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Energy Policy Research Foundation, Inc. (EPRINC)**

**Energy Bar Association**

**May 6, 2015**

# Lots of Light Tight Oil

Understanding North American Unconventional Production in the Midst of Low Oil Prices

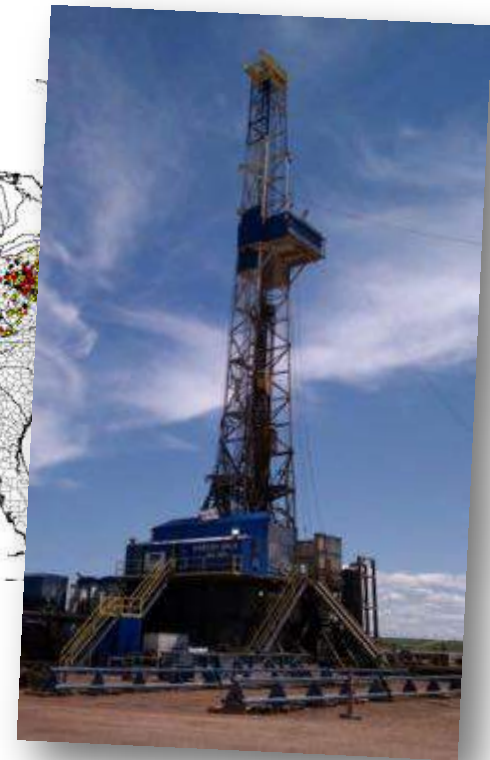
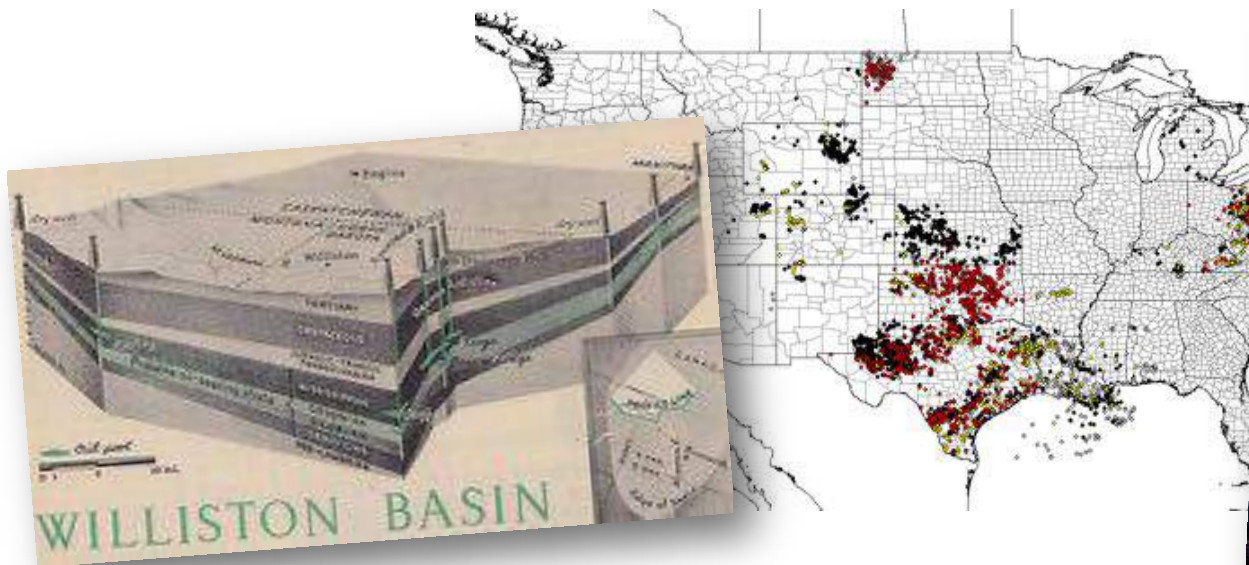
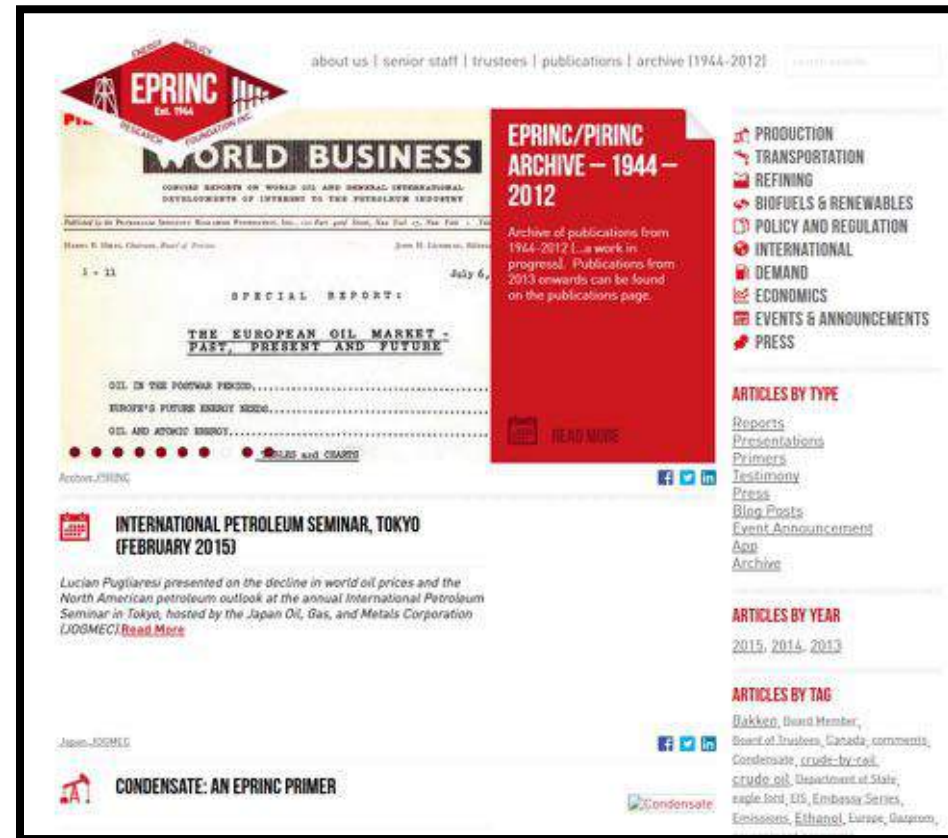


Photo by Trisha Curtis

# About EPRINC

- [www.eprinc.org](http://www.eprinc.org)
- Publications
- Embassy Series
- Presentations at Imperial College London, Columbia University, Wyoming Pipeline Authority, EPA, Oxford Institute for Energy Studies
- Infrastructure Paper <http://eprinc.org/wp-content/uploads/2013/10/EPRINC-PIPELINES-TRAINS-TRUCKS-OCT31.pdf>
- Department of Energy – Quadrennial Energy Review
- Department of Defense
- Rin App <http://eprinc.org/2014/02/rins-around-rosy-app-available-ios/>
- Forth Coming research paper on U.S. Unconventionals with Oxford Institute for Energy Studies

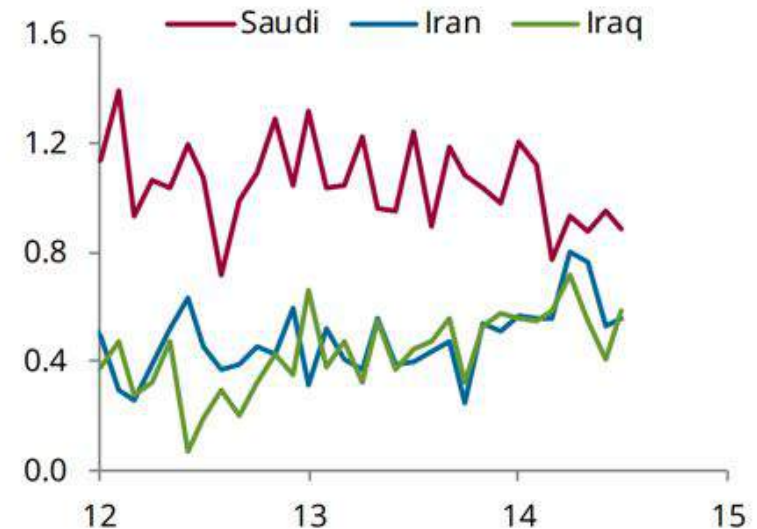


## When oil prices started to slip

Several events taken together along with lowered expectations of Chinese and European economic growth caused oil prices to weaken

- 9 mbd plus U.S. production
- Some strong non-OPEC production in 2014
- Significant volumes of crude moving from the U.S. to Canada displacing African barrels
- Libyan crude unexpectedly comes on the market
- ISIS is pushing barrels on the market
- Draghi spooks markets with negative inflation expectations for Europe in Jackson Hole Sept 2014
- People begin to actually believe the negative data out of China
- Saudi's share of crude into China and Asia eroded by volumes from Iran and Iraq

**Fig 2: Chinese imports from Middle East, mb/d**



Source: China Customs, Energy Aspects

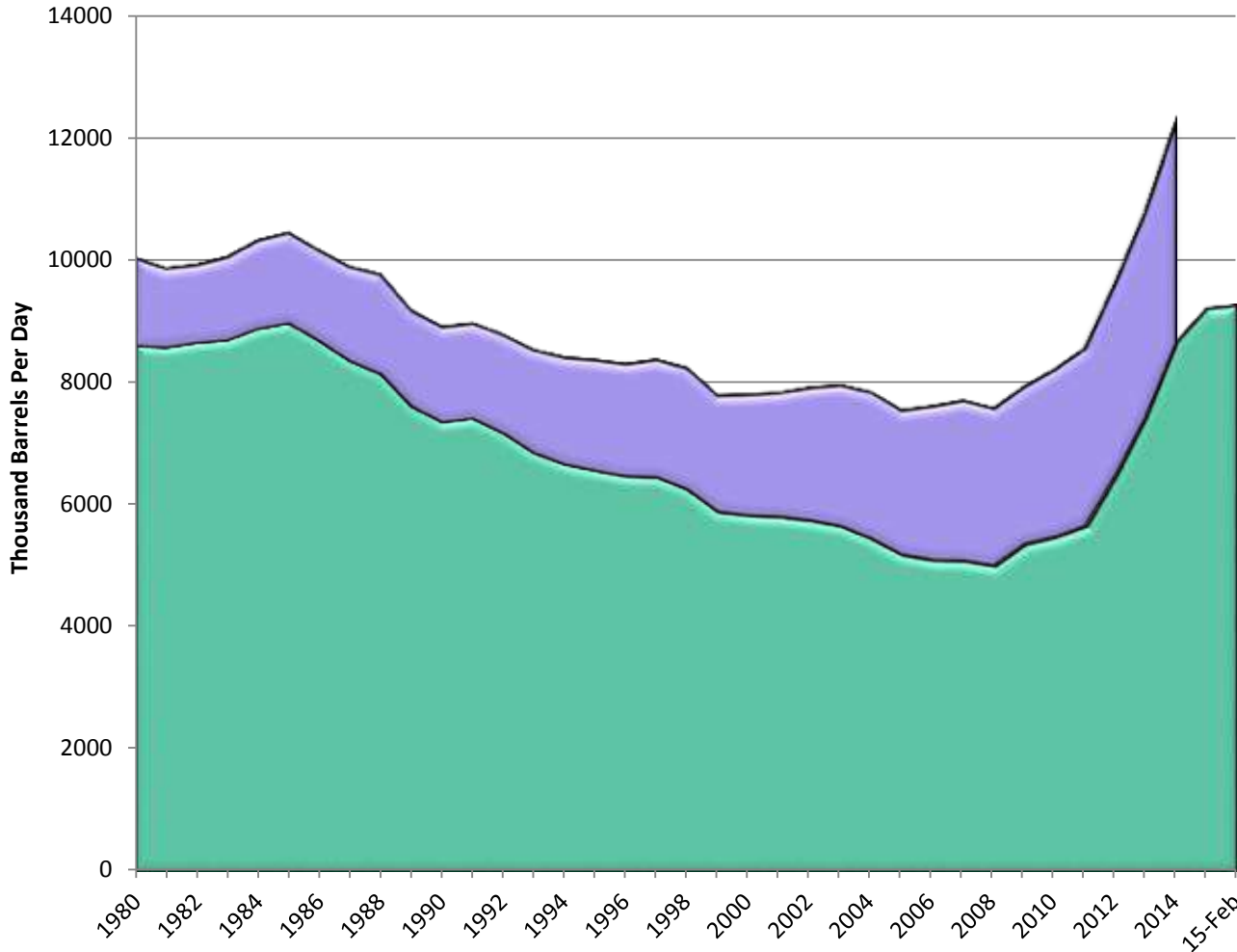
Source: Energy Aspects, Aug 24<sup>th</sup>, 2014, WSJ Nov 4 2014

# What sets the Bakken (and other tight oil) apart?

- Globally coveted rocks
  - 10,000 plus feet so more expensive to drill
  - Break evens vary
- Good and stable crude quality
- Distance from markets – cost of transportation
  - Rail accidents
  - And other crudes going to those markets (has to go east or west)
- Bakken's complexities make it tricky in short-term in a low oil price environment
- The Bakken is the best known shale/tight/unconventional oil play in the world and there is still a lot to learn. Long-term attraction/investment will continue
- **This is a boom and bust business. Right now it is busting, but it will boom again.**

