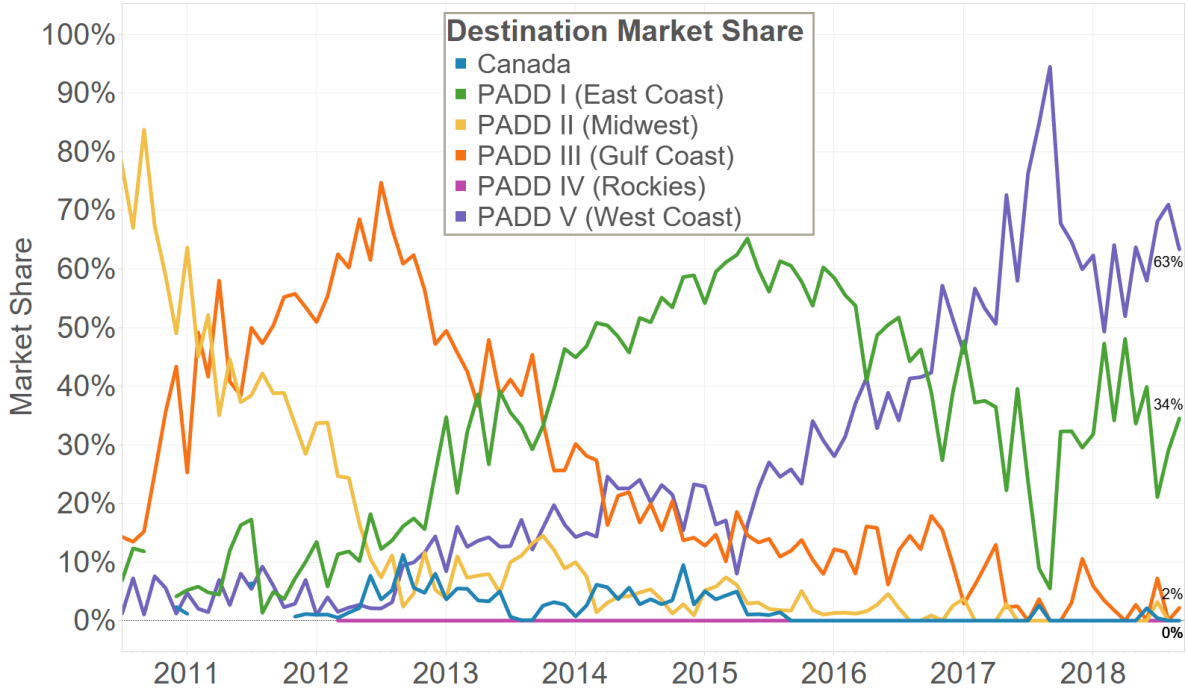
Estimated Williston Basin Oil Transportation



Estimated ND Rail Export Volumes

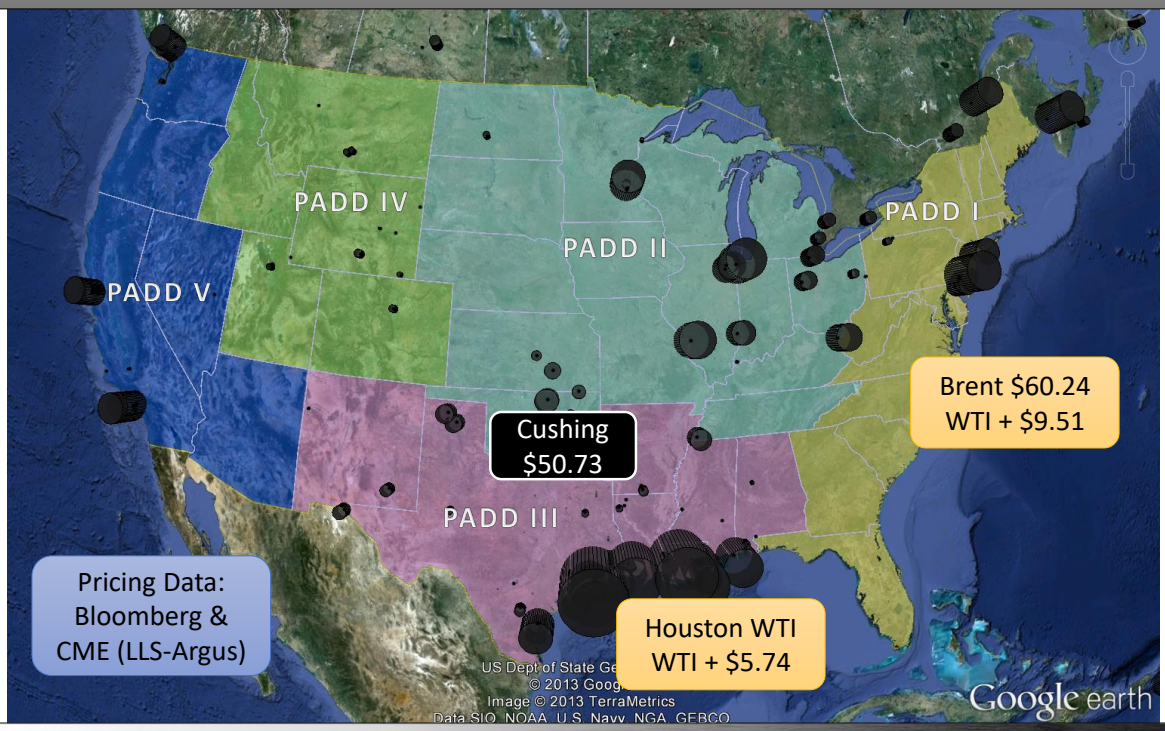


Rail Destinations Market Share (September 2018)



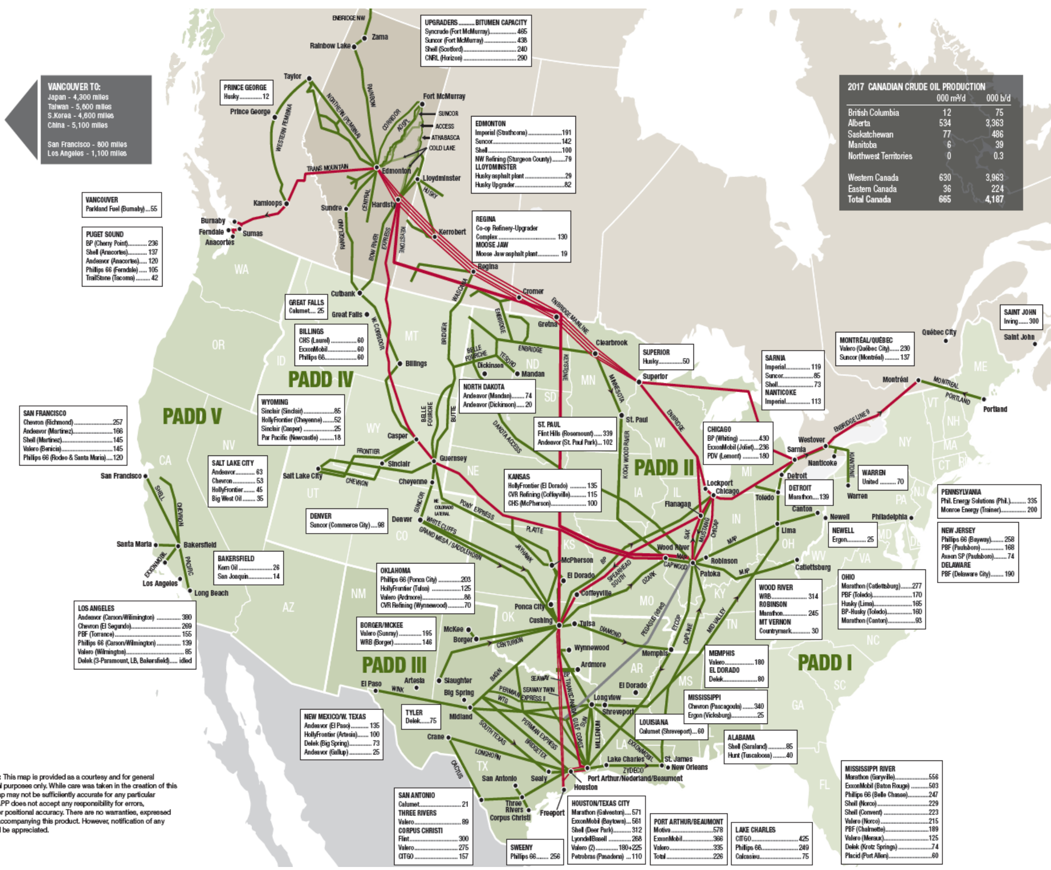
Data for Rail Destination Market Share Provided by the US Energy Information Administration

