

VALUE FOCUS

# Exploration & Production

Third Quarter 2017 // Region Focus: Bakken Shale



## Executive Summary

Oil prices remained relatively steady at \$50/barrel over the last twelve months despite OPEC's wavering commitment to production cuts.

OPEC and non-OPEC producers met in May 2017 and agreed to extend production cuts through March of 2018. OPEC's stated goal was keeping the price of oil above \$50 per barrel and aimed to bring stocks down to 2.7 billion barrels. Even if OPEC was to maintain production cuts, rising U.S. shale oil output is expected to temper the results of OPEC's reduction in supply. Ongoing oil prices remain below normal levels, but exploration and production activities have increased dramatically from one year ago. The Baker Hughes North American (U.S.) total oil rig count increased over 80% year-over-year.

Additionally, as oil prices stabilized around \$50 per barrel, the number of oil and gas companies filing for bankruptcy declined. After the collapse of oil prices Haynes and Boone updated their bankruptcy monitor every two months. But the last time the Bankruptcy Monitor was updated was July 2017 suggesting that the trend of bankruptcies in the oil and gas industry is coming to an end.

The price of crude oil is determined by market forces: supply and demand. On pages 1 and 2, world demand and supply are analyzed in order to understand the current pricing environment.

2017

Q1: Eagle Ford

Q2: Permian Basin

**Q3: Bakken Shale**

Q4: Marcellus and Utica



# Oil and Gas Industry Services

Mercer Capital provides business valuation and financial advisory services to companies in the energy industry.

## Services Provided

- Valuation of energy companies
- Transaction advisory for acquisitions and divestitures
- Valuations for purchase accounting and impairment testing
- Fairness and solvency opinions
- Litigation support for economic damages and valuation and shareholder disputes

## Industry Segments

Mercer Capital serves the following industry segments:

- Exploration & Production
- Oil Field Services
- Midstream Operations
- Alternative Energy

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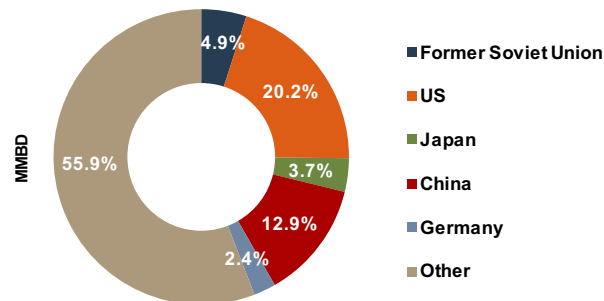
# World Oil Demand

## Crude Oil & Natural Gas

98.85  
mboe/d

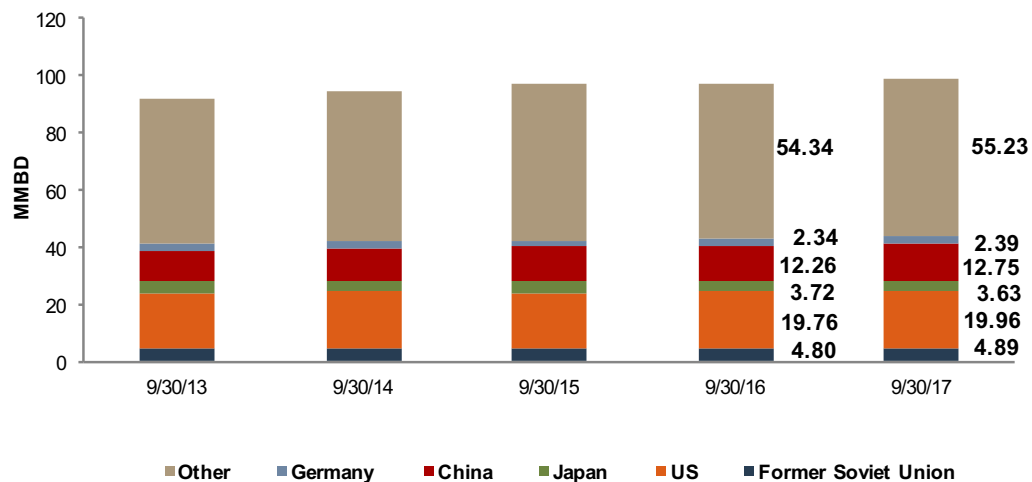
### World Daily Consumption of Crude Oil and Liquid Fuels: September 2017

As of September 30, 2017, total world daily consumption equaled 98.85 million barrels per day