- 
- Broader market
  - Put Bakken in context
  - Issues

# North American Oil Production



**U.S. 9.2 mbd (Feb 2015)**  
**Canada 3.7 mbd (Dec 2014)**

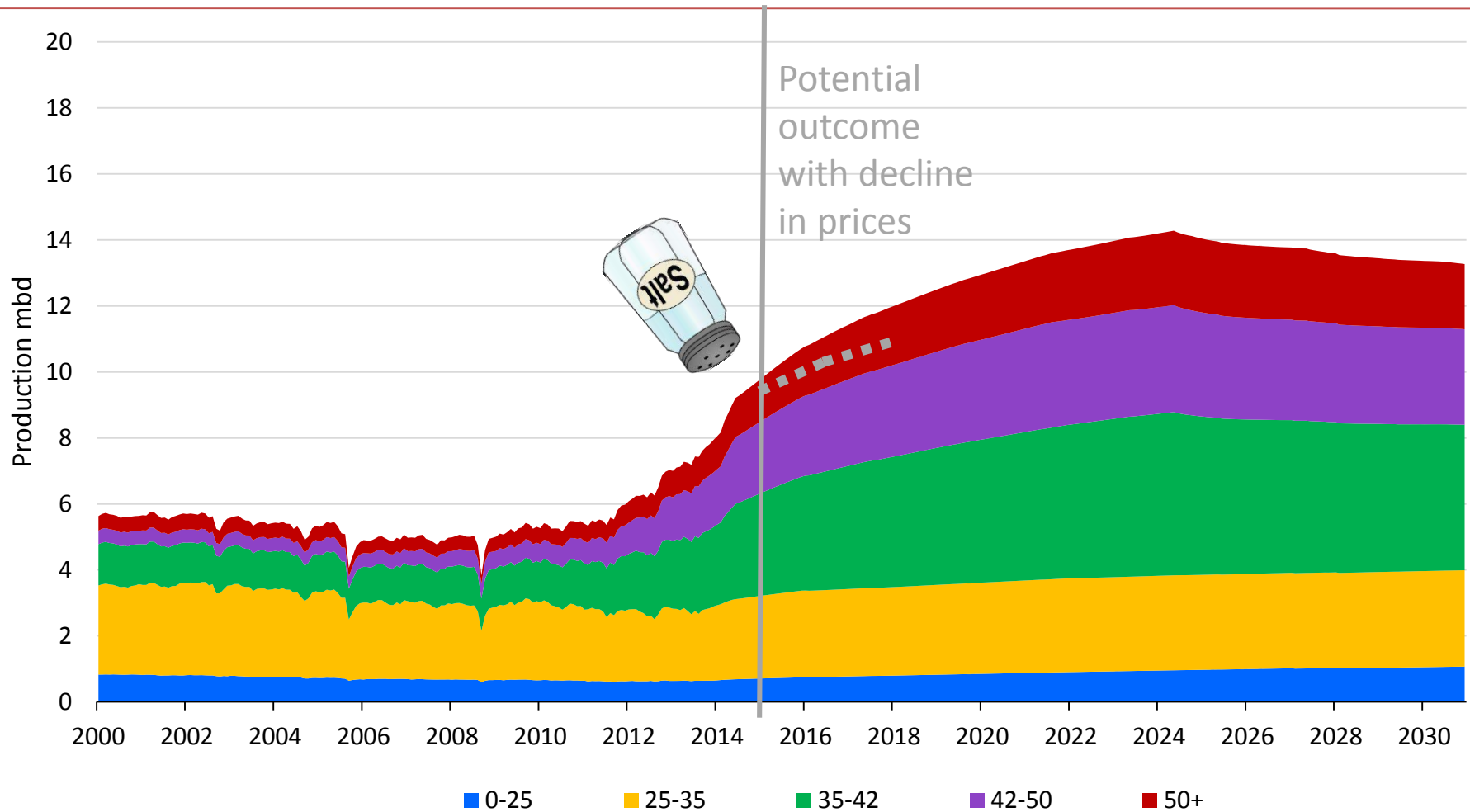
**North America = 12.9 mbd**

- Canadian Crude Oil Production
- U.S. Field Production of Crude Oil

Source: EIA

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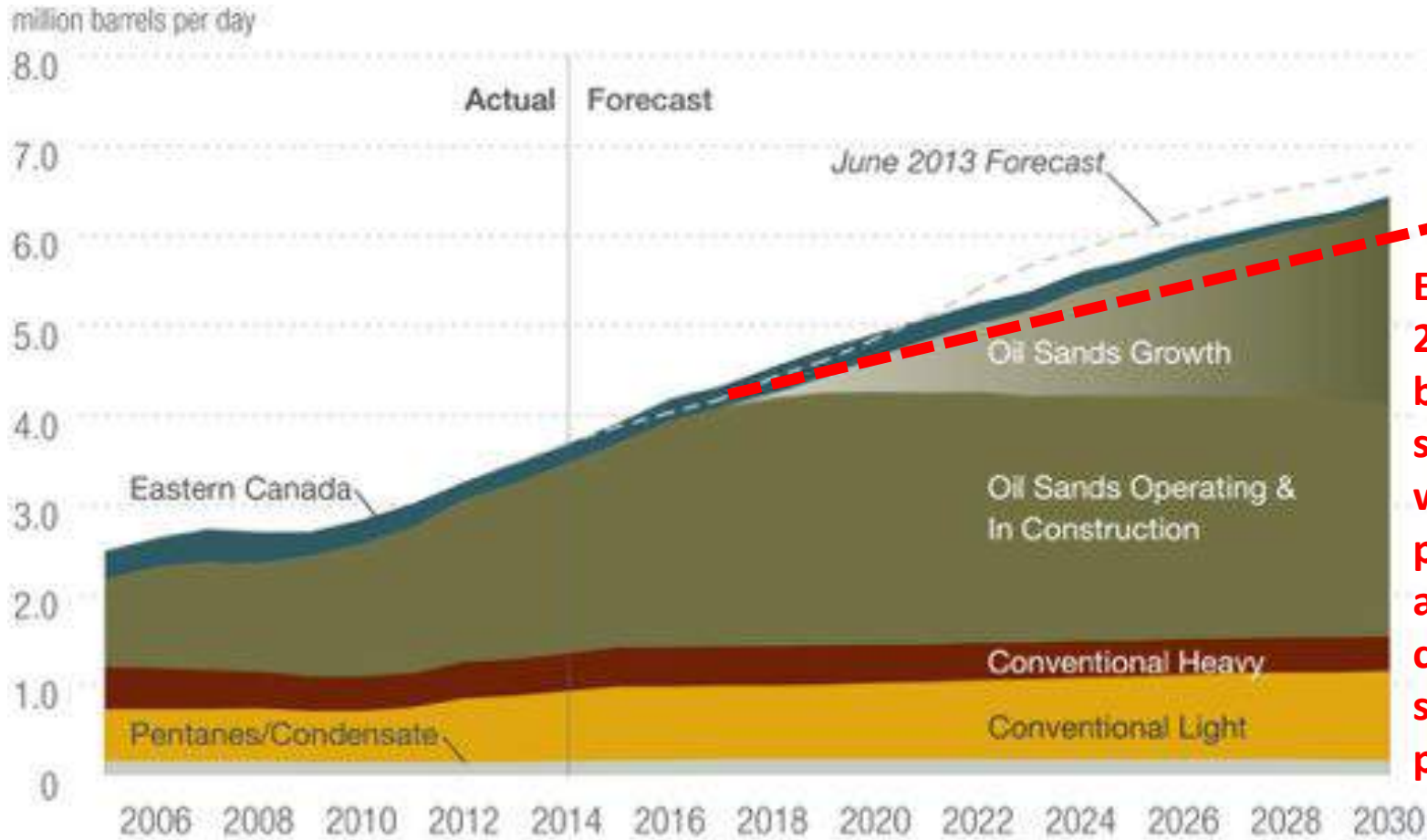
# EPRINC Production Evaluation...what production *could* be...



Source: EPRINC/Ponderosa

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# CAPP's Canadian crude oil forecast



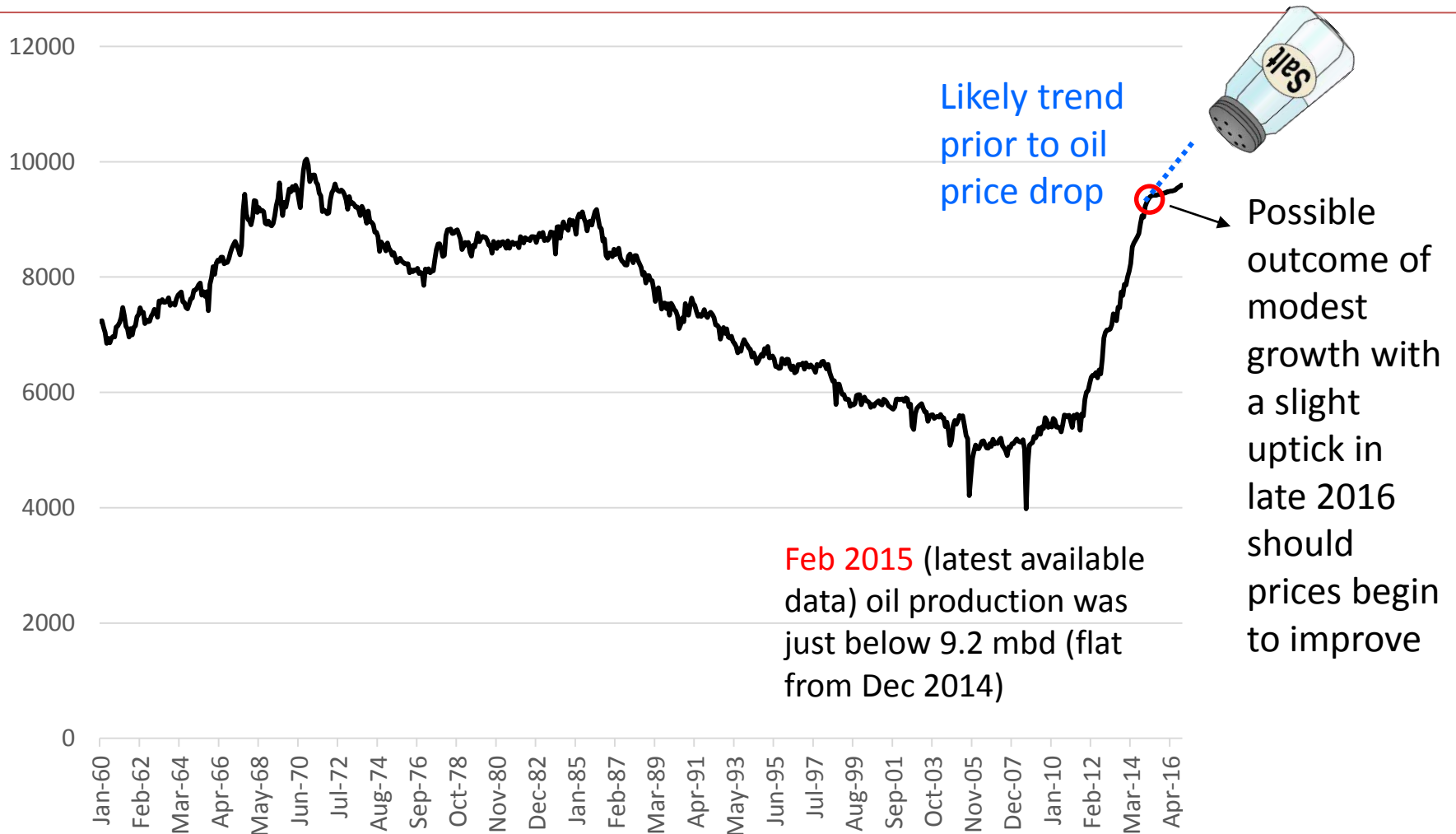
**EPRINC LINE - 2015 likely to be revised slightly lower with additional postponements and cancellations in some future projects**

Source: CAPP 2014, "Crude Oil Forecast. Markets, and Transportation"

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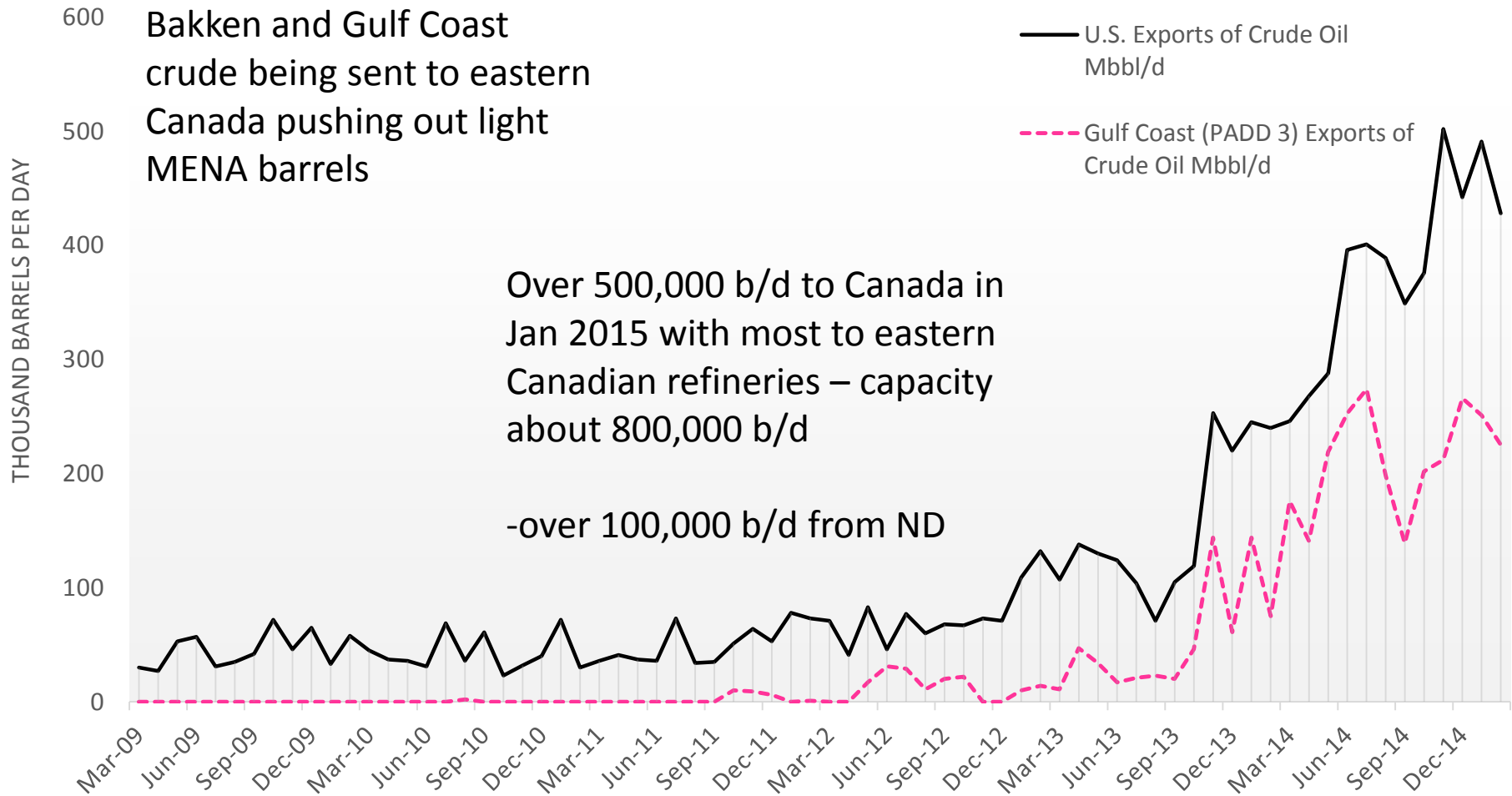
# US Crude Oil Production and 2015/2016 Possible Projection