Crude Oil Prices – December 17, 2018



CAPP
CANADA'S OIL & NATURAL GAS PRODUCERS

For information contact: (403) 267-1141 / CAPP.ca



2017 CANADIAN CRUDE OIL PRODUCTION	000 m³/d	000 b/d
British Columbia	12	75
Alberta	534	3,363
Saskatchewan	77	486
Manitoba	6	39
Northwest Territories	0	0.3
Western Canada	630	3,963
Eastern Canada	36	224
Total Canada	665	4,187

PIPELINE TOLLS FOR LIGHT OIL (US$ per barrel)	
Edmonton to	
Burnaby (Trans Mountain)	1.95
Anacortes (Trans Mountain/Puget)	2.25
Sarnia (Enbridge)	4.60
Montréal (Enbridge)	6.10
Chicago (Enbridge)	4.15
Cushing (Enbridge)	5.35*-6.70
Wood River (Enbridge/Mustang/Capwood)	5.50
U.S. Gulf Coast (Enbridge/Seaway)	6.45†-9.55
Hardisty to	
Guernsey (Express/Platte)	3.30*
Wood River (Express/Platte)	5.05*
Wood River (Keystone)	4.50**-7.95
U.S. Gulf Coast (Enbridge/Seaway)	6.20†-8.65§
U.S. Gulf Coast (Keystone/TC Gulf Coast)	9.70§-10.95
U.S. East Coast to Montréal (Portland/Montréal)	0.90
St. James to Wood River (Capline/Capwood)	1.35

PIPELINE TOLLS FOR HEAVY OIL (US$ per barrel)	
Hardisty to:	
Chicago (Enbridge)	4.35
Cushing (Enbridge)	5.55*-6.90
Cushing (Keystone)	6.25**-10.10
Wood River (Enbridge/Mustang/Capwood)	6.15
Wood River (Keystone)	5.15**-9.05
Wood River (Express/Platte)	5.65*
U.S. Gulf Coast (Enbridge/Seaway)	7.30†-10.40
U.S. Gulf Coast (Keystone/TC Gulf Coast)	10.55§-12.45

Notes 1) Assumed exchange rate = 0.78 US$ / 1C$ (May 2018 average)
2) Tolls rounded to nearest 5 cents
3) Tolls in effect July 1, 2018

* 10-year committed toll
** 20-year committed toll
† First Open Season, 15-year, 50,000+ b/d committed volumes
§ International Joint Tariff

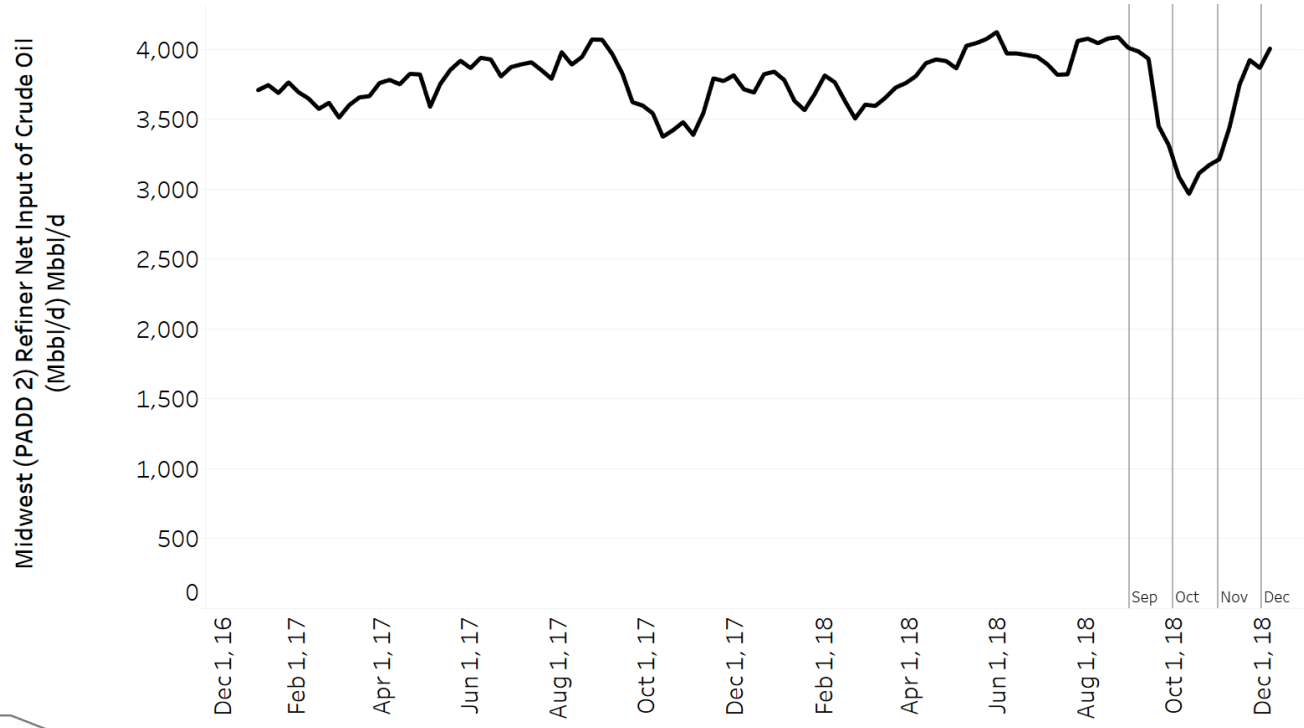
Crude Refining Capacities as at June 1, 2018 (thousand barrels per day)