Source: Bloomberg

### World Daily Consumption of Crude Oil and Liquid Fuels



Source: Bloomberg

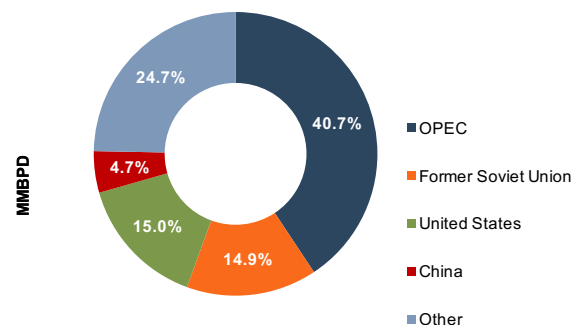
# World Oil Supply

## Crude Oil & Natural Gas

98.00  
mboe/d

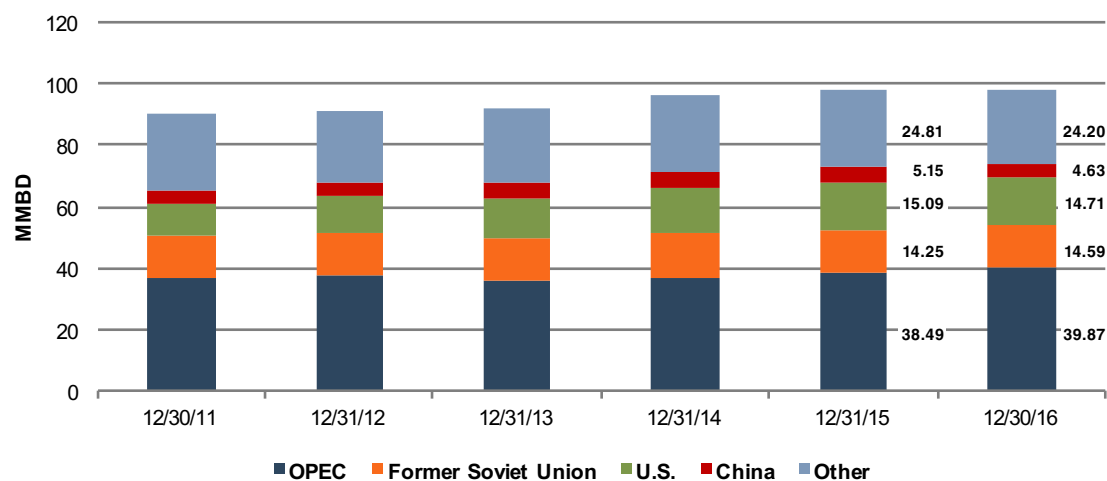
### World Daily Production of Crude Oil: December 2016

As of December 31, 2016 (the most recent date available) world daily production totaled 98.00 million barrels per day.



Source: Bloomberg

### World Daily Production of Crude Oil



Source: Bloomberg

# Regulation Overview

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## ENERGY VALUATION INSIGHTS

Updated weekly, the **Energy Valuation Insights Blog** presents issues important to the oil and gas industry.

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The oil and gas industry is heavily regulated by the Environmental Protection Agency (EPA), the Federal Energy Regulatory Commission (FERC), Bureau of Land Management (BLM), and the Department of the Interior (DOI). Given the new administration, there is much to consider.

On August 15, President Trump signed **an executive order** which aims to speed up the process for federal environmental reviews of energy and other infrastructure projects and holds agencies accountable if they fail to do so. Jack Gerard, President of the American Petroleum Institute (API), praised the order for its focus on speeding up projects, **saying**, “We also look forward to President Trump as he signs an executive order aimed at streamlining the permitting process for infrastructure projects.” **The API previously called for** significant improvements to be made to the permitting process.

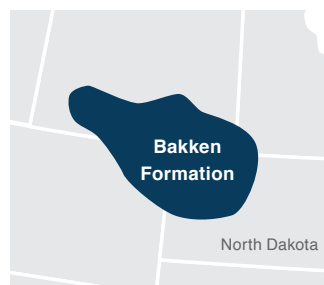
In August, **the Senate confirmed two appointees** to the Federal Energy Regulatory Commissions (FERC), **which is an independent agency** that regulates the interstate transmission of electricity, natural gas, and oil among other things. Prior to the appointments, the commission did not have quorum (the first time in its 40-year history), holding up projects worth \$50 billion in private capital **according to the Electric Reliability Coordinating Council**. FEER is now ready to address the backlog of projects.

Negotiations of NAFTA began in the third quarter of 2017 and remain unresolved. President Trump has indicated on multiple occasions that the U.S. could simply pull out of the agreement, which worries many in the oil and gas industry. The API, CAPP, and AMEXHI are the top trade groups in the United States, Canada, and Mexico, respectively, and they issued a **joint position paper** on August 2 hoping to keep current policies intact and “Do No Harm.” As early as 2020, North America could achieve energy self-sufficiency and has made significant strides since the agreement was signed 23 years ago. The paper goes on to claim that a change in trade agreements that reduces investment protections or increases tariffs or trade barriers could have a significant negative impact on the industry and risk tens of millions of jobs that depend on trade in North America.

Towards the end of the third quarter 2017, Congressional Republicans introduced the outlines of their plans for tax reform. In general the bill has the goal of reducing the corporate tax rate and simplifying the overall tax code. The energy industry will likely see aspects that are both good and bad. A corporate income tax rate decrease from 35% to 20% would be great news for the oil and gas industry. On the other hand simplifying the tax code will likely lead to a decrease in tax exemptions of **over \$4 billion for the industry**. The biggest of these, “intangible drilling costs,” or IDCs, could actually be expanded, with a provision in the reform that allows for the immediate expensing of new investments.

# Bakken Shale

## Overview



*The economics of oil and gas production varies by region. Mercer Capital focuses on trends in the Eagle Ford, Permian, Bakken, and Marcellus and Utica plays. The cost of producing oil and gas depends on the geological makeup of the reserve, depth of reserve, and cost to transport the raw crude to market. We can observe different costs in different regions depending on these factors. This quarter we take a closer look at the Bakken Shale.*

The Bakken and associated Three Forks formation is the largest continuous crude oil source in the U.S. Discovered in 1951, it remained largely unproductive until 2000 when technological advances such as hydraulic fracturing and horizontal drilling enabled economically viable production of its sizable reserves. The Bakken is primarily an oil producing region using unconventional drilling techniques. Underlying the Bakken shale layers is a more extensive, thicker shale play called the Three Forks. This layer is accessed using the same unconventional technique, and is estimated to hold a little over half the undiscovered, recoverable resources of the total Bakken/Three Forks petroleum system. The Bakken is one of the largest producers of oil in the U.S. but lags the Eagle Ford and the Permian.

When prices fell in mid-2014, many companies were forced to terminate operations in the Bakken because limited shipping options led to higher breakeven prices. However, the Bakken has seen significant improvement this year. Limited shipping options from the Upper Midwest created high transportation costs in the Bakken. However, according to *Bloomberg*, the North Dakota Access Pipeline, which has been in operation since June, has lowered **breakeven costs** in the Bakken from \$55 to \$52 per barrel. Additionally, in the past, an insufficient pipeline network led to lower realized wellhead prices in North Dakota because of the surplus of oil in the region. Continental, who is the largest operator in the Bakken, reported that the **Bakken Oil Differential to WTI** fell from \$8.26 per barrel in 2016 to \$5.54 over the last quarter. Continental Resources CEO, Harold G. Hamm, in the third quarter earnings call said, "I think it's fair to say the total **improvement in the last 12 months** in the Bakken has surprised many in the U.S. industry and the improvement in the last 36 months has surprised many in the entire world."