Source: EIA, EPRINC

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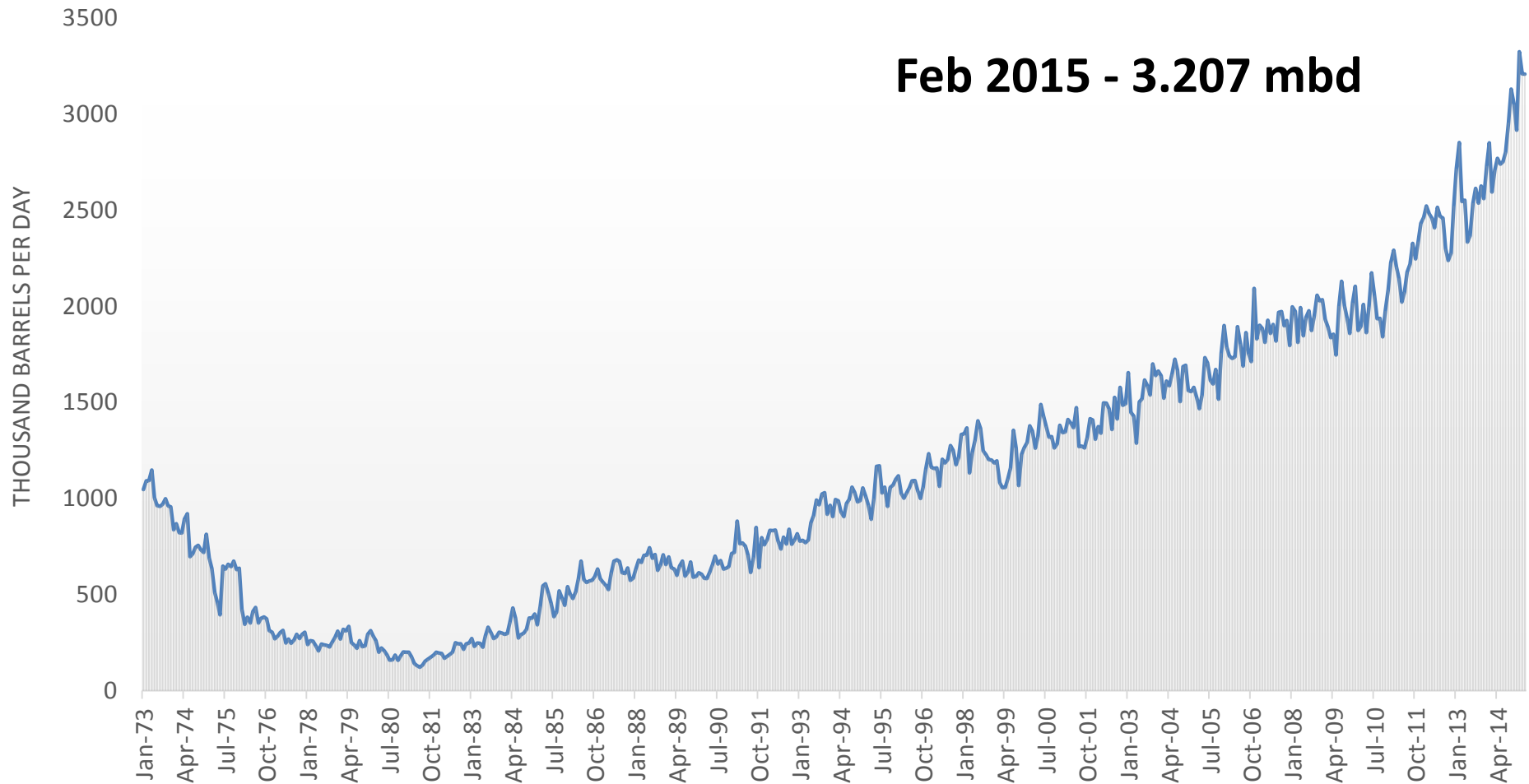
# U.S. exports of crude oil



Source: EIA

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# U.S. imports of Canadian crude oil

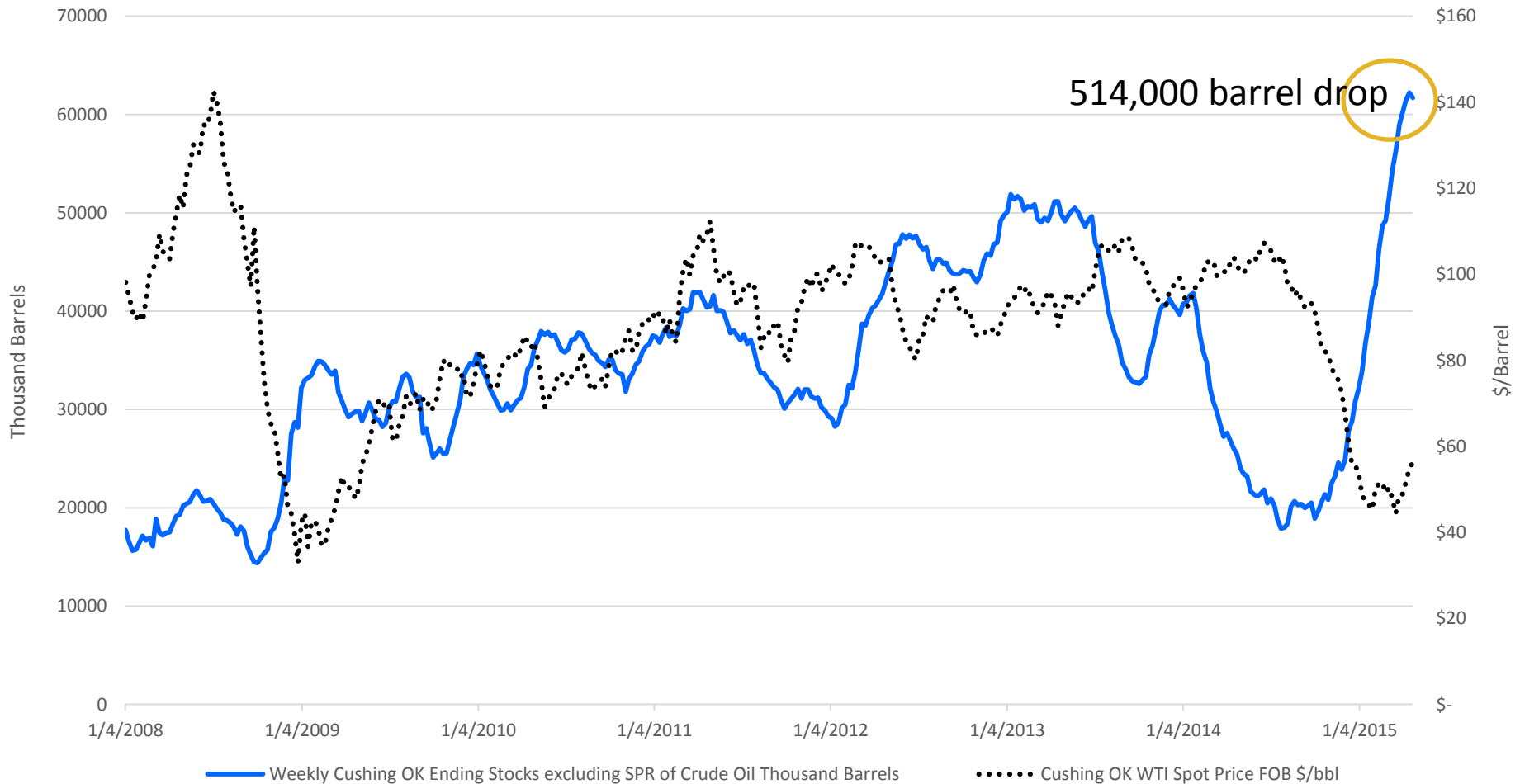


Source: EIA

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# Storage and Rig Count

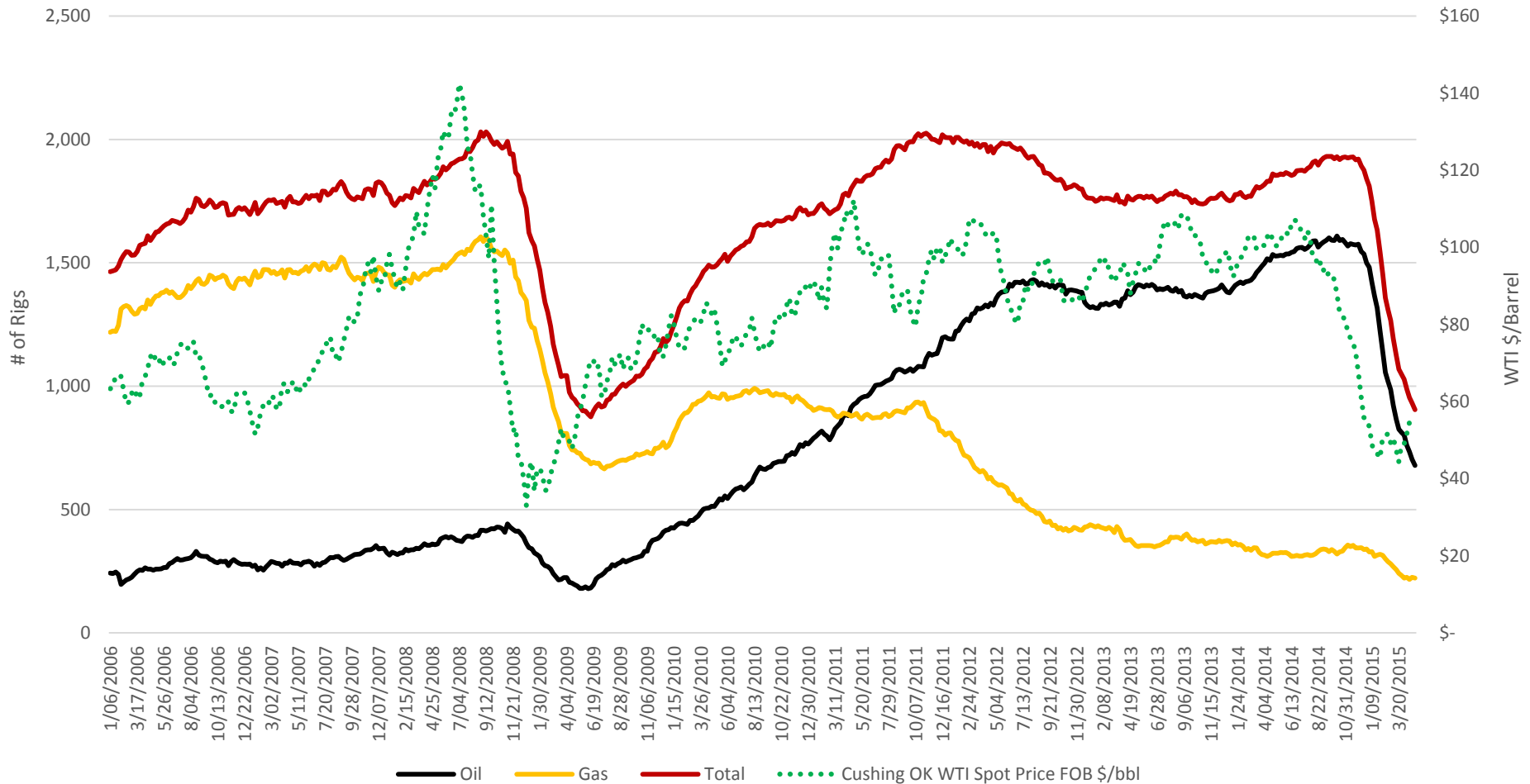
# Cushing stockpiles and WTI



Source: EIA

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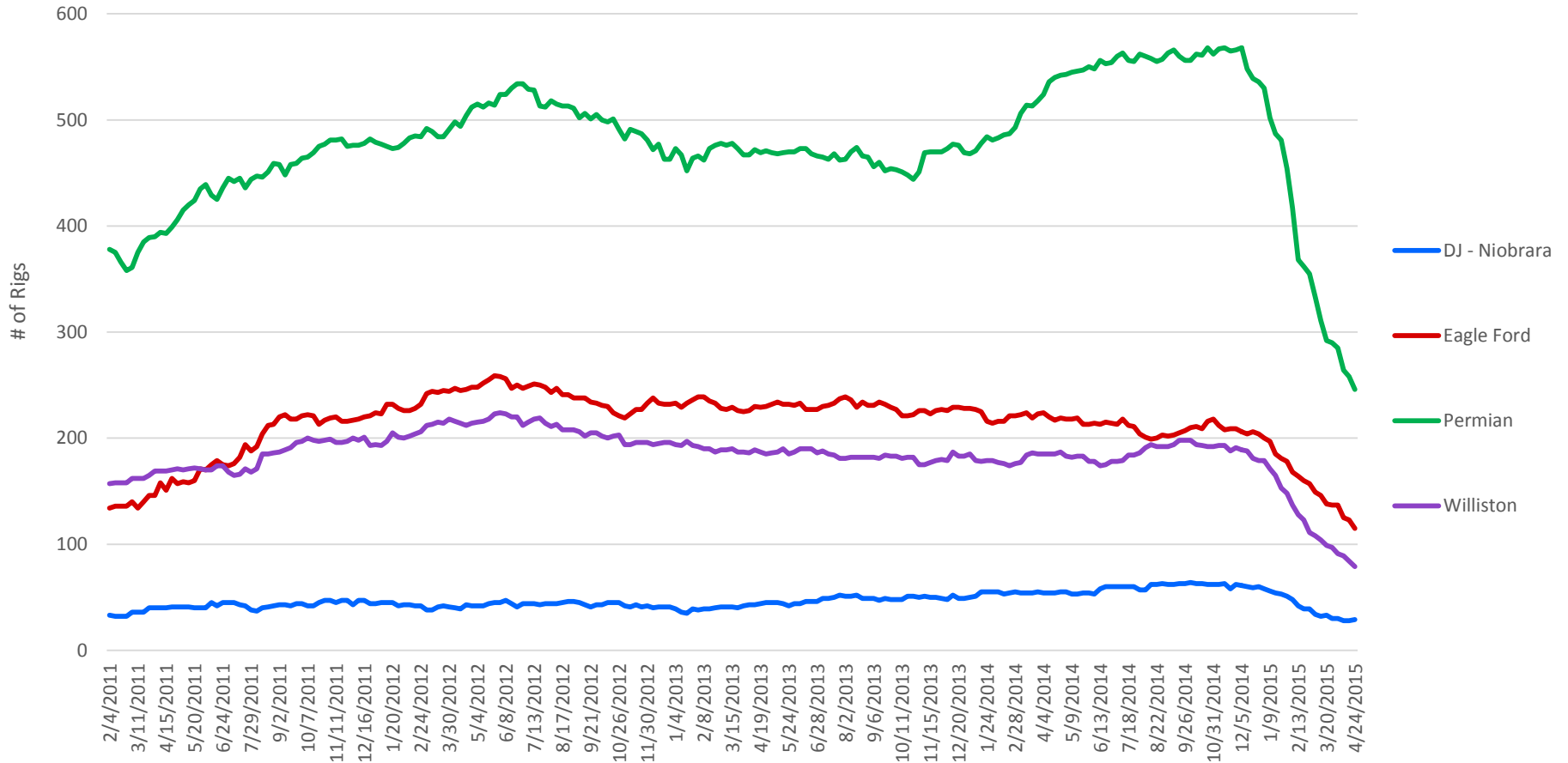
# U.S. rigs and WTI