PADD Petroleum Administration for Defense District

Major Existing Crude Oil Pipelines Carrying Canadian Crude Oil

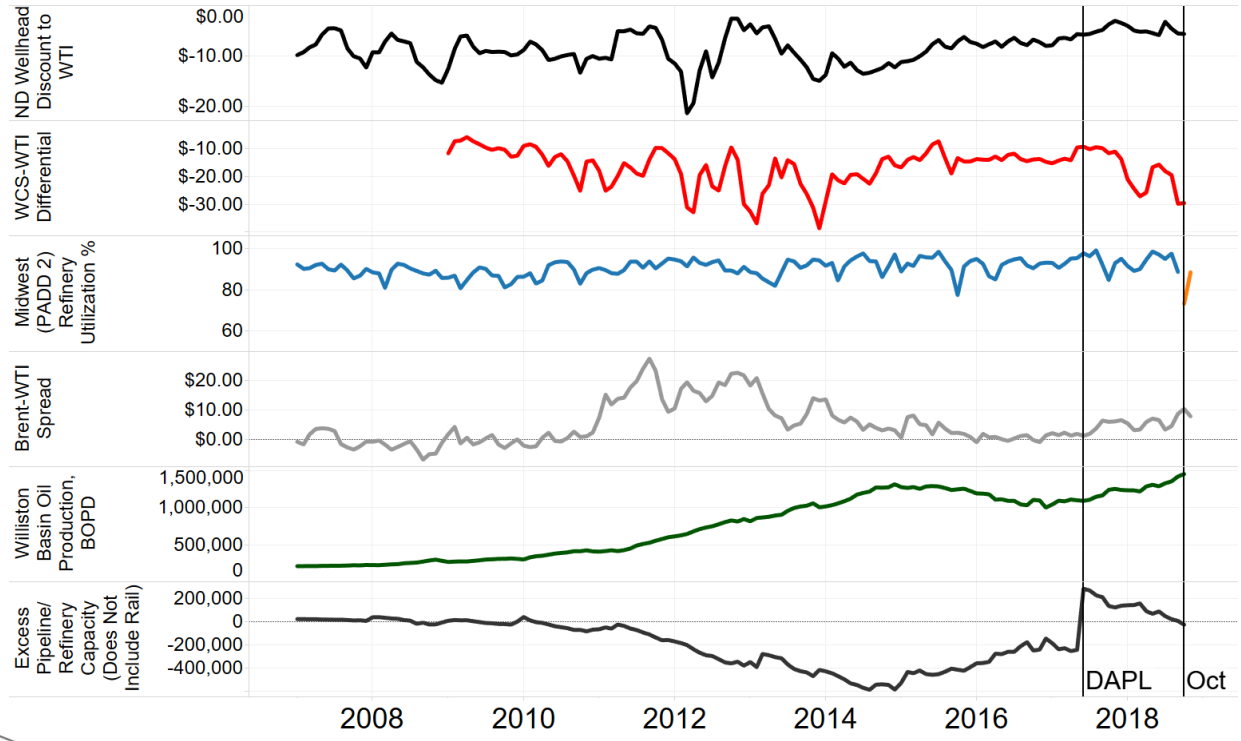
Selected Other Crude Oil Pipelines

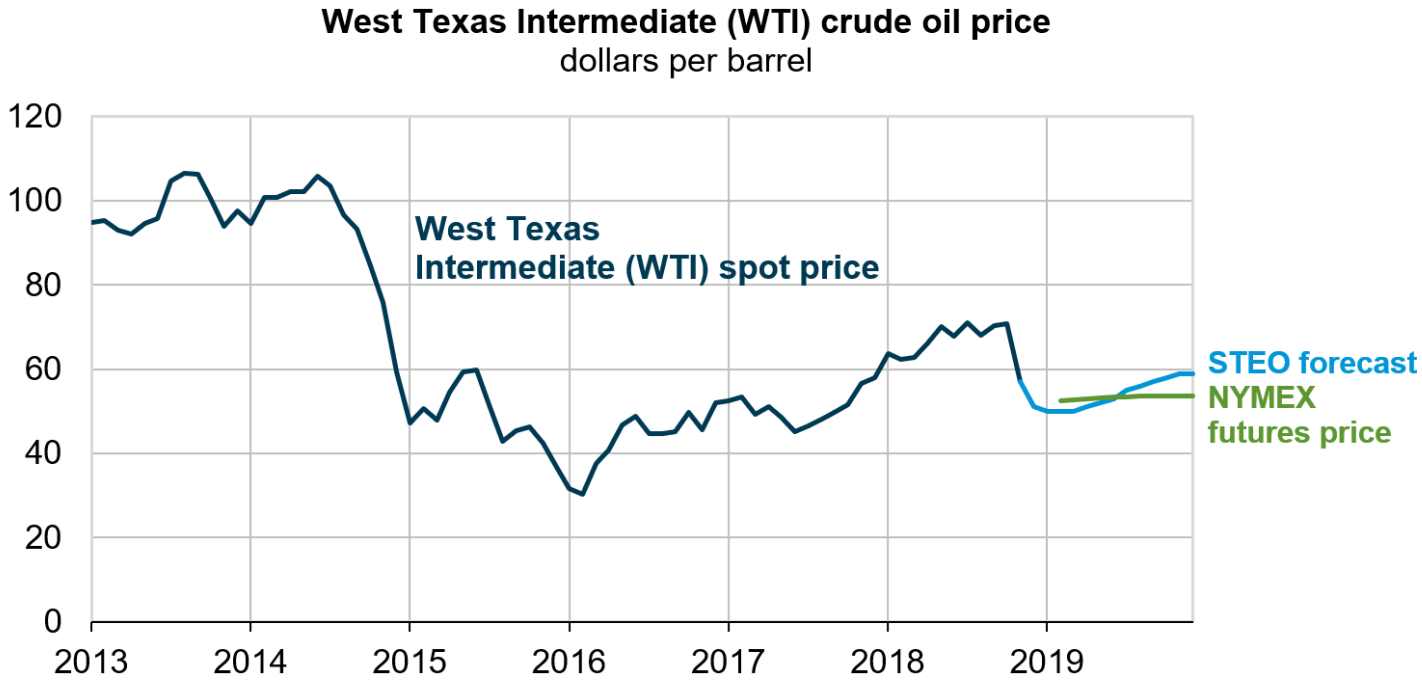
Midwest (PADD 2) Refinery Crude Oil Consumption



EIA Data

North Dakota Oil Pricing

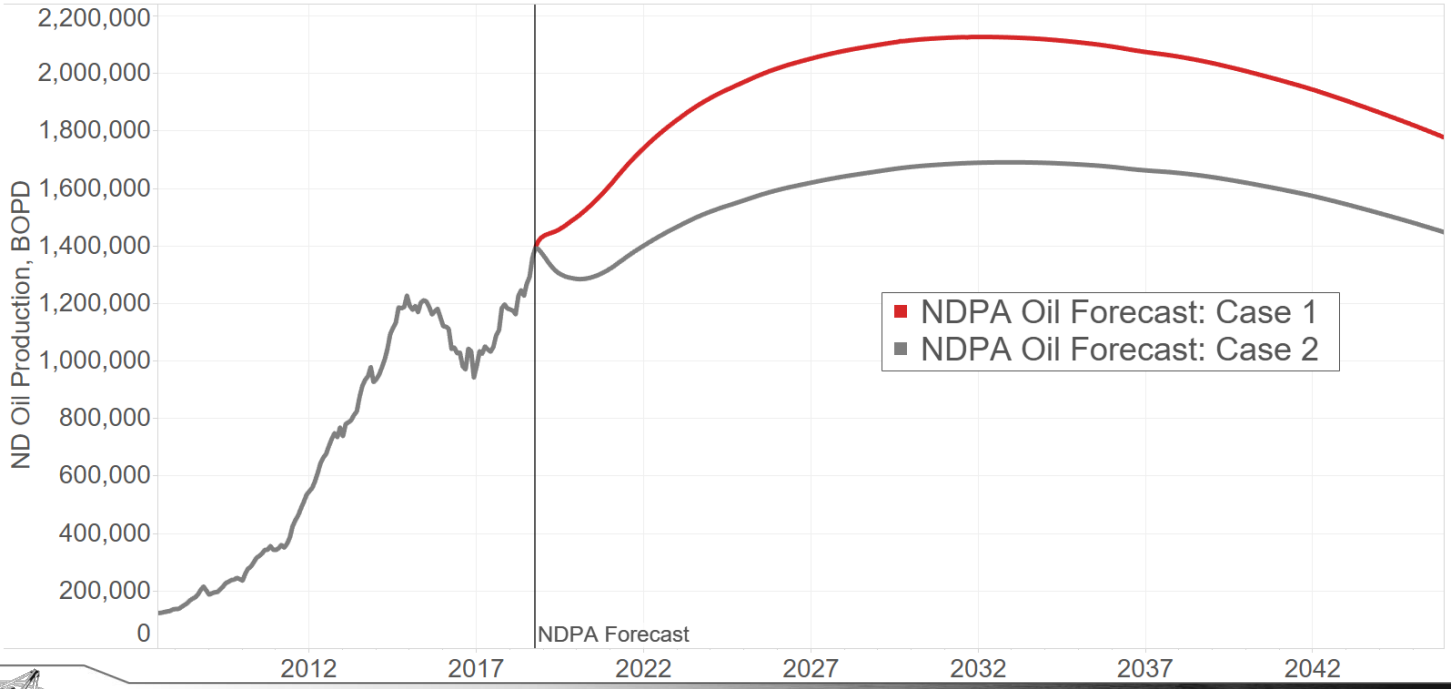




Source: Short-Term Energy Outlook, December 2018, and CME Group

North Dakota Oil Production Forecast

Assumes Current Technology – Enhanced Oil Recovery Not Included



North Dakota Oil Production Forecast

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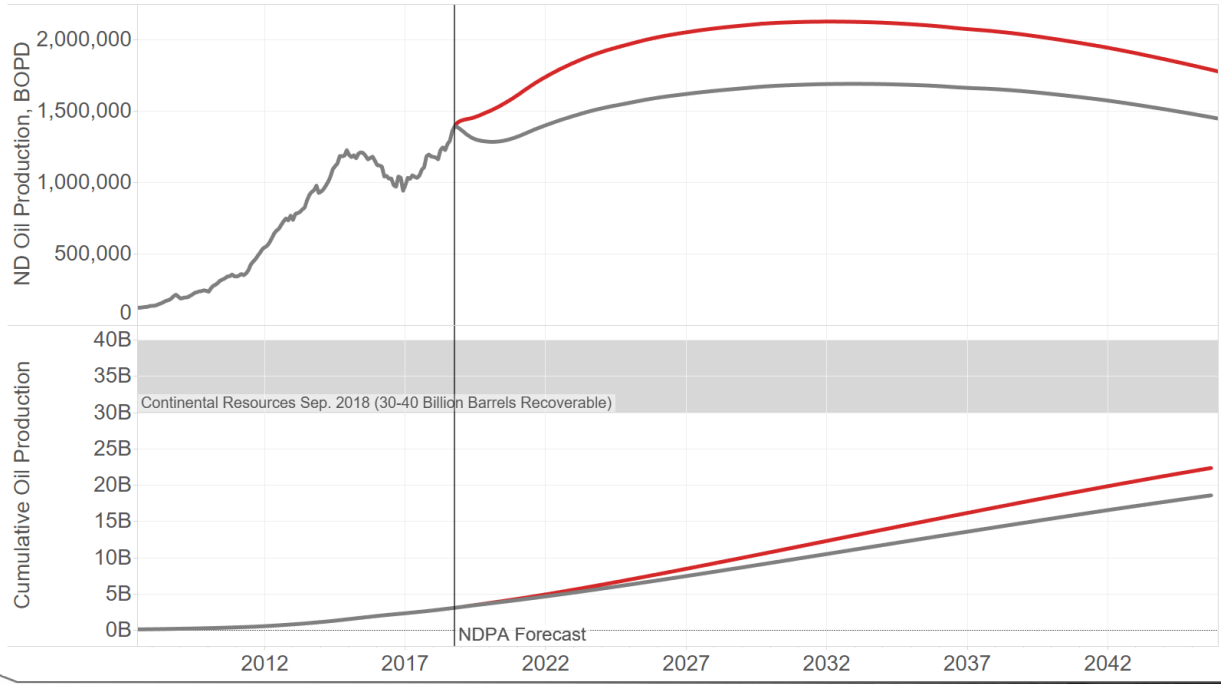