# Bakken Shale

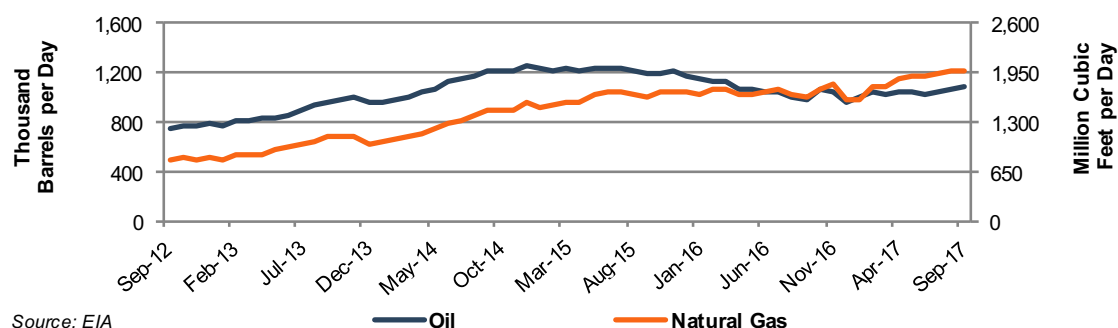
## Production

The EIA estimates of total production as the sum of new production from recently drilled wells and legacy production from existing wells. Legacy productions trends are dominated by depletion rates. Over the last year the change in legacy production has become even more negative.

Production of oil and natural gas in the Bakken has increased at a compound annual rate of 7.6% and 19.4%, respectively over the last five years. Currently nearly 12% of the U.S.' crude and 2% of the country's natural gas is coming from the Bakken region. On average, production per rig for oil in the Bakken leads both the Eagle Ford and Permian regions; it leads the Permian in natural gas as well, but Eagle Ford produces more than double the natural gas per rig than the Bakken. The top producers in the Bakken include Continental Resources, Whiting Petroleum Corporation, Marathon Oil Corporation, and Hess Corporation.

After a 16.9% decrease from September 2015 to September 2016, oil production in the Bakken for twelve months ended September 2017 rebounded by 9.8%. Production originally decreased after the collapse of oil prices when breakeven prices were higher than the price of oil. As the price of oil has stabilized around \$50 per barrel, production in the Bakken has picked up to many in the industry's surprise. For comparison, production in the Eagle Ford has only rebounded 1.7% over the previous twelve months ended September 2017 after declining 21.6% over the previous twelve months. The Permian has experienced growth in each of the past two years, with a 25.5% increase in the past year over a 5.5% increase the year before.

**Total Oil and Gas Production in the Bakken Shale**



Source: EIA

## Bakken Shale

### Guideline Public Company Valuation Multiples

As shown in Appendix B, valuation multiples for companies focused in the Bakken have historically been higher than companies operating in other domestic plays even as drilling in the Bakken became uneconomical after the crash in prices in mid-2014. Valuation multiples in the Permian, however, surpassed those of companies in the Bakken in mid-2013. Multiples in the two regions remained relatively in line until the end of 2016 when multiples in the Bakken remain flat and multiples in the Permian increased by almost 25%. Multiples in the Permian have remained higher ever since as companies moved out of other regions and relocated to the Permian which is thought to have better upside potential.

Valuation multiples in the Bakken reached \$83/boe in the fourth quarter of 2016 and have since fallen to \$62/boe. Multiples have decreased as enterprise values for companies operating in the Bakken fell by an average of 14% while average production increased by approximately 31%. The share price of companies operating in the Bakken have experienced recent volatility because the play was thought to be uneconomical after the collapse in oil prices but is now the coming back with significant production growth.



## Bakken Shale

### M&A Transaction Activity

M&A activity in the E&P sector generated approximately \$51.5 billion over the past nine months. The Permian Basin still remains the most active play for M&A activity in the U.S. with 42% of deal value derived from the play.

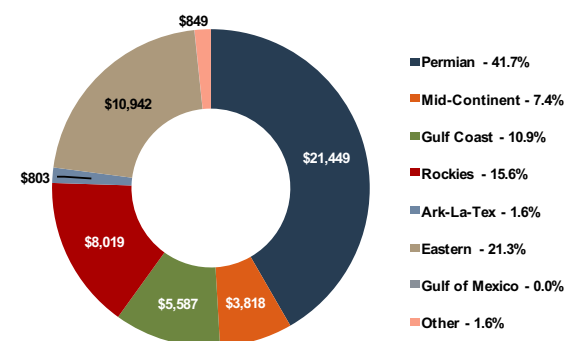
According to *1Derrick* the Permian Basin had the most M&A activity over the last nine months with 240 E&P mergers and acquisitions generating over \$21.4 billion in deal value. While there was \$8 billion of deal value generated in the Rocky Mountain region over the last nine months (which includes the Bakken/Williston Basin, DJ/Niobrara, and Wyoming's Powder River Basin and others in PADD 4), M&A activity in the Bakken was overshadowed by activity in the Permian. Acreage and production multiples in the Bakken were lower than the average multiples in the Permian.

**Halcon Resources** sold off the remainder of its Bakken assets in July making it a pure play Permian company. While this sale significantly shrunk the operations of the company, the transaction is thought to be the final step in the company's recovery from bankruptcy. This transaction demonstrates a significant trend that has dominated oil and gas M&A activity since the downturn. Companies are **rushing to the Permian** to acquire acreage while it is still available.

**Resource Energy Partners** acquired acreage previously owned by **Blue Ridge Mountain Resources**, which has helped push the company's interest to 384 wells in the Bakken region, 186 of which are currently operated. This is part of their acquisition-heavy strategy for the next several years in which they plan to **spend between \$25MM and \$500MM**. Resource Energy Partners bought this acreage at discounted multiples compared to other transactions which was likely due to the fact that Blue Ridge Mountain Resources was still in the process of restructuring post-bankruptcy.