Source: Baker Hughes, EIA

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# Permian rigs take the biggest dive



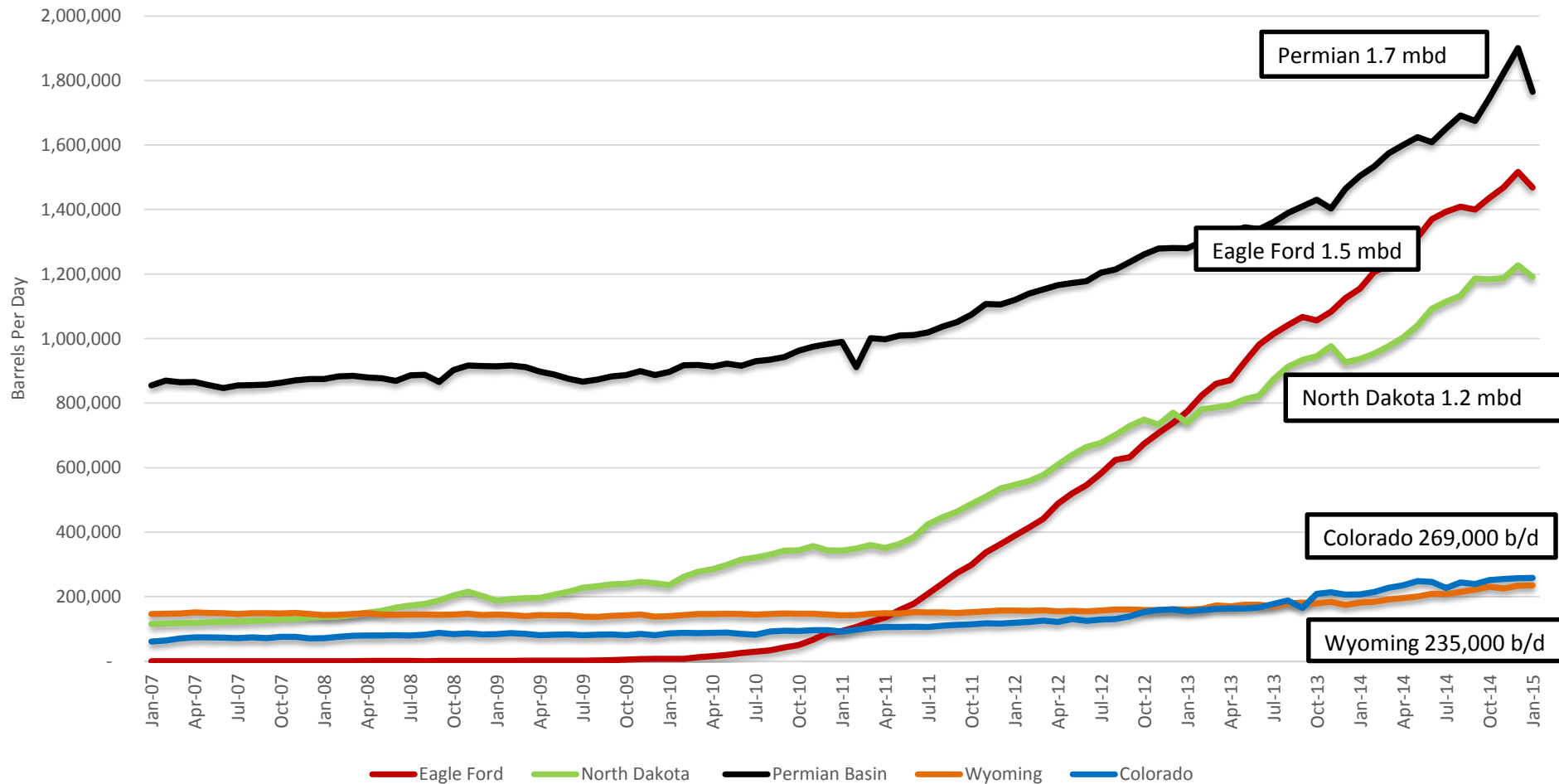
Source: Baker Hughes

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# Production and Technology



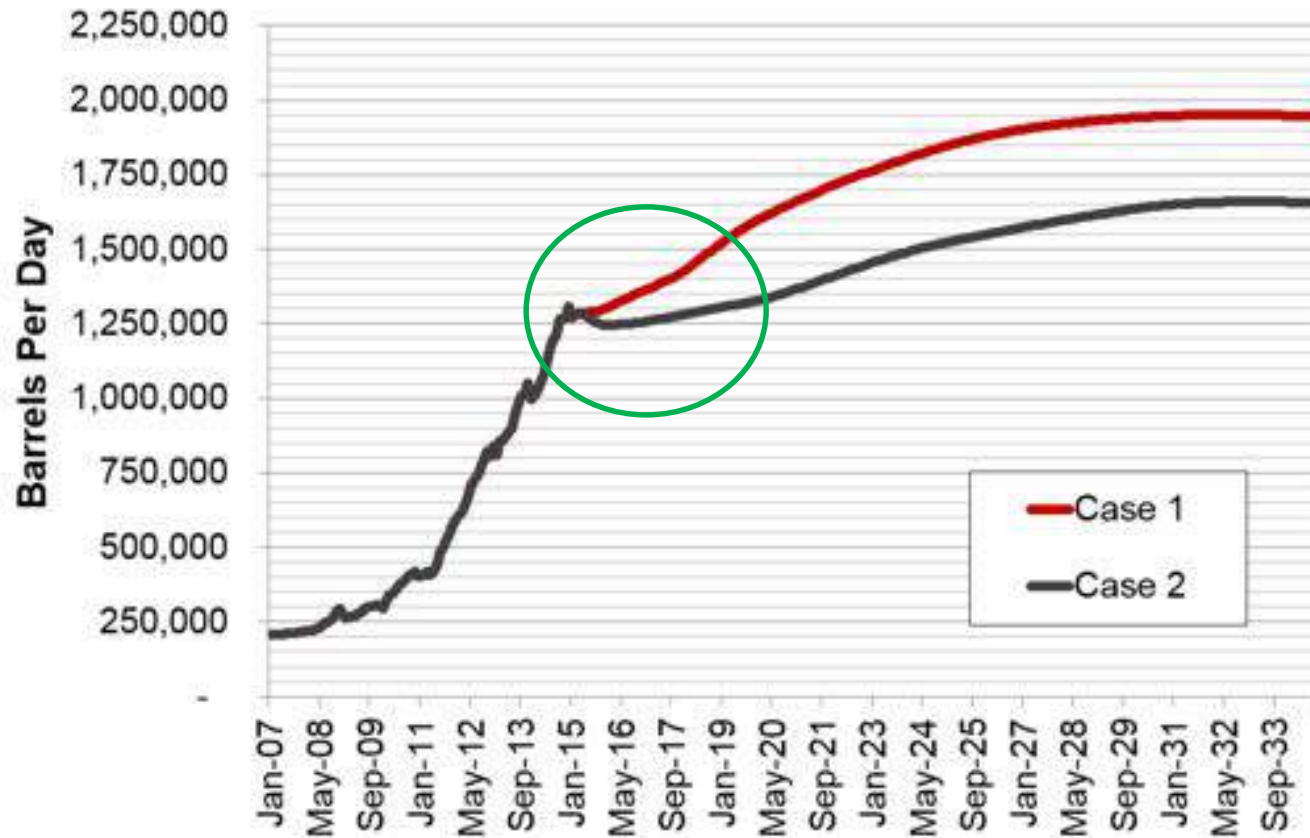
# Shale oil play production



Source: HPDI April 10 2015, EIA, NDPA

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# ND Crude Forecast



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



JJ Kringstad - North Dakota Pipeline Authority

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# Optimism and yield prevail

## US high-yield bonds

Yield to worst (%)



Source: Barclays

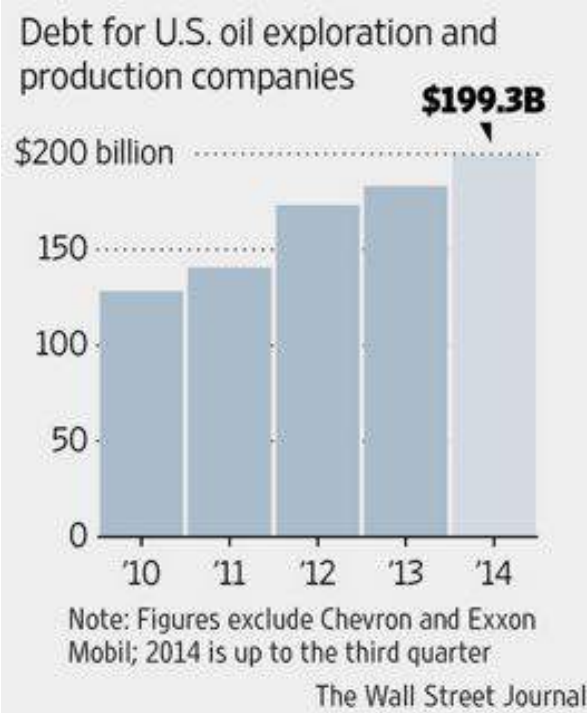
FT

*“Standard & Poor’s keeps a list of the number of ‘weakest link’ companies globally — those rated B- or worse and with negative outlooks. Of the 13 new entrants in March, seven were in the oil and gas sector. Of the 157 ‘weakest link’ companies monitored by the agency, 13 per cent are from the energy industry.”*

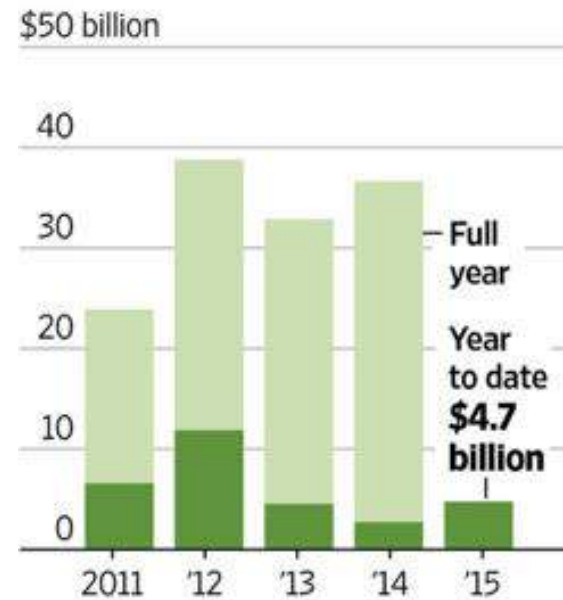
Source: FT, April 7, 2015, “Energy junk bonds find much needed support,” Robin Wigglesworth

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# Able to sell more bonds and issue more stock

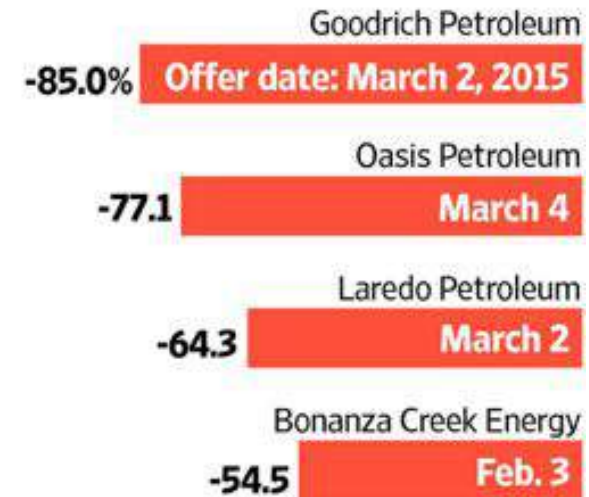


U.S. bond sales by junk-rated oil and gas exploration and production companies



Sources: Dealogic (debt, stock sales); FactSet (stock sales)

Share-price decline from June 30, 2014, through stock offering



THE WALL STREET JOURNAL.