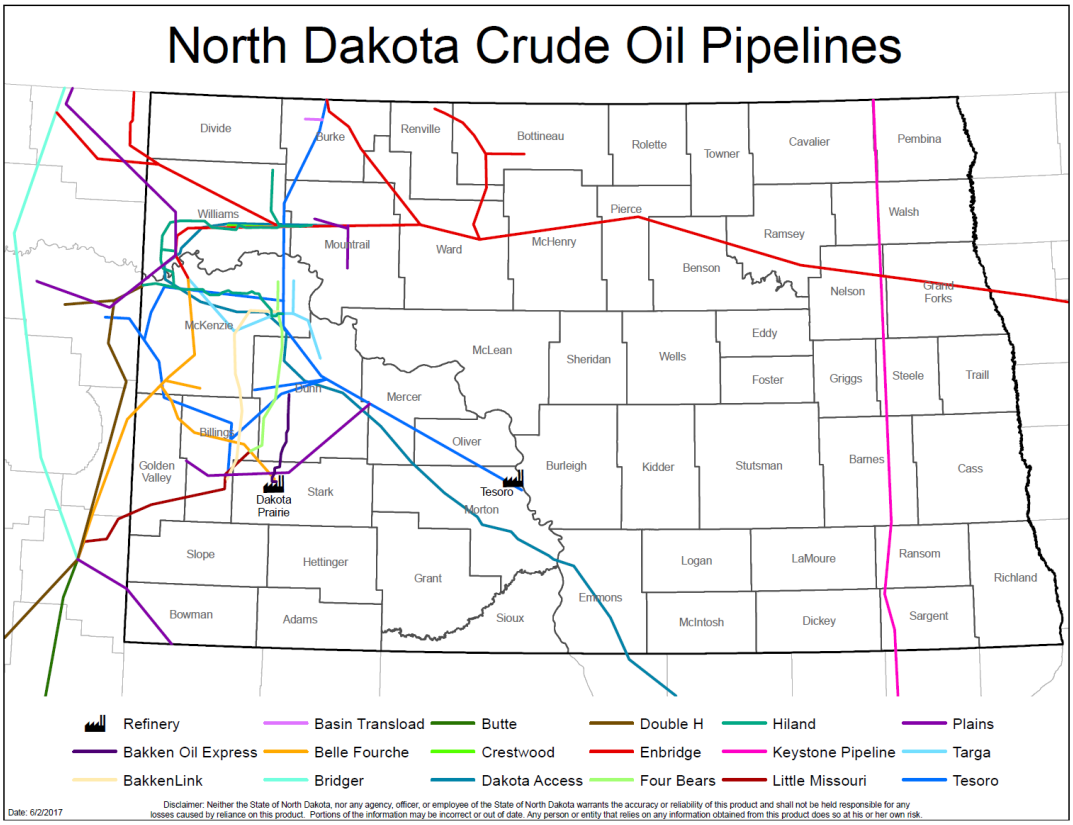
North Dakota Crude Oil Pipelines
Divide
Burke
Renville
Bottineau
Rolette
Towner
Cavalier
Pembina
Williams
Mountrail
Ward
McHenry
Pierce
Ramsey
Walsh
Benson
Nelson
Grand Forks
McKenzie
McLean
Sheridan
Wells
Eddy
Foster
Griggs
Steele
Traill
Dunn
Mercer
Billings
Oliver
Golden Valley
Dakota Prairie
Stark
Tesoro
Morton
Burleigh
Kidder
Stutsman
Barnes
Cass
Slope
Hettinger
Grant
Emmons
Logan
LaMoure
Ransom
Richland
Bowman
Adams
Sioux
McIntosh
Dickey
Sargent
Refinery
Basin Transload
Butte
Double H
Hiland
Plains
Bakken Oil Express
Belle Fourche
Crestwood
Enbridge
Keystone Pipeline
Targa
BakkenLink
Bridger
Dakota Access
Four Bears
Little Missouri
Tesoro
Date: 6/2/2017
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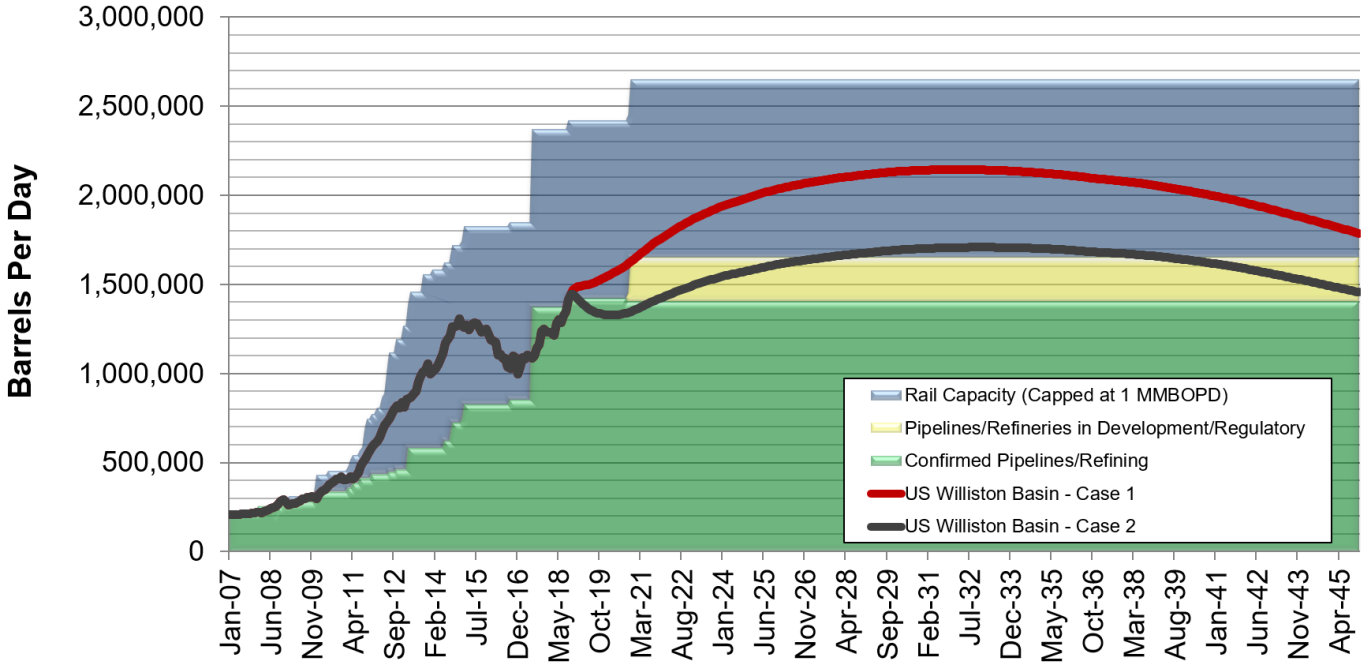
Williston Basin Oil Production & Export Capacity, BOPD