### U.S. Announced Deal Value (as of YTD 9/30/2017)

(in \$millions)



Source: 1Derrick

## M&A Transaction Activity (continued)

**Crescent Point Energy Corporation** completed a relatively small deal of \$100 million, that had an enormous production multiple which begged for explanation. It seems that Crescent Point was paying for something other than current production; rather they were likely paying for proven undeveloped reserves (PUDs) which they will develop once the price of oil rises and production becomes more economical. **Crescent Points announced** that the assets acquired have approximately “50 net high-quality internally identified drilling locations” and approximately “\$250 million of future development opportunities.”

### Acreage Transactions in the Bakken

Announced Date	Buyer	Seller	Deal Value (\$MM)	\$ / Acre	\$ / Boepd
10/23/17	Not Disclosed	Linn Energy, Inc	\$285	\$14,250	\$35,625
9/20/17	Not Disclosed	Halcon Resources Corp	104	na	45,435
8/15/17	RimRock Oil & Gas	Whiting Petroleum Corp.	500	16,871	64,226
7/11/17	Bruin E&P Partners	Halcon Resources Corp	1,400	13,500	48,276
4/26/17	Resource Energy Partners LLC	Blue Ridge Mountain Resources Inc.	35	771	23,133
3/31/17	Crescent Point Energy Corp.	<i>Not Disclosed</i>	100	na	266,667
12/12/16	Bruin E&P Partners	Enerplus Corp	292	50,345	58,400
10/20/16	Pilgrim Petroleum Corporation	<i>Not Disclosed</i>	330	15,714	na
10/18/16	Oasis Petroleum Inc.	SM Energy Company	766	13,924	61,758
9/9/16	Resource Energy Partners LLC	Samson Resources Company	75	na	na
<b>Median</b>			<b>\$289</b>	<b>\$14,250</b>	<b>\$53,338</b>
<b>Average</b>			<b>\$389</b>	<b>\$17,911</b>	<b>\$75,440</b>

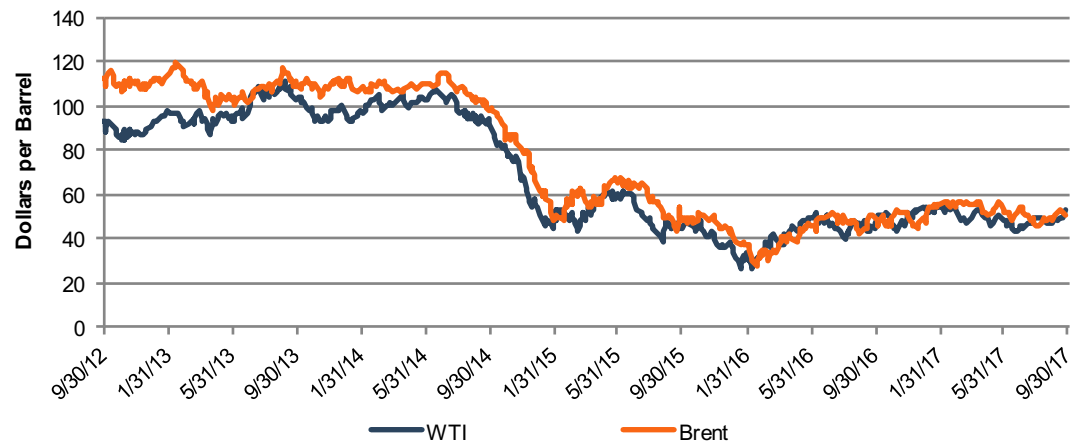
Source: Shale Experts

\* Does not include all transactions in the Bakken for the last twelve months ended 9/30/2017

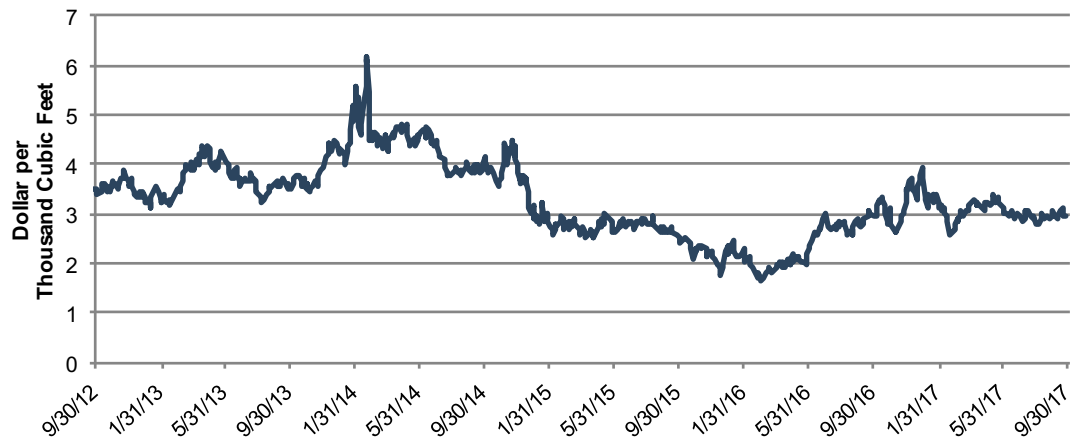
Appendix A

# Commodity Prices

Crude Oil Spot Prices



Henry Hub Natural Gas Spot Price



## Appendix B

## Selected Public Company Information

Mercer Capital tracks the performance of Exploration and Production companies across different mineral reserves in order to understand how the current pricing environment affects operators in each region. We created an index of seven groups to better understand performance trends across reserves and across the industry. The current pricing multiples of each company in the index is summarized below.