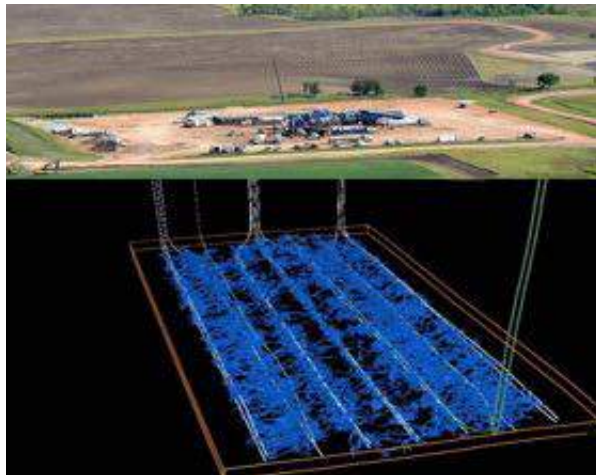
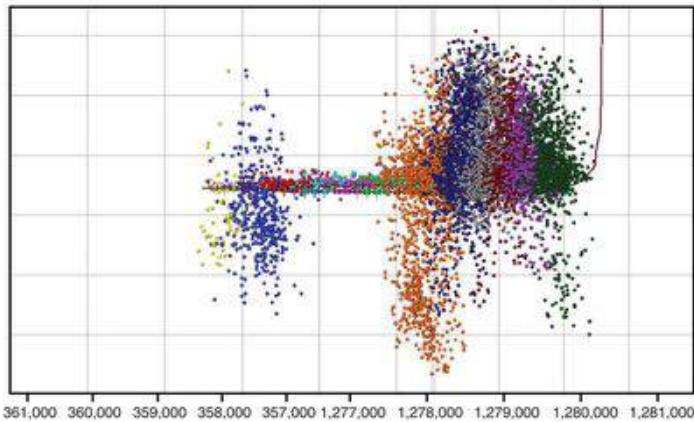
Source: WSJ, March 9 2015, **Investors Are Buying Stocks and Bonds From Energy Producers Amid Oil Price Drop**, By **CORRIE DRIEBUSCH**, **RYAN DEZEMBER** and **MIKE CHERNEY** **Deep Debt Keeps Oil Firms Pumping**; Producers Have Increased Their Borrowings by 55% Since 2010 By **ERIN AILWORTH**, **RUSSELL GOLD** and **TIMOTHY PUKO** January 6, 2015

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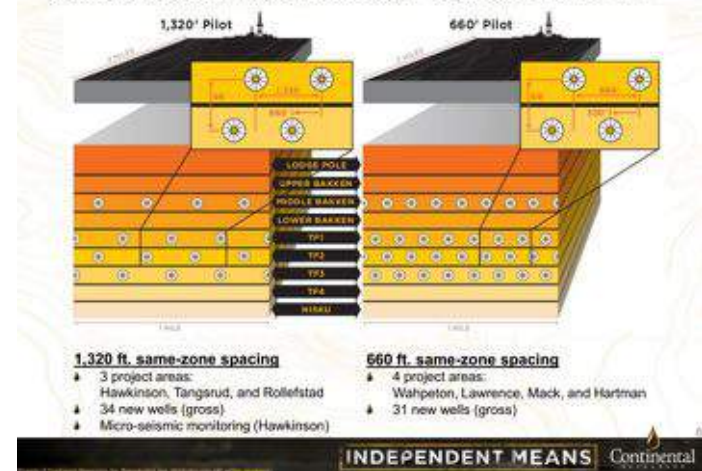
# Drilling more and completing less

- Recent conference calls suggest completion costs are roughly 60% of well costs
- Pressuring service costs lower, drilling, but not completing
- ND wells waiting on completion are around 900 and likely similar across the country (at least a few thousand)
- Refracing can work, but need to test it and need a good wellbore to start with
- Reservoir performance, completion best practices, and cost reduction?
- Job losses and ability to quickly turn on production...? Swing producer?
- Companies forced to make complex economic and geologic decisions
- EURs – future production

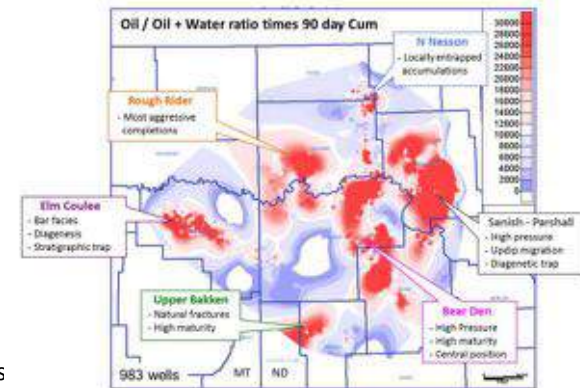
# Technology advances and then oil prices drop



1,320' & 660' Pilot Density Projects: 2013-14



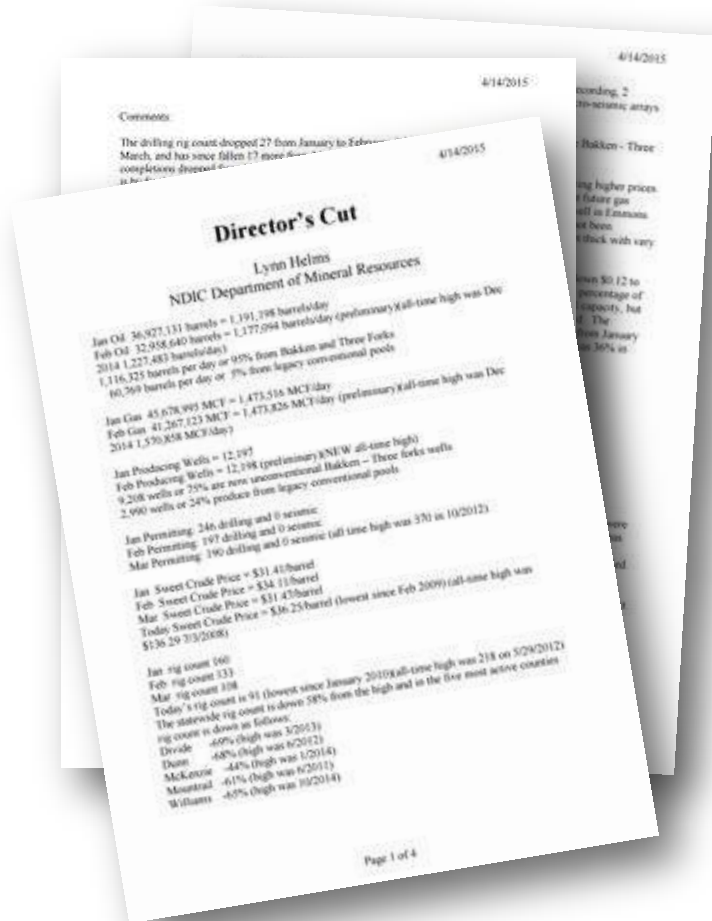
Source: Continental Resources March Investor Presentation, Permission granted



Source: The American Oil and Gas Reporter, Dec 2011; Continental Resources November 2014 Investor Pres  
 Sonnenberg, SPE Paper 168870, presented Denver Aug 2013, "Integrating Geology and Engineering: Implications for Production in the Bakken Play, Williston Basin"

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## A little dive into ND data



The drilling rig count dropped 27 from January to February, 25 more from February to March, and has since fallen 17 more from March to today. The number of well completions dropped from 63 (final) in January to 42 (preliminary) in February. Oil price is by far the biggest driver behind the slow-down, with operators reporting postponed completion work to avoid high initial oil production at very low prices and to achieve NDIC gas capture goals. There were no major precipitation events, 7 days with wind speeds in excess of 35 mph (too high for completion work), and 9 days with temperatures below -10F.

Over 99% of drilling now targets the Bakken and Three Forks formations.

At the end of February there were an estimated 900 wells waiting on completion services<sup>1</sup>, an increase of 75. Comparing December, January, and February completions and production increases results in a requirement of 110-120 completions per month to maintain production near 1.2 million barrels per day.

February 2015 – Estimated 900 Wells WOC

January 2015 – 825 wells WOC

Dec – 750

Nov – 775

Oct 2014 – 650

Sept 2014 – 610

2014 avg - 646

2013 avg - 478

# Changes in ND Tax Law April 24, 2015



## ND House adds its OK to oil tax changes

By Amy Dalrymple on Apr 24, 2015 at 10:21 p.m.

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**B**ISMARCK – A bill to reform North Dakota's oil taxes is on its way to the governor's desk, but questions remain about the implications to the state's oil tax sharing agreement with the Three Affiliated Tribes.

House members voted 66-26 Friday to give final approval to what many call monumental legislation to lower the oil extraction tax and eliminate price-based tax breaks, concurring with amendments the Senate made late Thursday.

House Bill 1476 lowers the oil extraction tax from 6.5 percent to 5 percent starting Jan. 1, but allows that rate to increase to 6 percent if oil prices average above \$90 a barrel for three consecutive months. It also removes the price-based tax breaks known as triggers starting Dec. 1, a policy supporters say will bring stability and predictability to state oil tax revenues.



An oil pump is reflected in a puddle near Stanley, N.D. David Samson / The Forum

*House Bill 1476 lowers the oil extraction tax from 6.5 percent to 5 percent starting Jan. 1, but allows that rate to increase to 6 percent if oil prices average above \$90 a barrel for three consecutive months. It also removes the price-based tax breaks known as triggers starting Dec. 1, a policy supporters say will bring stability and predictability to state oil tax revenues.*

*It does not change the 5 percent gross production tax, bringing the state's overall tax rate down from 11.5 percent to 10 percent.*

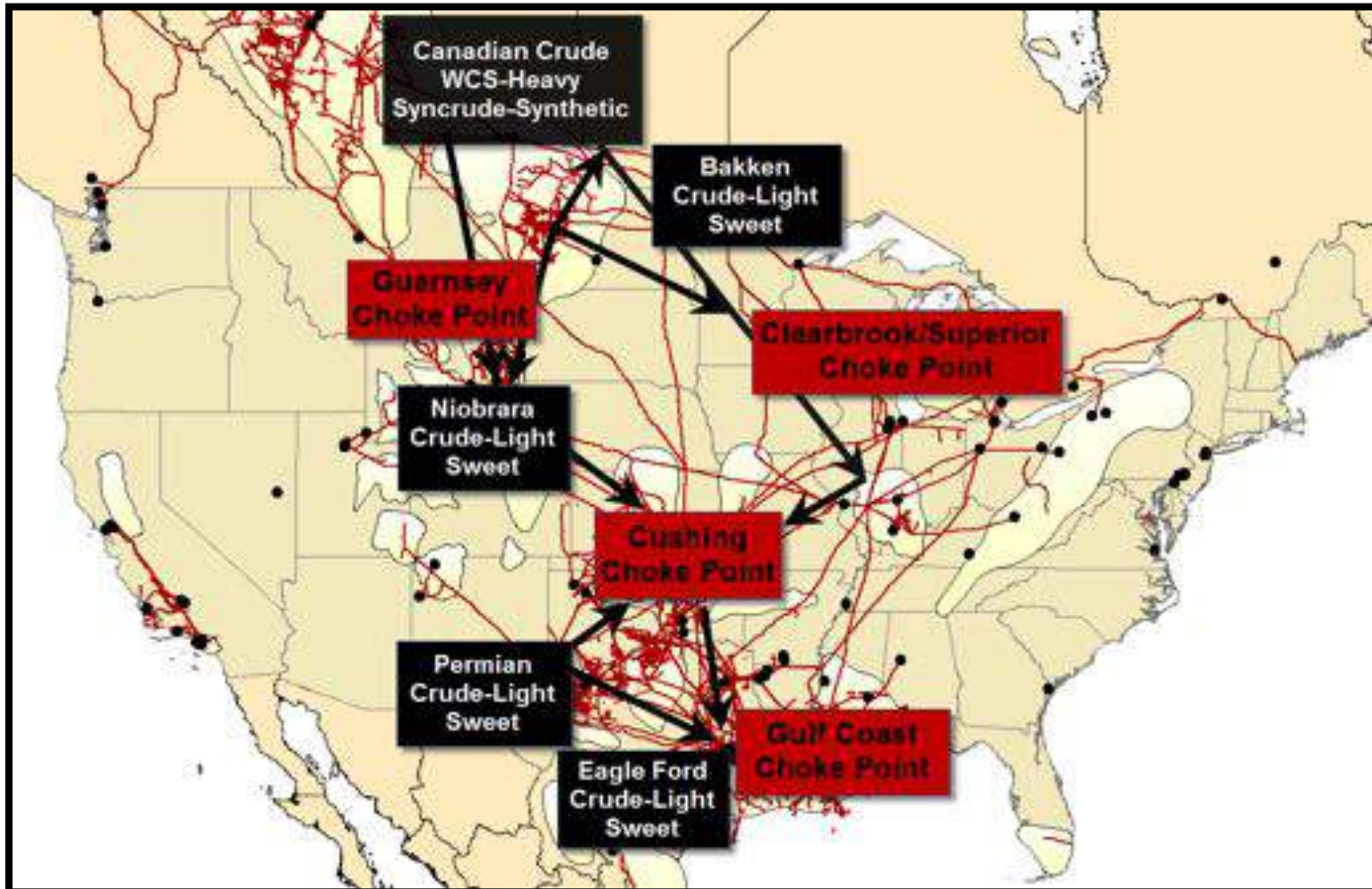
Source: Amy Dalrymple, April 24 2015, Inforum

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# Infrastructure and Pricing

# Major chokepoints are still relevant



Source: EPRINC Choke Point Map using Hart ArcGIS Mapping software

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# February 2015 Williston Basin Crude Transportation