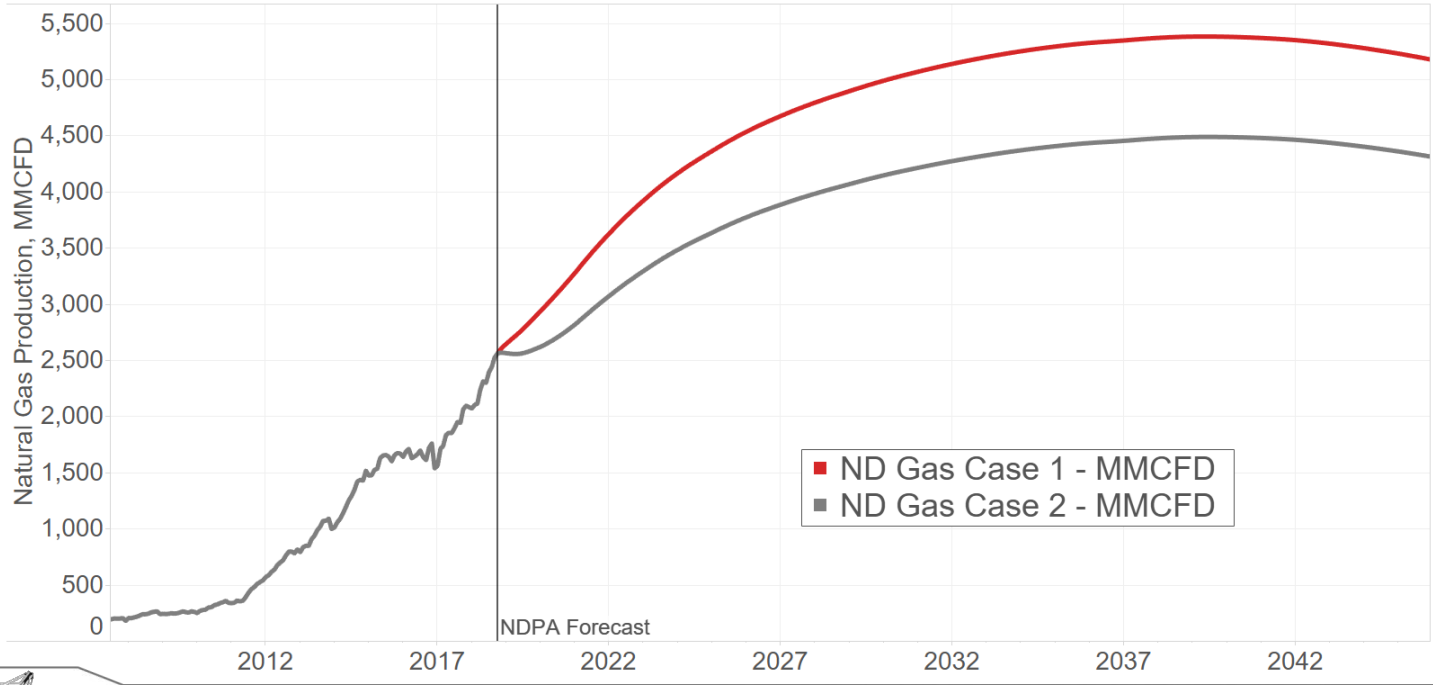
Assumes Current Technology – Enhanced Oil Recovery Not Included



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

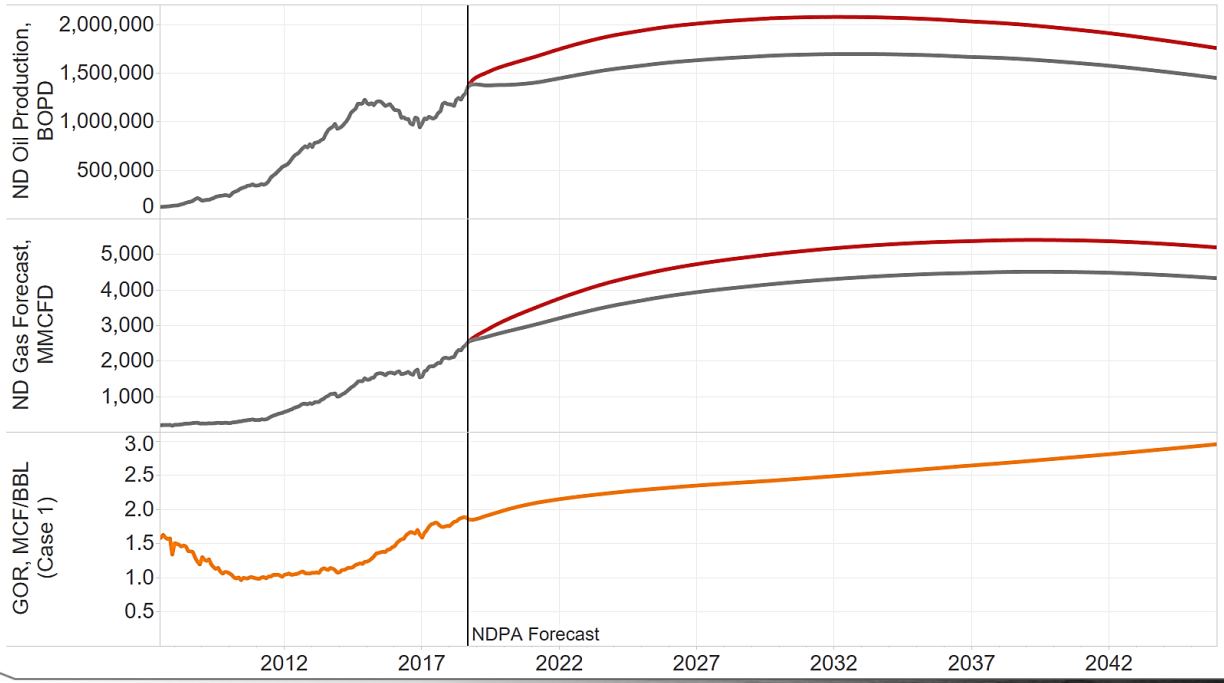
NDPA North Dakota Gas Production Forecast

Assumes Current Technology – Enhanced Oil Recovery Not Included

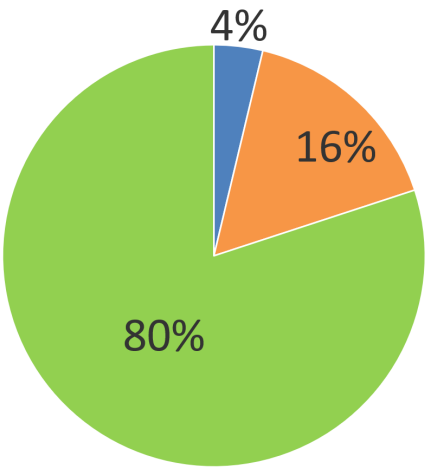


NDPA North Dakota Production Forecast Summary

Assumes Current Technology – Enhanced Oil Recovery Not Included



Solving the Flaring Challenge



Statewide

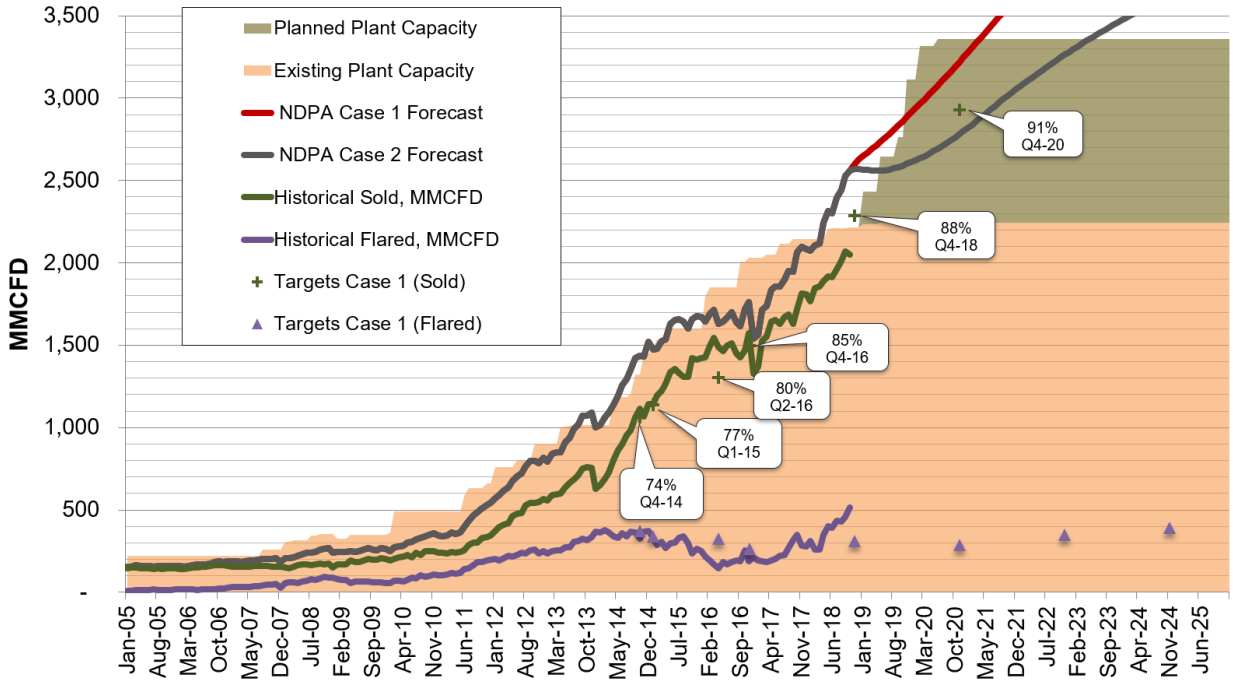
GREEN – % of gas captured and sold
Blue – % flared from zero sales wells
Orange – % flared from wells with at least one mcf sold.