as of 9/30/2017									
Company Name	Ticker	LTM		EBITDAX Margin	Daily Production (MBOE/D)	Enterprise Value (\$MM)	YOY Change in EV	EV/ EBITDAX	EV/ Total Production
		Revenues (\$MM)	EBITDAX (\$MM)						
<b>Global Integrated</b>									
Exxon Mobil Corporation	XOM	222,508	31,898	14.3%	4,230	390,624	-4.6%	12x	92,339x
Statoil	STO	56,557	19,280	34.1%	2,122	76,831	13.4%	4x	36,210x
Shell Corporation	RDS/A	284,524	41,442	14.6%	na	325,157	13.3%	8x	na
Chevron Corporation	CVX	123,290	24,986	20.3%	2,803	259,179	11.1%	10x	92,476x
Occidental Petroleum Co.	OXY	11,804	4,593	38.9%	623	57,113	-6.2%	12x	91,675x
BP	BP	223,399	24,470	11.0%	na	168,134	15.6%	7x	na
<b>Average</b>		<b>153,680</b>	<b>24,445</b>	<b>22.2%</b>	<b>2,444</b>	<b>212,840</b>	<b>7.1%</b>	<b>9x</b>	<b>78,175x</b>
<b>Median</b>		<b>172,899</b>	<b>24,728</b>	<b>17.4%</b>	<b>2,462</b>	<b>213,656</b>	<b>12.2%</b>	<b>9x</b>	<b>92,007x</b>

Presented in \$000,000s, as of 9/30/2017  
Source: Bloomberg L.P.

### Notes on Select Public Companies

- Atlas Resources filed for bankruptcy in July 2016 and changed name to Titan Energy LLC when they emerged from Bankruptcy. Titan has not fully recovered.
- Lucas Energy was renamed Camber Energy (CEI) & bought assets in the Permian Basin. CEI is involved in litigation with Discover Growth Fund and is not operating normally.
- Vanguard Natural Resources filed for Bankruptcy in February 2017 and restructured in August 2017; it does not yet have a full year of financial information.
- Ultra Petroleum filed for Chapter 11 bankruptcy on April 29, 2016. They changed their ticker to UPL and are operating normally.
- Swift Energy emerged from bankruptcy on April 25, 2016 and changed its name to Silverbow Resources. It appears to be fully operational.
- Clayton Williams Energy was acquired by Noble Energy in April 2017 (we added Noble Energy to our group of global E&P companies).
- Stone Energy filed for bankruptcy in December 2016 and emerged midway through Q1 2017; they appear to be fully operational.
- REX Energy Group and USEG are trading below \$5 per share.
- Halcon Resources sold off its Bakken assets and is now a pure-play Permian company.

## Appendix B

## Selected Public Company Information

as of 9/30/2017

Company Name	Ticker	LTM		EBITDAX Margin	Daily Production (MBOE/D)	Enterprise Value (\$MM)	YOY Change in EV	EV/ EBITDAX	EV/ Total Production
		Revenues (\$MM)	EBITDAX (\$MM)						
<b>Global E&amp;P</b>									
Marathon Oil	MRO	4,390	2,270	51.7%	378	16,217	-13.4%	7x	42,889x
Hess Corporation	HES	5,251	(796)	-15.2%	336	20,963	-6.6%	nm	62,352x
ConocoPhillips Co.	COP	27,796	7,063	25.4%	1,218	72,517	-7.6%	10x	59,558x
Anadarko Petroleum Corp.	APC	11,434	5,593	48.9%	656	40,835	-18.8%	7x	62,240x
Noble Energy	NBL	4,030	215	5.3%	388	21,263	-2.6%	nm	54,832x
Apache Corp.	APA	5,672	3,819	67.3%	467	25,450	-23.4%	7x	54,549x
Murphy Oil	MUR	2,000	1,303	65.1%	168	6,514	-11.7%	5x	38,686x
<b>Average</b>		<b>3,831</b>	<b>1,399</b>	<b>33.2%</b>	<b>273</b>	<b>12,565</b>	<b>-8.2%</b>	<b>10x</b>	<b>42,393x</b>
<b>Median</b>		<b>1,735</b>	<b>878</b>	<b>37.8%</b>	<b>168</b>	<b>7,664</b>	<b>-11.7%</b>	<b>9x</b>	<b>42,889x</b>
<b>Other North American E&amp;P</b>									
Legacy Reserves	LGCY	417	107	25.6%	54	1,672	12.1%	16x	31,161x
EXCO Resources	XCO	288	nm	nm	na	1,302	-18.9%	nm	na
Ultra Petroleum Corp	UPL	875	nm	nm	142	4,022	na	nm	28,384x
EV Energy Partners	EVEP	224	(121)	-54.1%	30	614	-15.4%	nm	20,545x
Encana Corp.	ECA	4,063	1,534	37.8%	326	14,791	9.8%	10x	45,373x
Devon	DVN	12,613	3,745	29.7%	571	31,719	-12.6%	8x	55,551x
Contango Oil & Gas	MCF	80	nm	nm	10	208	-33.8%	nm	20,974x

Presented in \$000,000s, as of 9/30/2017  
Source: Bloomberg L.P.