Williston Basin Production: 1.3 mbd

North Dakota: 1,177,094 b/d

South Dakota: 4,680\* b/d

Eastern Montana: 78,000\* b/d



Tesoro Refinery: 68,000 b/d



Truck to Canadian Pipeline: 17,000 b/d

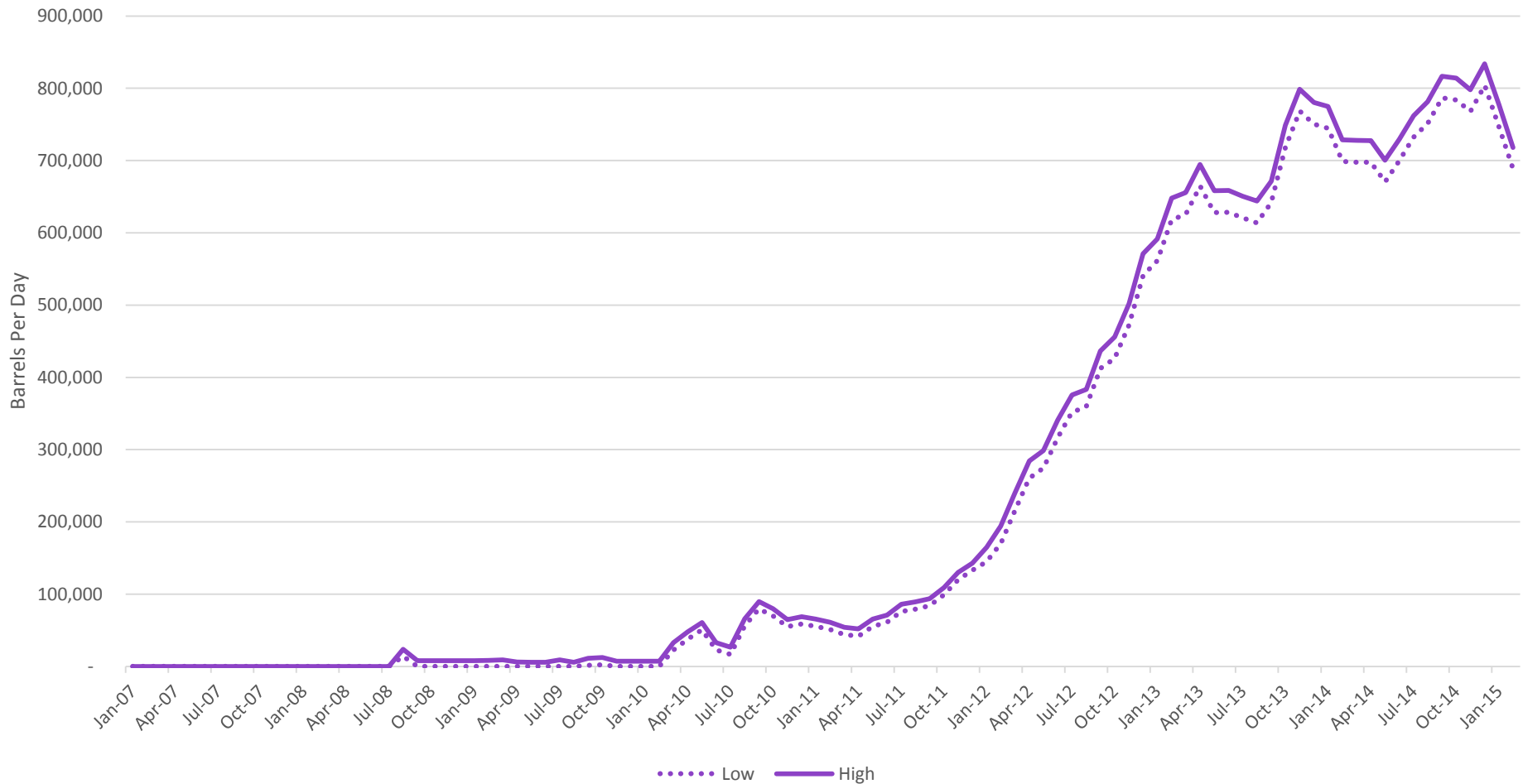


Rail: 703,155 b/d



Pipeline: 495,619 b/d

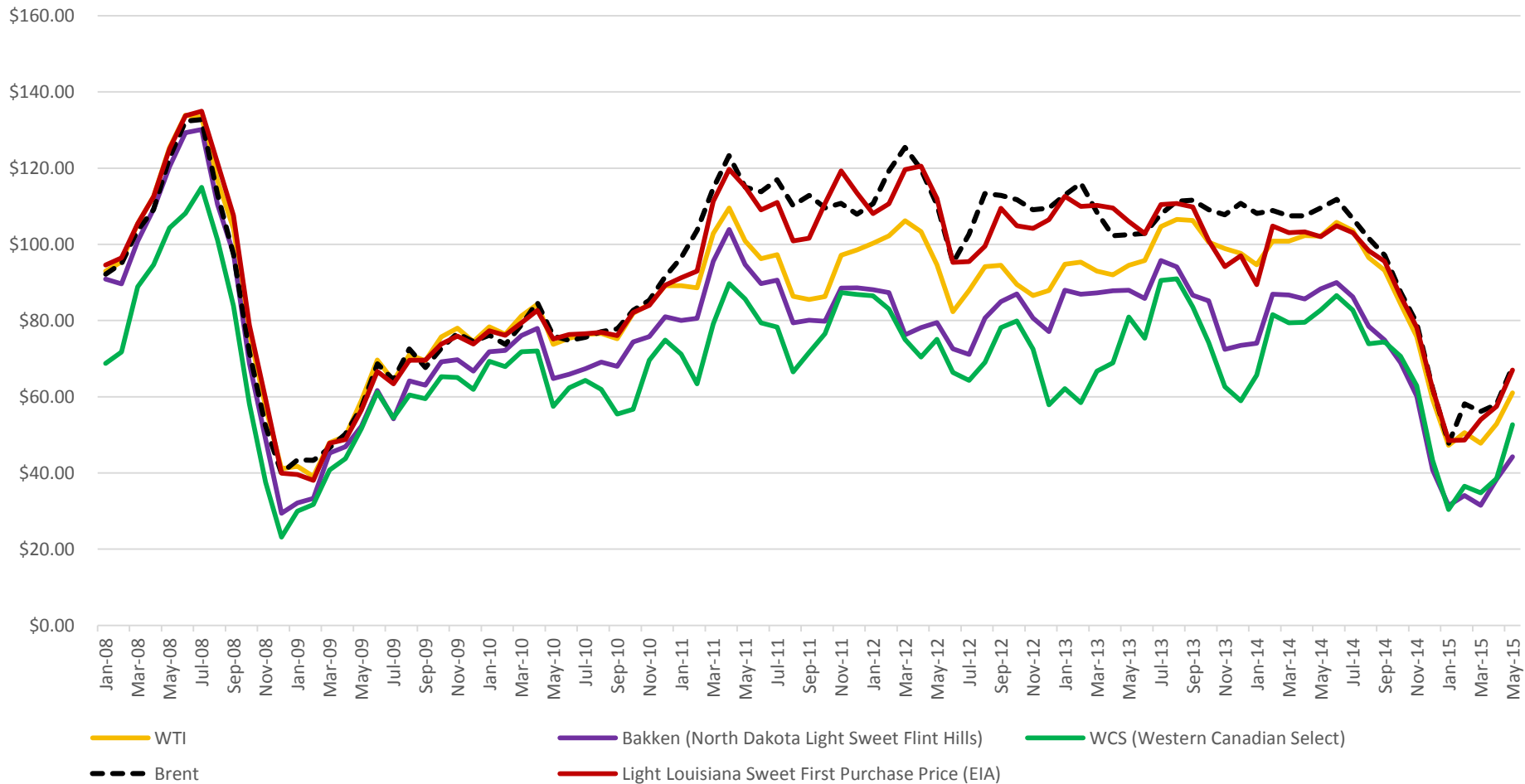
# Williston Basin Rail Estimates



Source: NDPA

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# Price Comparison



Source: EIA, Flint Hills, CME Group, Bloomberg

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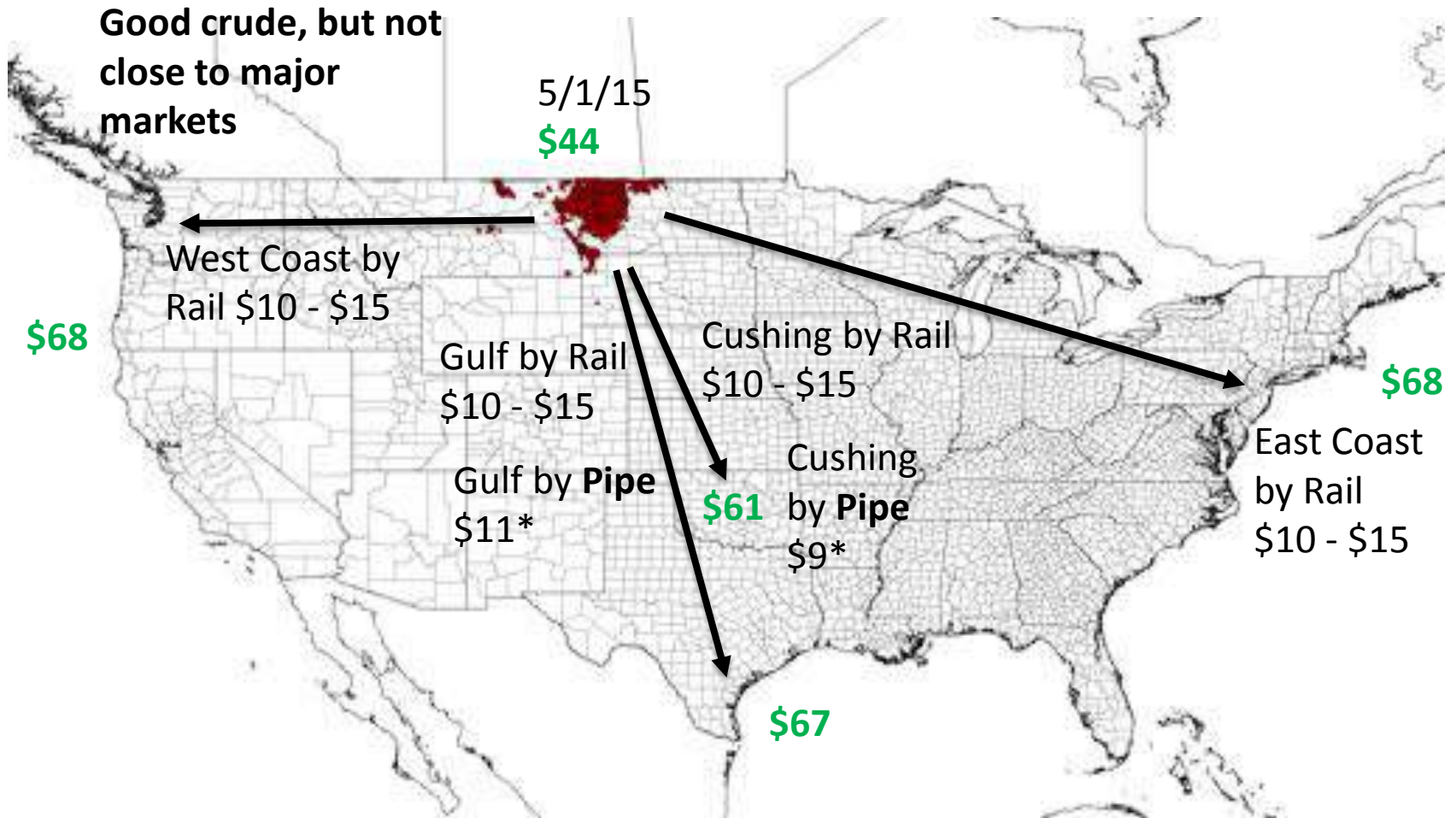
# Regional Pricing Disparities



Source: Map from AFPM, Flint Hills, EIA, CME Group, and estimates

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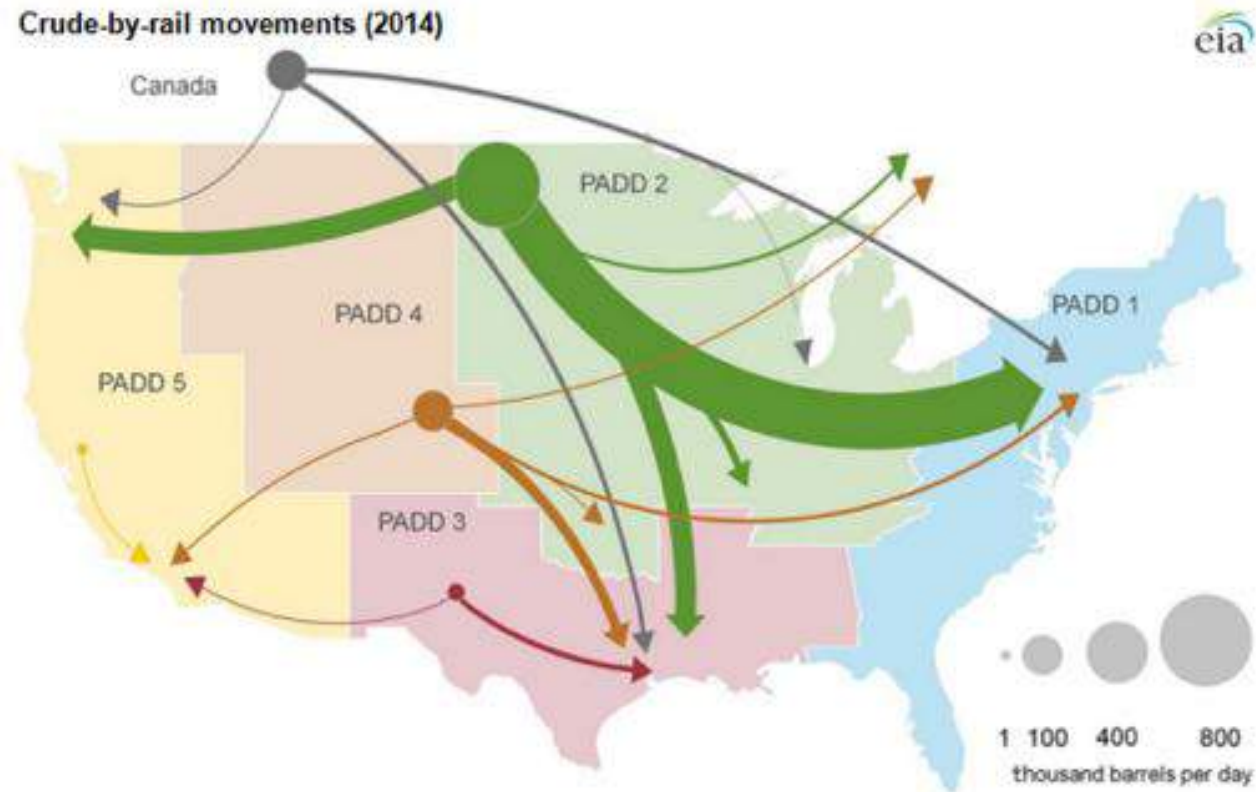
# Bakken netbacks under pressure



Source: Flint Hills ND Light Sweet, \*Estimates from RBN blog Feb 2015

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# EIA's new rail data highlights Bakken