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

Oct. 2018 Data – Non-Confidential Wells

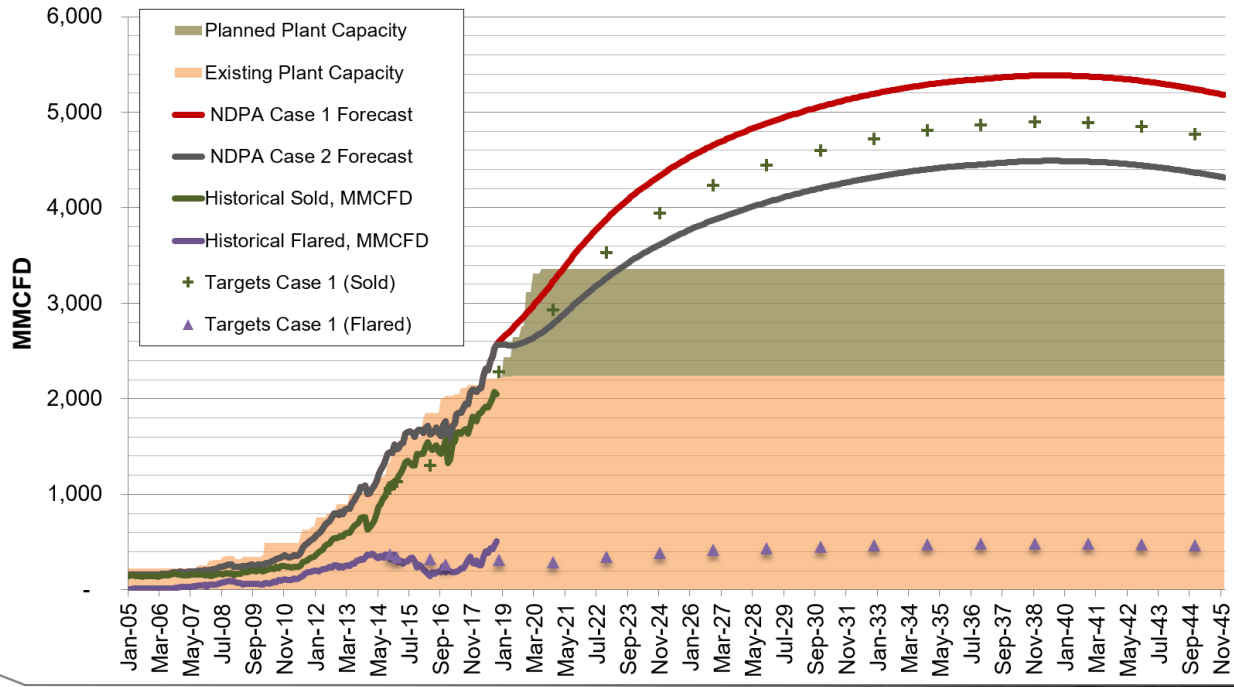
Solving the Flaring Challenge

Assumes Current Technology – Enhanced Oil Recovery Not Included

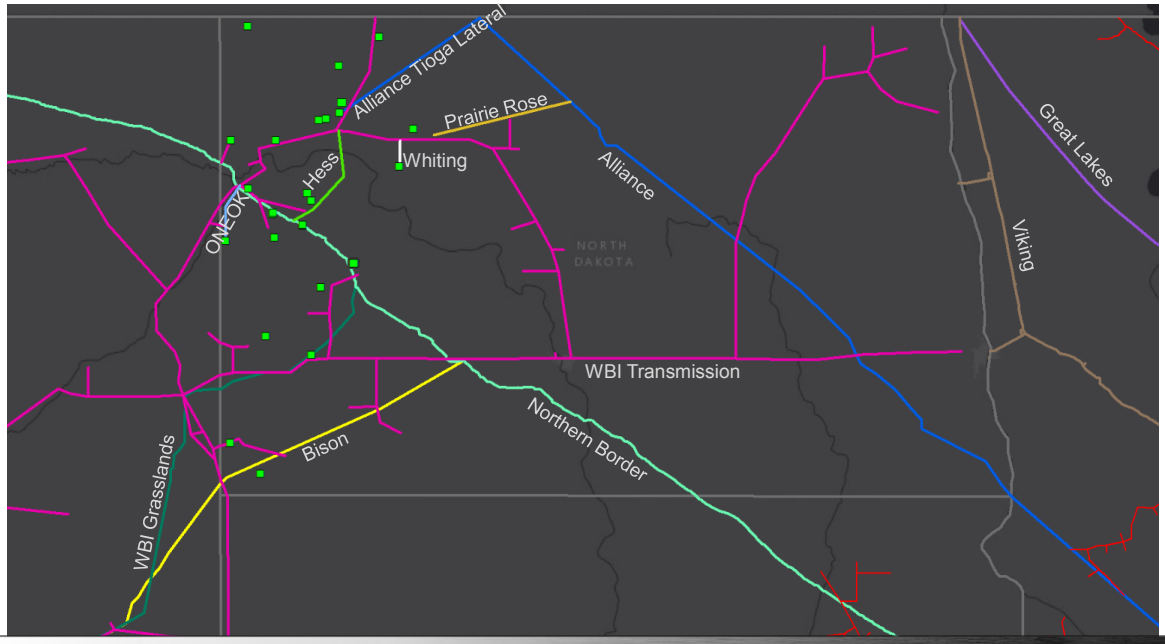


Solving the Flaring Challenge

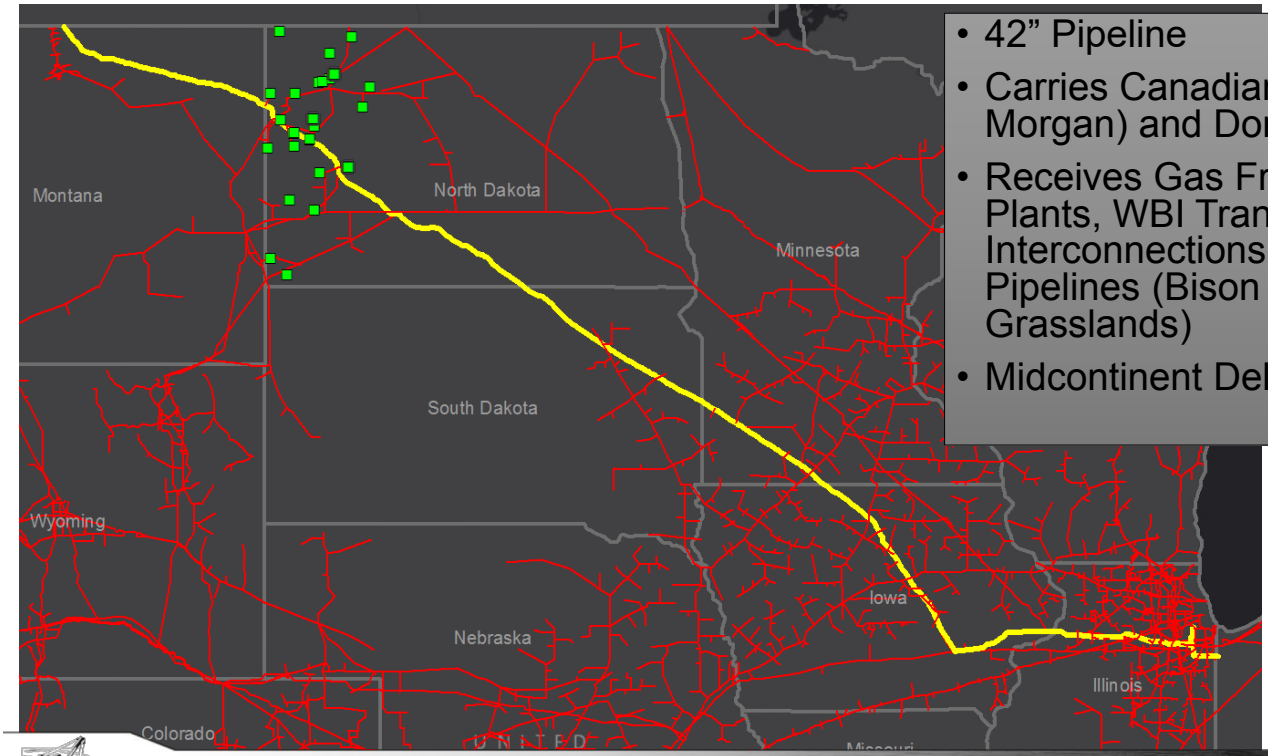
Assumes Current Technology – Enhanced Oil Recovery Not Included