## Appendix B

## Selected Public Company Information

as of 9/30/2017

Company Name	Ticker	LTM		EBITDAX Margin	Daily Production (MBOE/D)	Enterprise Value (\$MM)	YOY Change in EV	EV/ EBITDAX	EV/ Total Production
		Revenues (\$MM)	EBITDAX (\$MM)						
Stone Energy Corp	SGY	357	(188)	-52.5%	19	571	na	nm	30,235x
Bill Barrett Corp	BBG	254	147	58.1%	19	841	-3.7%	6x	43,442x
Denbury Resources Inc	DNR	990	291	29.3%	63	3,682	-13.8%	13x	58,867x
Bonanza Creek Energy Inc	BCEI	192	23	12.1%	na	643	na	28x	na
Enerplus	ERF	676	619	91.6%	88	2,645	29.6%	4x	29,920x
QEP Resources Inc	SXL	1,596	878	55.0%	134	3,304	-41.7%	4x	24,573x
Abraxas Petroleum Corp.	AXAS	79	40	50.8%	11	375	16.0%	9x	35,566x
WPX Energy	WPX	1,204	686	57.0%	128	7,664	11.8%	11x	60,077x
EQT	EQT	2,694	1,779	66.0%	452	17,560	3.9%	10x	38,849x
Chesapeake Energy	CHK	8,966	1,327	14.8%	569	15,724	-11.9%	12x	27,612x
Newfield Exploration	NFX	1,735	961	55.4%	164	7,919	-25.0%	8x	48,302x
Matador Resources	MTDR	467	274	58.7%	39	3,367	24.3%	12x	85,294x
Comstock Resources	CRK	231	nm	nm	43	1,158	5.4%	nm	26,819x
<b>Average</b>		<b>1,900</b>	<b>756</b>	<b>33.5%</b>	<b>159</b>	<b>5,989</b>	<b>-3.7%</b>	<b>11x</b>	<b>39,530x</b>
<b>Median</b>		<b>571</b>	<b>455</b>	<b>44.3%</b>	<b>75</b>	<b>2,974</b>	<b>-3.7%</b>	<b>10x</b>	<b>33,363x</b>

Presented in \$000,000s, as of 9/30/2017  
Source: Bloomberg L.P.

## Appendix B

## Selected Public Company Information

Focused E&P Companies (>50% of Production in region)

as of 9/30/2017

Company Name	Ticker	LTM		EBITDAX Margin	Daily Production (MBOE/D)	Enterprise Value (\$MM)	YOY Change in EV	EV/ EBITDAX	EV/ Total Production
		Revenues (\$MM)	EBITDAX (\$MM)						
<b>Bakken</b>									
Continental Resources	CLR	2,608	1,900	72.9%	263	21,091	-19.7%	11x	80,315x
Whiting Petroleum Corp	WLL	1,354	308	22.7%	129	4,930	-23.9%	16x	38,183x
Oasis Petro	OAS	1,068	570	53.4%	72	4,613	10.3%	8x	64,431x
Crescent Point Energy	CPG	2,815	1,740	61.8%	177	7,655	-23.7%	4x	43,212x
<b>Average</b>		<b>1,961</b>	<b>1,129</b>	<b>52.7%</b>	<b>160</b>	<b>9,572</b>	<b>-14.3%</b>	<b>10x</b>	<b>56,535x</b>
<b>Median</b>		<b>1,981</b>	<b>1,155</b>	<b>57.6%</b>	<b>153</b>	<b>6,293</b>	<b>-21.7%</b>	<b>10x</b>	<b>53,822x</b>
<b>Marcellus &amp; Utica</b>									
Range Resources	RRC	2,245	1,216	54.2%	366	8,837	-34.1%	7x	24,151x
Cabot Oil and Gas	COG	1,670	445	26.6%	320	13,383	2.8%	30x	41,764x
Rice Energy	RICE	1,481	834	56.3%	237	9,857	53.8%	12x	41,564x
Antero Resources Corp	AR	3,078	1,595	51.8%	417	11,496	-20.3%	7x	27,577x
Eclipse Resources Corp.	ECR	366	166	45.2%	61	1,122	-4.2%	7x	18,474x
Gulfport Energy	GPOR	986	502	50.9%	215	4,456	7.7%	9x	20,720x
Southwestern Energy Co	SWN	3,111	1,170	37.6%	436	8,283	-29.4%	7x	18,999x
<b>Average</b>		<b>1,848</b>	<b>847</b>	<b>46.1%</b>	<b>293</b>	<b>8,205</b>	<b>-3.4%</b>	<b>11x</b>	<b>27,607x</b>
<b>Median</b>		<b>1,670</b>	<b>834</b>	<b>50.9%</b>	<b>320</b>	<b>8,837</b>	<b>-4.2%</b>	<b>7x</b>	<b>24,151x</b>

Presented in \$000,000s, as of 9/30/2017  
Source: Bloomberg L.P.

## Appendix B

## Selected Public Company Information

Focused E&P Companies (>50% of Production in region)

as of 9/30/2017

Company Name	Ticker	LTM		EBITDAX Margin	Daily Production (MBOE/D)	Enterprise Value (\$MM)	YOY Change in EV	EV/ EBITDAX	EV/ Total Production
		Revenues (\$MM)	EBITDAX (\$MM)						
<b>Permian Basin</b>									
Concho Resources	CXO	2,500	2,272	90.9%	199	22,394	7.1%	10x	112,786x
Callon Petroleum Co	CPE	315	210	66.6%	29	2,875	12.1%	14x	99,581x
Parsley Energy	PEIX	812	563	69.3%	85	9,534	30.7%	17x	112,408x
Diamondback Energy	FANG	999	759	76.0%	89	11,527	40.8%	15x	130,150x
Earthstone Energy, Inc.	ESTE	87	nm	nm	11	710	289.0%	nm	67,589x
RSP Permian Inc	RSPP	676	nm	nm	65	6,918	49.0%	nm	105,627x
Halcon Resources Corp	HK	545	734	134.7%	11	849	-54.3%	nm	78,634x
Laredo Petroleum Inc.	LPI	827	421	50.9%	64	4,556	3.1%	11x	71,532x
Approach Resources Inc	AREX	102	51	49.6%	13	592	-7.2%	12x	46,741x
Ring Energy	REI	53	27	51.2%	7	744	62.8%	27x	112,324x
Pioneer Natural Resources Co.	PXD	5,595	1,728	30.9%	298	25,840	-19.5%	15x	86,681x
Cimarex Energy Co.	XEC	1,709	1,031	60.4%	199	11,894	-12.2%	12x	59,656x
Energren Corp	EGN	792	521	65.9%	84	6,080	6.6%	12x	72,778x
<b>Average</b>		<b>1,155</b>	<b>756</b>	<b>67.9%</b>	<b>89</b>	<b>8,040</b>	<b>31.4%</b>	<b>14x</b>	<b>88,961x</b>
<b>Median</b>		<b>792</b>	<b>563</b>	<b>65.9%</b>	<b>65</b>	<b>6,080</b>	<b>7.1%</b>	<b>13x</b>	<b>86,681x</b>

Presented in \$000,000s, as of 9/30/2017  
Source: Bloomberg L.P.