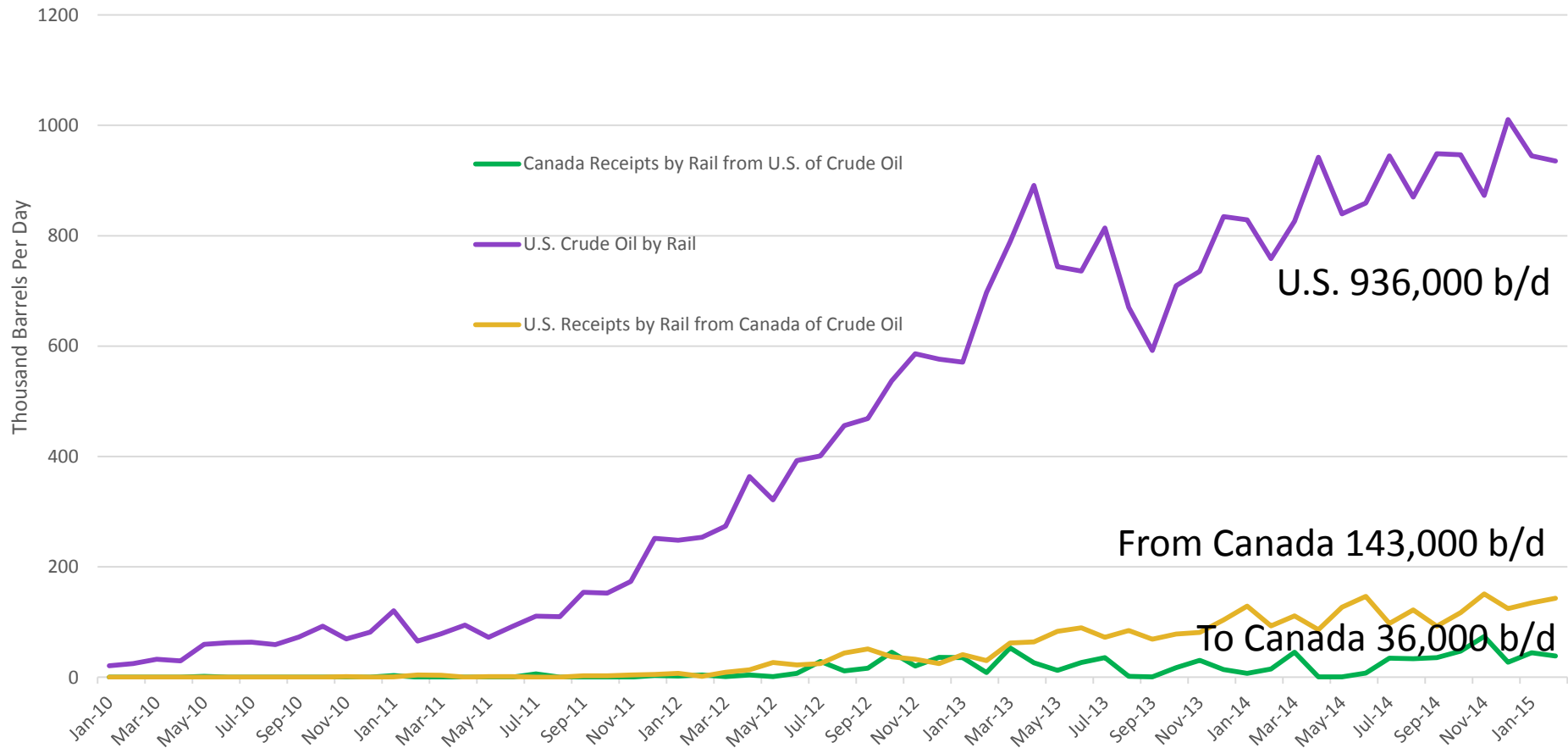


Source EIA March 31, 2015:

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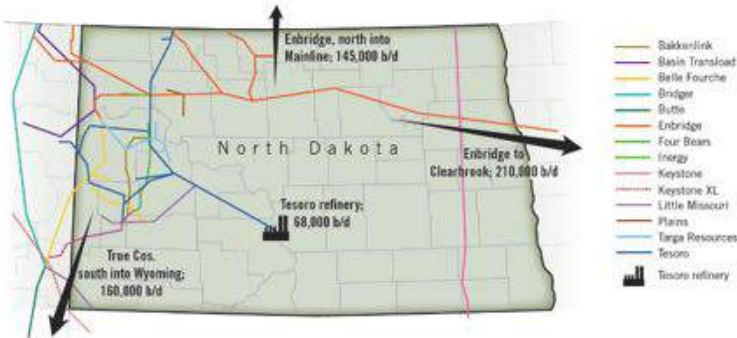
# U.S. and Canadian crude by rail volumes



Source EIA

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# Bakken Pipeline and Refinery Capacity



Source: EPRINC's article in Oil and Gas Journal March 2014

Source: North Dakota Pipeline Authority, DNR

	2012	2013	2014	2015	2016	2017*	2018*	2019*
Butte Pipeline	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
Butte Expansion (Q3 2014)	-	-	100,000	100,000	100,000	100,000	100,000	100,000
Tesoro Mandan Refinery	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000
Enbridge Mainline North Dakota	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000
Enbridge Bakken Expansion Program	25,000	145,000	145,000	145,000	145,000	145,000	145,000	145,000
Plains Bakken North (Up to 70,000 BOPD)	-	-	40,000	40,000	40,000	40,000	40,000	40,000
Enbridge Sandpaper* (Q1 2017)	-	-	-	-	-	225,000	225,000	225,000
TransCanada Keystone XL* (100,000 BOPD, Timeline Uncertain)	-	-	-	-	-	-	-	100,000
Dakota Prairie Refinery (Q4 2014/Q1 2015)	-	-	-	20,000	20,000	20,000	20,000	20,000
Thunder Butte Refinery (2018, Timeline Uncertain)*	-	-	-	-	-	-	20,000	20,000
Energy Transfer Partners Bakken Pipeline* (Late 2016)	-	-	-	-	-	450,000	450,000	450,000
TransCanada Upland Pipeline* (Late 2018)	-	-	-	-	-	-	-	220,000
Kinder Morgan Double H Pipeline (Q1 2015)	-	-	-	84,000	108,000	108,000	108,000	108,000
<b>Pipeline/Refining Total</b>	<b>463,000</b>	<b>583,000</b>	<b>723,000</b>	<b>827,000</b>	<b>851,000</b>	<b>1,526,000</b>	<b>1,546,000</b>	<b>1,866,000</b>

Source: NDPA

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# Pipeline hurdles continue

\$2.6 billion Sandpiper pipeline, 610 miles – 225,000b/d from ND to Superior, Wisconsin

“approved by North Dakota regulators. But it remains under administrative review in Minnesota, where developers are seeking a certificate of need to ship the oil and a route permit to build the pipeline across 300 miles of the state's Lakes Belt.”

## NewsRelease



### TransCanada Alters Québec Scope of Energy East Pipeline Project *Decision a Result of Continued Conversations with Communities and Stakeholders*

MONTREAL, Québec – April 2, 2015 – TransCanada Corporation (TSX, NYSE: TRP) (TransCanada) today announced it is altering the scope of the Energy East pipeline project in Québec as part of its continued commitment to stakeholder consultation, environmental stewardship and community safety. Part of that altered scope includes the decision not to build a marine and associated tank terminals at Cacouna, Québec. Potential alternative terminal options in Québec are being reviewed. Québec and New Brunswick refineries would continue to be connected directly to Energy East.

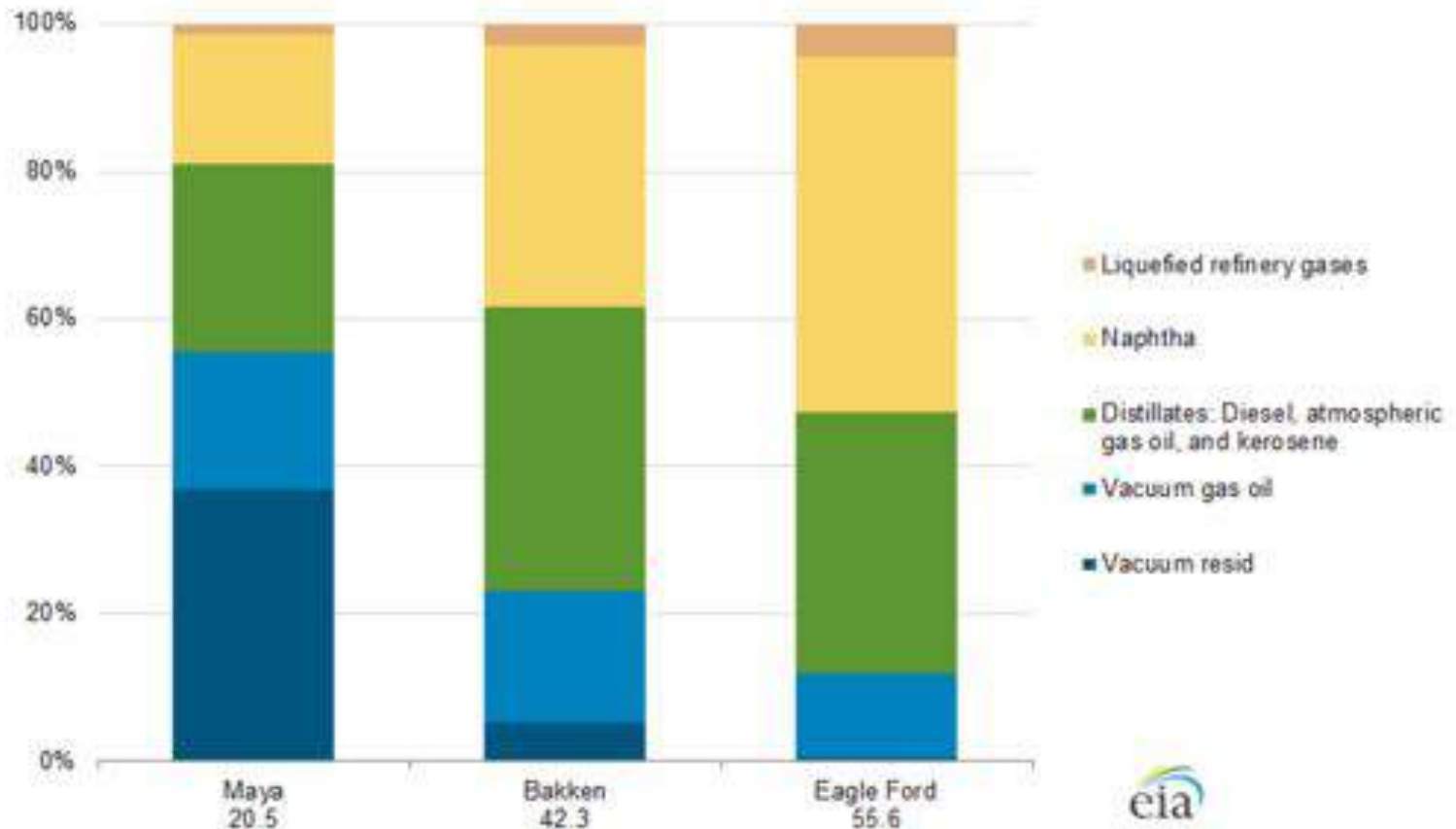
“TransCanada will be advising the NEB that the company will not be proceeding with a marine terminal in Cacouna and is evaluating other options....The result of this alteration to the project scope and further refinement of the project schedule is expected to result in an in service date of 2020. The 1.1 million barrels per day (bbl/d) Energy East project has secured approximately one million bbl/d of firm, long-term contracts. The \$12 billion project is an important element of TransCanada’s \$46 billion of commercially secured growth projects.”

Source: Energywire, April 10 2015, Daniel Cisick, “Bakken-bearing pipeline meets stiff opposition in the Land of 10,000 Lakes” and TransCanada

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# Refining/Downstream

# Distillation yield comparison

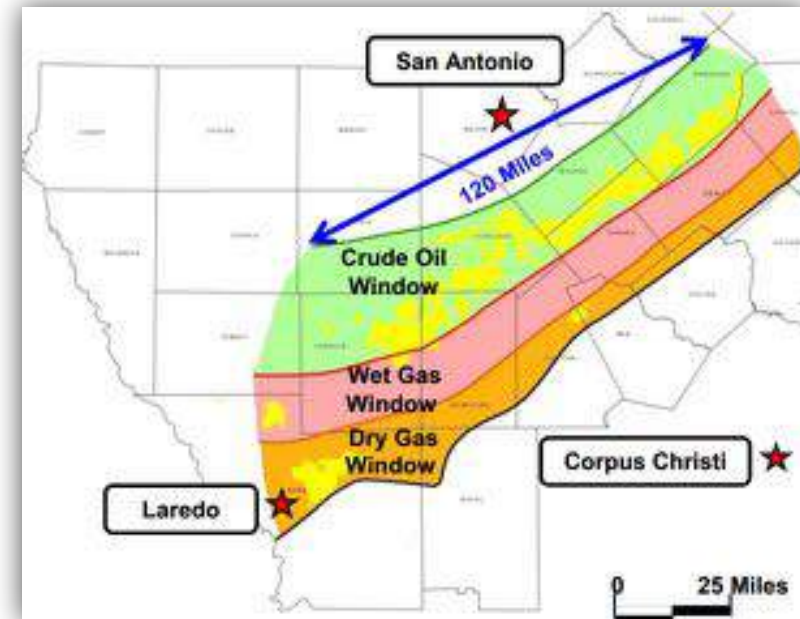


Source: U.S. Energy Information Administration calculations with Chevron Crude Assay Library data.

Source: EIA, "Technical Options for Processing Additional Light Tight Oil Volumes within the United States," April 2015

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# Do exports matter for Bakken crude?



One problem -  
varying grades of  
light crude in the  
Eagle Ford

# These differences have been impacting prices

## FLINT HILLS RESOURCES CRUDE OIL POSTINGS P.O. BOX 2917, WICHITA, KS 67201

09/16/14  
20140160

Effective 7:00 A.M., on dates shown below, and subject to its division orders as amended and supplemented, contracts and other agreements, FLINT HILLS RESOURCES, LP will pay the following prices per barrel of 42 U.S. gallons for merchantable crude oil purchased and delivered into pipelines or facilities authorized by FLINT HILLS RESOURCES, LP, in the fields or area designated below. The following prices are for informational purposes only, do not constitute an offer, and are subject to change or revisions without notice.