Major Gas Pipeline and Processing Infrastructure



Northern Border Pipeline

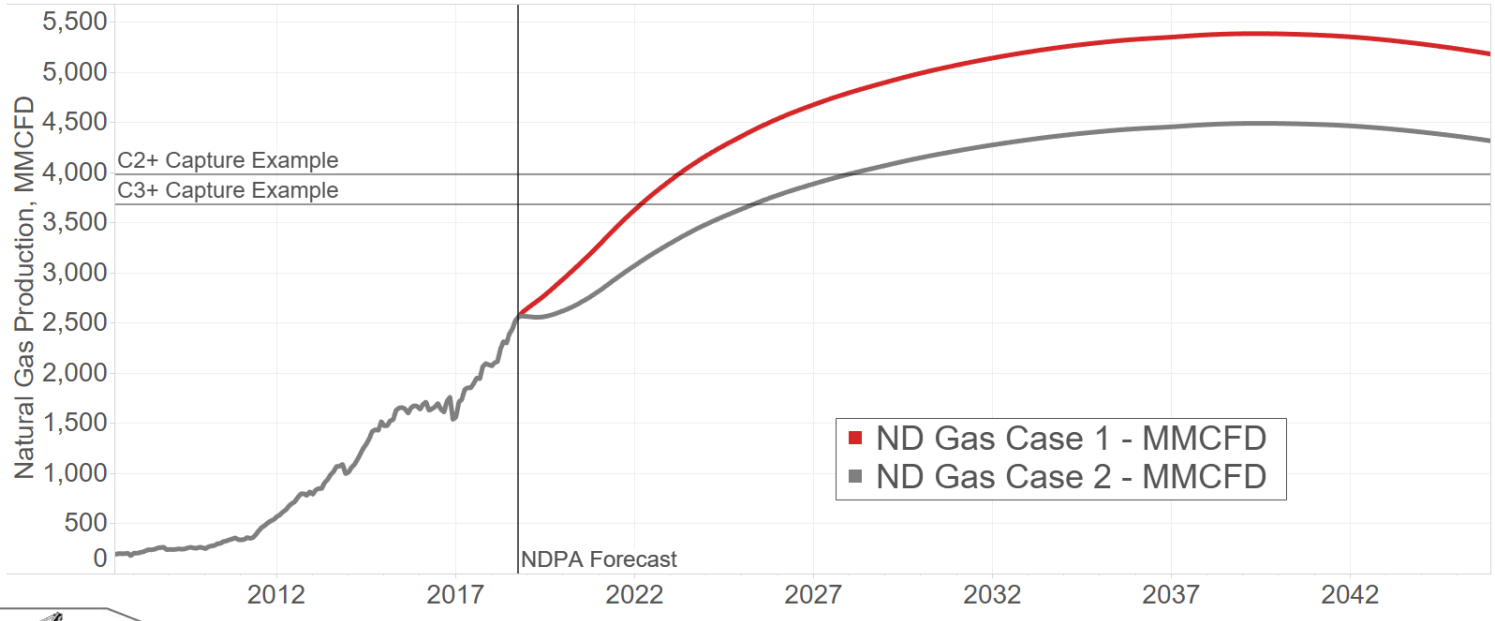


- 42” Pipeline
- Carries Canadian (Port of Morgan) and Domestic Gas
- Receives Gas From ND Plants, WBI Transmission Interconnections, and WY Pipelines (Bison & Grasslands)
- Midcontinent Deliveries

*Data Source: Northern Border IPS

Simplified Example NB Calculations

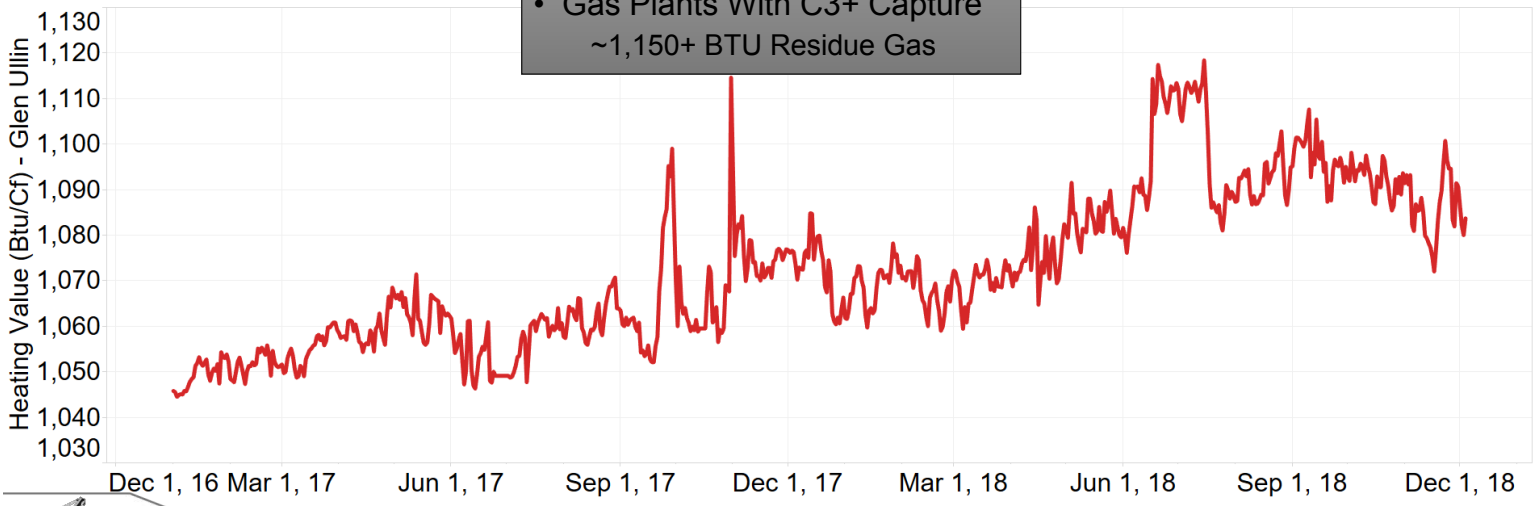
Conclusion: **IF** no other gas export options open and all other deliveries on other pipelines stay static, ND gas production could increase 1.11-1.41 BCFD (from Oct-18) before Northern Border is 100% Bakken production. **BTU management becomes increasingly important for Bakken residue gas.**