## Appendix B

## Selected Public Company Information

Focused E&P Companies (>50% of Production in region)

as of 9/30/2017

Company Name	Ticker	LTM		EBITDAX Margin	Daily Production (MBOE/D)	Enterprise Value (\$MM)	YOY Change in EV	EV/ EBITDAX	EV/ Total Production
		Revenues (\$MM)	EBITDAX (\$MM)						
<b>Eagle Ford</b>									
Carrizo Oil & Gas Inc.	CRZO	671	443	66.0%	65	3,091	-17.0%	7x	47,687x
Baytex Energy	BTE	810	11	1.4%	70	2,064	-9.6%	nm	29,542x
Sanchez Energy	SN	640	243	38.0%	83	2,605	16.6%	11x	31,385x
SM Energy (St. Mary Land & Exploration)	SM	1,267	308	24.3%	126	4,444	-15.6%	14x	35,194x
EOG Resources	EOG	10,205	4,223	41.4%	624	61,403	3.7%	15x	98,456x
SilverBow Resources	SBOW	178	95	53.1%	27	520	-7.4%	5x	19,243x
<b>Average</b>		<b>2,295</b>	<b>887</b>	<b>37.4%</b>	<b>166</b>	<b>12,355</b>	<b>-4.9%</b>	<b>10x</b>	<b>43,584x</b>
<b>Median</b>		<b>741</b>	<b>275</b>	<b>39.7%</b>	<b>76</b>	<b>2,848</b>	<b>-8.5%</b>	<b>11x</b>	<b>33,289x</b>

Presented in \$000,000s, as of 9/30/2017  
Source: Bloomberg L.P.

## Appendix B

## Selected Public Company Information

Focused E&P Companies (>50% of Production in region)

as of 9/30/2017

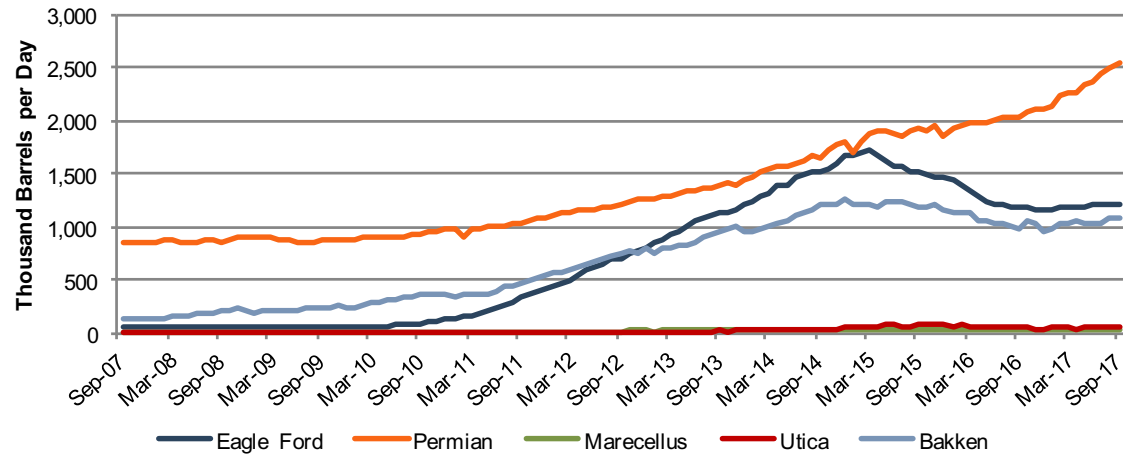
Company Name	Ticker	LTM		EBITDAX Margin	Daily Production (MBOE/D)	Enterprise Value (\$MM)	YOY Change in EV	EV/ EBITDAX	EV/ Total Production
		Revenues (\$MM)	EBITDAX (\$MM)						
<b>Focused E&amp;P</b>									
<b>Average</b>		<b>1,598</b>	<b>761</b>	<b>50.8%</b>	<b>152</b>	<b>8,421</b>	<b>13.9%</b>	<b>13x</b>	<b>60,479x</b>
<b>Median</b>		<b>906</b>	<b>512</b>	<b>51.0%</b>	<b>84</b>	<b>4,772</b>	<b>2.9%</b>	<b>12x</b>	<b>53,199x</b>
<b>E&amp;P</b>									
<b>Average</b>		<b>2,507</b>	<b>999</b>	<b>39.9%</b>	<b>198</b>	<b>9,287</b>	<b>1.5%</b>	<b>11x</b>	<b>48,461x</b>
<b>Median</b>		<b>990</b>	<b>595</b>	<b>50.2%</b>	<b>128</b>	<b>4,456</b>	<b>-7.2%</b>	<b>10x</b>	<b>42,889x</b>
<b>All</b>									
<b>Average</b>		<b>13,988</b>	<b>3,009</b>	<b>38.4%</b>	<b>321</b>	<b>24,747</b>	<b>2.0%</b>	<b>11x</b>	<b>50,089x</b>
<b>Median</b>		<b>1,068</b>	<b>686</b>	<b>43.3%</b>	<b>129</b>	<b>4,930</b>	<b>-4.6%</b>	<b>10x</b>	<b>42,889x</b>

Presented in \$000,000s, as of 9/30/2017  
Source: Bloomberg L.P.