Effective Date	05/01/15		09/16/14
Bulletin	20150081	EDQ	20140160
<b>TEXAS</b>			
Eagle Ford Condensate, equal to or greater than 60 API	46.5000 *		79.7500 *
Eagle Ford Light, equal to or greater than 50 API and less than 60 API	51.5000 *		84.7500 *
Eagle Ford Sour	50.7500 *		83.7500 *
Eagle Ford West Condensate, equal to or greater than 60 API	46.5000 *		79.7500 *
Eagle Ford West Light, equal to greater than 50 API and less 60 API	51.5000 *		84.7500 *
Eagle Ford West Sour	50.7500 *		86.2500 *
Eagle Ford West, crude oil less than 50 API	53.0000 *		89.2500 *
Eagle Ford, crude oil less than 50 API	53.0000 *		89.2500 *
Giddings Sweet Texas	53.5000 *		89.0000 *
Pearsall Sweet	53.2500 *		86.2500 *
South Texas Heavy	53.0000 *		86.2500 *
South Texas Light Sweet	53.0000 *		83.7500 *
South Texas Sour	50.7500 *		86.2500 *
South Texas Sweet	53.0000 *		89.2500 *
West Texas/New Mexico Intermediate	55.5000 *		89.5000 *
			91.2500 *

**May 5, 2015**  
**WTI \$61**  
**Brent \$68**  
**Nat Gas \$2.80**

# Additional Challenges and Regulatory Uncertainty



# Issues and Regulatory Concerns

- **Oil prices/costs/discounts**
  - Exports
  - Infrastructure delays
  - **Regulatory uncertainty: midstream and downstream companies trying to forecast crude exports etc.**
- **Safety**
- **Rail Safety**
- **Pipeline and Rail Spills**
- **Flaring**
- **Water: Spilling, disposing, frac usage**
- **Waste disposal**
- **Environmental Concerns - emissions**

# BLM Fracking Regulations

It is really going to be about implementation

Really seems to be about proper casing and frac water management

*Submit detailed information about the proposed operation, including wellbore geology, the location of faults and fractures, the depths of all usable water, estimated volume of fluid to be used, and **estimated direction and length of fractures**, to the BLM with the APD or a Sundry Notice and Report on Wells (Form 3160-5) as a Notice of Intent (NOI) to hydraulically fracture an existing well;*



Source, USGS

[http://nationalmap.gov/small\\_scale/printable/images/pdf/fedlands/DOI\\_ALL\\_2.pdf](http://nationalmap.gov/small_scale/printable/images/pdf/fedlands/DOI_ALL_2.pdf)

Source: <http://www.gpo.gov/fdsys/pkg/FR-2015-03-26/pdf/2015-06658.pdf>

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# Water Issues

“The analysis suggests that a likely contributing factor to the increase in earthquakes is triggering by wastewater injected into deep geologic formations. This phenomenon is known as injection-induced seismicity, which has been documented for nearly half a century, with new cases identified recently in Arkansas, Ohio, Texas and Colorado.”

**USGS**  
science for a changing world

**Earthquake Hazards Program**

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Contacts

### Record Number of Oklahoma Tremors Raises Possibility of Damaging Earthquakes

Updated USGS-Oklahoma Geological Survey Joint Statement on Oklahoma Earthquakes  
Originally Released: 10/22/2013 1 07:59 PM, Updated May 2, 2014

The rate of earthquakes in Oklahoma has increased remarkably since October 2013 – by about 50 percent – significantly increasing the chance for a damaging magnitude 5.5 or greater quake in central Oklahoma.

[View map of Oklahoma seismicity.](#)  
[View animation of Oklahoma Seismicity.](#)

A new U.S. Geological Survey and Oklahoma Geological Survey analysis found that 145 earthquakes of magnitude 3.0 or greater

#### Oklahoma Earthquakes Magnitude 3.0 and greater

As of May 2, 2014

Earthquakes in all of 2013

~1.6/year

Year	Number of Earthquakes per Year
1978 to 1999	~1.6
2001	~2
2003	~2
2005	~2
2007	~2
2009	~20
2010	~45
2011	~65
2012	~35
2013	~110
As of May 2, 2014	~145

Source: 2003 AFIC Contract & Oklahoma Geological Survey, May 2, 2014

Source: USGS, May 2014

# Natural Gas Flaring - NDPA

Month	Monthly Total, MCF	Average, MCFD
Jan 2015 - Final	45,678,995	1,473,516
Feb 2015 - Prelim.	41,267,123	1,473,826

**February 2015 - Flaring 18%  
or roughly 265,289 mcf/day**

**Compare to August 2014 - Flaring  
26/27% or roughly 362,000 mcf/day**

## **GAS STATS\***

**82% CAPTURED & SOLD**

**13% FLARED DUE TO  
CHALLENGES OR  
CONSTRAINTS ON EXISTING  
GATHERING SYSTEMS**

**5% FLARED FROM WELL  
WITH ZERO SALES**

**\*FEB 2015 NON-CONF DATA**

Case No. 22058  
(Continued)  
Order No. 24665

temperature, pressure, and liquid content. Initial production decline is also very rapid, due to the highly fractured nature of the completion interval.

(15) The Commission believes the North Dakota Petroleum Council's Flaring Task Force's targets of capturing 74% of the gas by October 1, 2014; 77% by January 1, 2015; 85% by January 1, 2016; and 90% by October 1, 2020 with potential for 95% capture are attainable and should be adopted as gas capture goals by the Commission. The restrictions imposed by this order will strive to meet such goals.

# Crude by Rail Accidents



LAC MAGENTIC: AP PHOTO/THE CANADIAN PRESS, PAUL CHIASSON



[http://usnews.nbcnews.com/\\_news/2013/12/30/22113442-mile-long-train-carrying-crude-oil-derails-explodes-in-north-dakota?lite](http://usnews.nbcnews.com/_news/2013/12/30/22113442-mile-long-train-carrying-crude-oil-derails-explodes-in-north-dakota?lite)

# Accident List

- July 6, 2013, a run-away train crashed and exploded in Lac-Mégantic, Quebec, killing 47 people and destroying parts of the town
- November 8, 2013, about 12 cars derailed in a unit train of 90 cars carrying crude oil near Aliceville, Alabama (45 miles SW Tuscaloosa). Nobody was injured, but three of the cars exploded.
- December 30, 2013, a train hauling grain derailed near Casselton, ND hitting a 106 car unit train of crude oil which caused 18 crude tank cars to derail causing a massive explosion and fireball
- January 7, 2014, a Canadian National train jumped tracks in Plaster Rock, New Brunswick. 15 cars derailed and caught fire. The train was carrying propane and crude oil from Western Canada
- January 20, 2014, a CSX train derailed in Pennsylvania on a railroad bridge and close a busy expressway (Schuylkill), but did not leak any crude oil.
- January 31, 2014, a CN train carry heavy Canadian crude and other products derailed and leaked in New Augusta, MS
- February 13, 2014, 21 of 120 NS cars carrying heavy Canadian crude derailed in Vandergrift, PA
- April 30, 2014, oil tanks cars on CSX derailed and caught fire in Lynchburg, VA (3 of 15 cars that derailed caught fire). Nobody was injured by 300 people were evacuated temporarily
- January 31, 2015, tank cars derailed in CSX in Philadelphia, PA, but did not rupture
- February 14, 2015, 29 of 100 cars derailed on CN in Timmins, Ontario transporting crude and product, 7 out of the 29 caught fire
- February 16, 2015, 26 cars in a 109 CSX unit train carrying Bakken crude derailed in Mount Carbon, VA. 19 of the 26 cars caught fire. A home was destroyed and a person was injured. Drinking water was contaminated. The psi was said to be 13.9 which would be above the new standard to set to be implemented in ND in April at 13.7.
- March 5, 2015, 21 of 105 carrying Bakken crude derailed on BNSF in Galena, IL. At least 2 cars caught fire
- March 7, 2015, 39 cars derailed on a 94 car CN train in Gogama, Ontario carrying heavy Canadian crude. 7 cars caught fire and 5 entered the Makami River

# New regulations released May 1, 2015

United States Department of Transportation

Home » Briefing Room

## DOT Announces Final Rule to Strengthen Safe Transportation of Flammable Liquids by Rail

Friday, May 1, 2015

### Rule Will Make Significant and Extensive Changes to Improve Accident Prevention, Mitigation, and Emergency Response

WASHINGTON – U.S. Transportation Secretary Anthony Foxx today announced a final rule for the safe transportation of flammable liquids by rail. The final rule, developed by the Pipeline and Hazardous Materials Safety Administration (PHMSA) and Federal Railroad Administration (FRA), in coordination with Canada, focuses on safety improvements that are designed to prevent accidents, mitigate consequences in the event of an accident, and support emergency response.

The rule:

1. Unveils a new, enhanced tank car standard and an aggressive, risk-based retrofitting schedule for older tank cars carrying crude oil and ethanol;
2. Requires a new braking standard for certain trains that will offer a superior level of safety by potentially reducing the severity of an accident, and the "pile-up effect";

**Related Links**

- Rule Summary: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains
- Chronology of DOT Actions on Safe Transportation of Flammable Liquids by Rail
- Transport Canada media release on final Generation of Stronger, Safer Rail Tank Car

**Related Documents**

- Final Rule for Safer Transportation of Flammable Liquids by Rail

**Media Contact**

**Press Office**

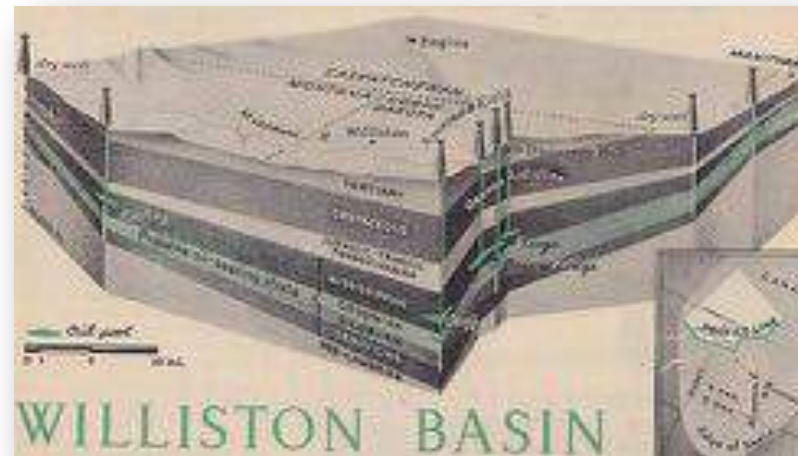
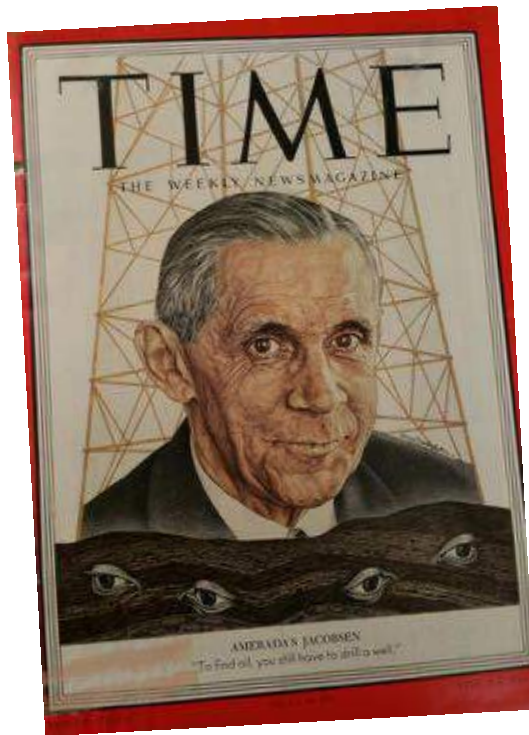
describes the regulatory changes implemented in this final rule and identifies entities affected by this final rule:

Table 1 Affected Entities and Requirements		Affected Entity
Adopted Requirement		
<p><b>Enhanced Standards for Both New and Existing Tank Cars Used in HHPLTs</b></p> <ul style="list-style-type: none"> <li>• New tank cars constructed after October 1, 2015 are required to meet enhanced DOT Specification 117 design or performance criteria</li> <li>• Existing tank cars must be retrofitted in accordance with the DOT-prescribed retrofit design or performance standard</li> <li>• Retrofits must be completed based on a prescriptive retrofit schedule and a retrofit reporting requirement is triggered if initial milestone is not achieved</li> </ul>		Tank Car Manufacturers, Tank Car Owners, Shippers / Offerees and Rail Carriers
<p><b>More Accurate Classification of Unrefined Petroleum-Based Products</b></p> <ul style="list-style-type: none"> <li>• Develop and carry out sampling and testing program for all unrefined petroleum-based products, such as crude oil, to address:               <ol style="list-style-type: none"> <li>(1) Frequency of sampling and testing that accounts for any appreciable variability of the material</li> <li>(2) Sampling prior to the initial offering of the material for transportation and when changes that may affect the properties of the material occur</li> <li>(3) Sampling methods that ensures a representative sample of the entire mixture, as offered, is collected</li> <li>(4) Testing methods that enable classification of the material under the HDMR</li> <li>(5) Quality control measures for sample frequencies</li> <li>(6) Duplicate samples or equivalent measures for quality assurance</li> <li>(7) Criteria for modifying the sampling and testing program</li> <li>(8) Testing or other appropriate methods used to identify properties of the mixture relevant to packaging requirements</li> </ol> </li> <li>• Certify that program is in place, document the testing and sampling program outcomes, and make information available to DOT personnel upon request</li> </ul>		Offerees / Shippers of unrefined petroleum-based products
<p><b>Rail System - Risk Assessment</b></p> <ul style="list-style-type: none"> <li>• Perform a routing analysis that considers, at a minimum, 27 safety and security factors and select a route based on its findings. These planning requirements are prescribed in 49 CFR § 172.820.</li> </ul>		Rail Carriers, Emergency Responders
<p><b>Rail Routing - Notification</b></p> <ul style="list-style-type: none"> <li>• Ensures that railroads notify State and/or regional fusion centers and State, local, and tribal officials who contact a railroad to discuss routing decisions are provided appropriate contact information for the railroad in order to request information related to the routing of hazardous materials through their jurisdictions. This replaces the proposed requirements to notify State Emergency Response Commissions (SERCs) or other appropriate state delegated entity about the operation of these trains through their States.</li> </ul>		

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# Conclusions

- Tight/unconventional oil complexities will continue and potentially be exacerbated in a low oil price environment (drilling costs, transportation costs and issues, etc.)
- In the long run, the Bakken (in addition to Permian and Eagle Ford) is a stable and well understood production platform which will attract long-term investment
- Diamond in the rough



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