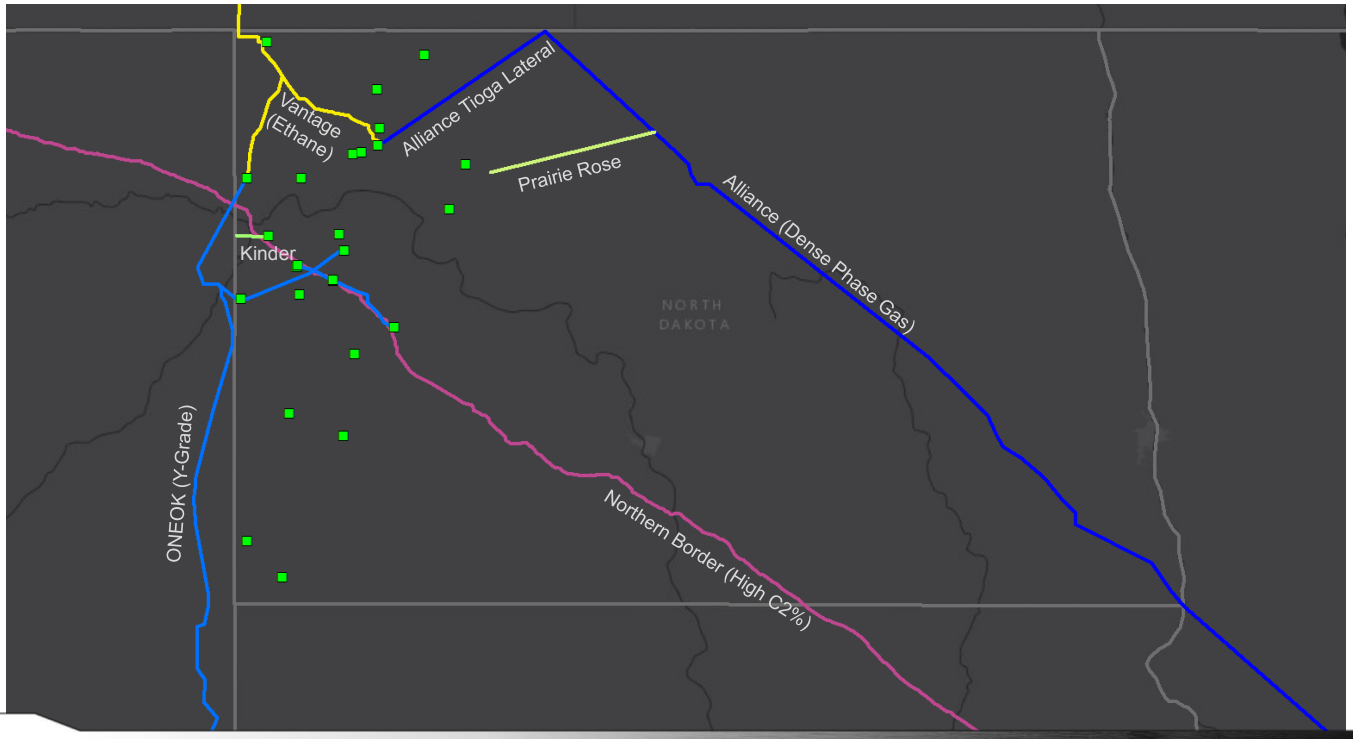
Simplified Example NB Calculations

Conclusion: **IF** no other gas export options open and all other deliveries on other pipelines stay static, ND gas production could increase 1.11-1.41 BCFD (from Oct-18) before Northern Border is 100% Bakken production. ***BTU management becomes increasingly important for Bakken residue gas.***

- Gas Plants With C2+ Capture
  ~1,010+ BTU Residue Gas
- Gas Plants With C3+ Capture
  ~1,150+ BTU Residue Gas

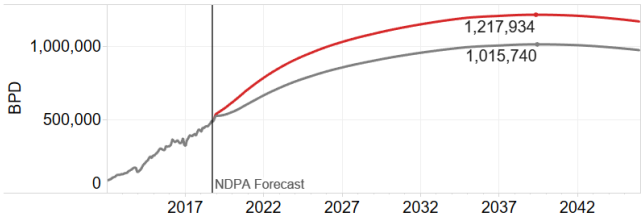


Regional NGL Infrastructure

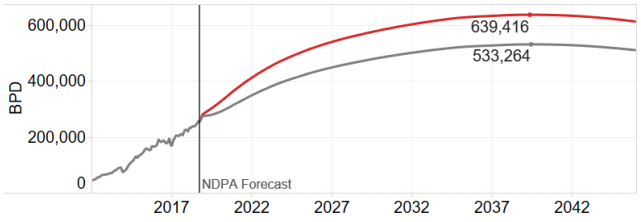


North Dakota Captured* NGL's

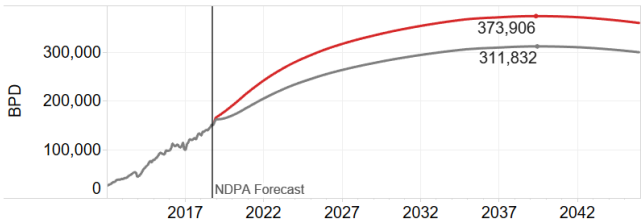
All Natural Gas Liquids



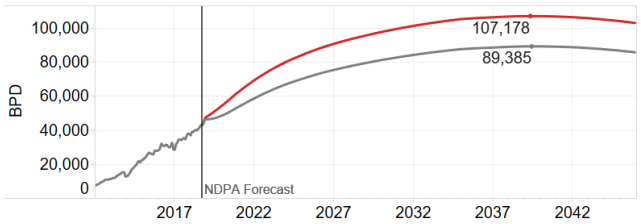
Ethane



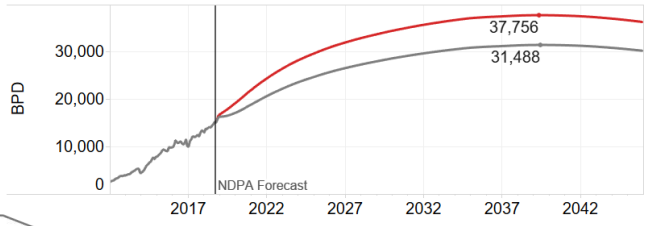
Propane



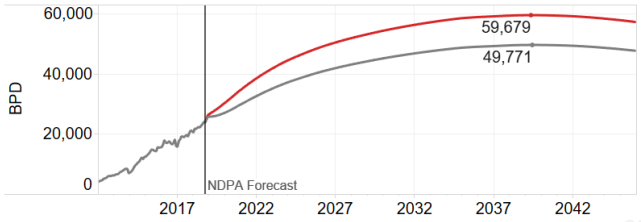
Butane



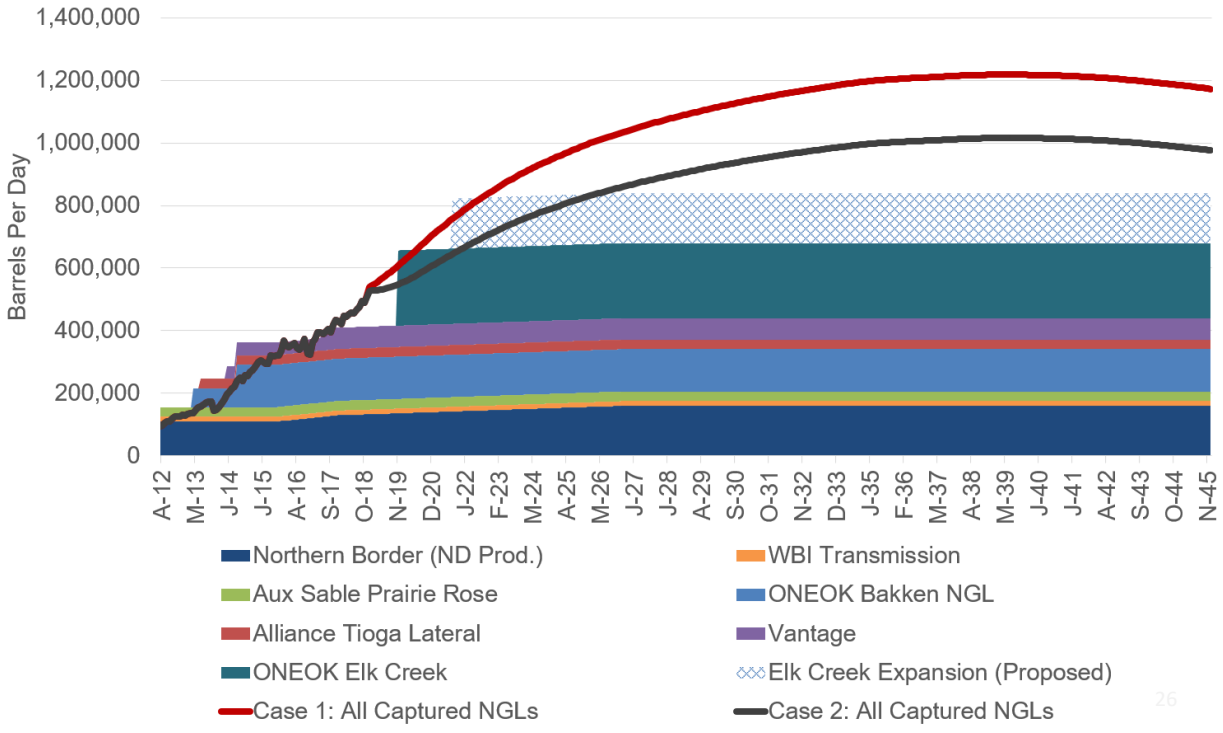
Isobutane



Natural Gasoline



NGL Pipeline Takeaway Options



Natural Gas Liquids Study?

Reservoir level analysis to better understand NGL production over the life of a well/field.

- Key questions to answer
  - GPM changes over time?
  - NGL chemistry shifts over life of well?
  - Others?
- Existing Information?

Contact Information

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Know what's **below.**
Call before you dig.

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