Appendix C

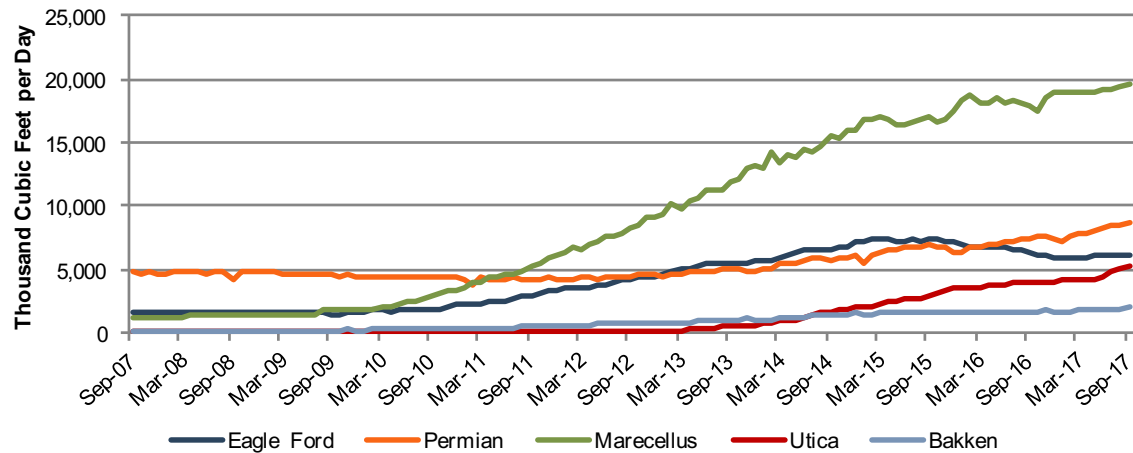
# Production by Region

**Crude Oil Production**



Source: EIA

**Natural Gas Production**

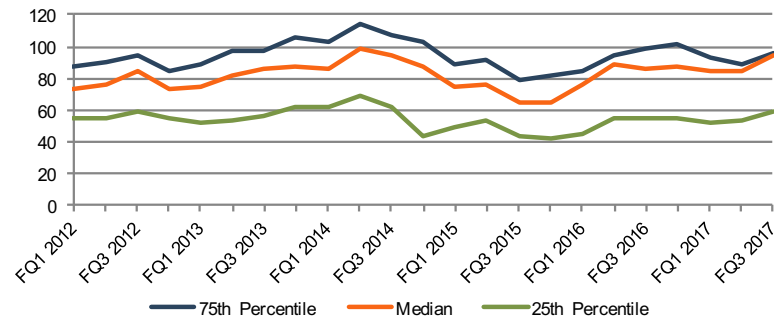


Source: EIA

## Appendix D

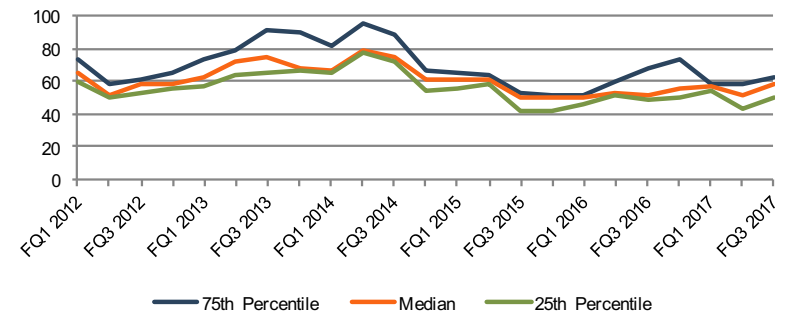
# Historical Valuations

**Global Integrated EV/Total Production**



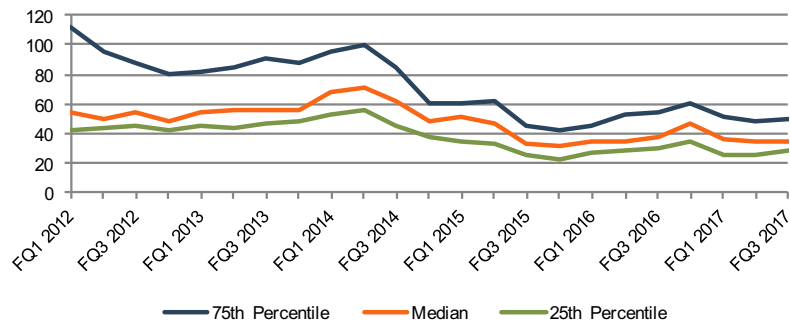
Source: Bloomberg L.P.

**Global E&P EV/Total Production**



Source: Bloomberg L.P.

**North American E&P EV/Total Production**

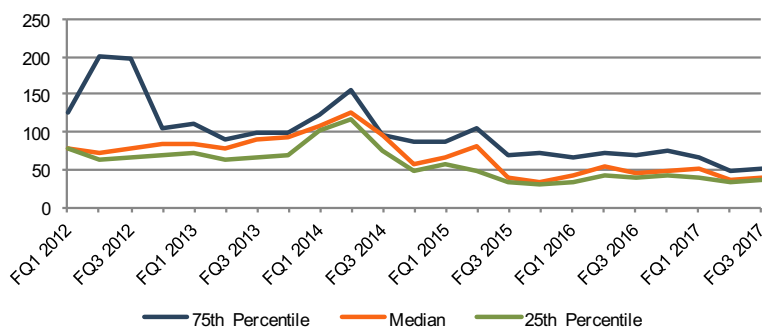


Source: Bloomberg L.P.

## Appendix D

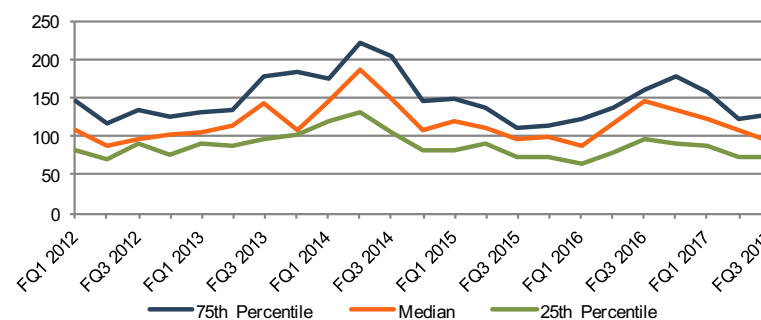
# Historical Valuations

**Eagle Ford EV/Total Production**



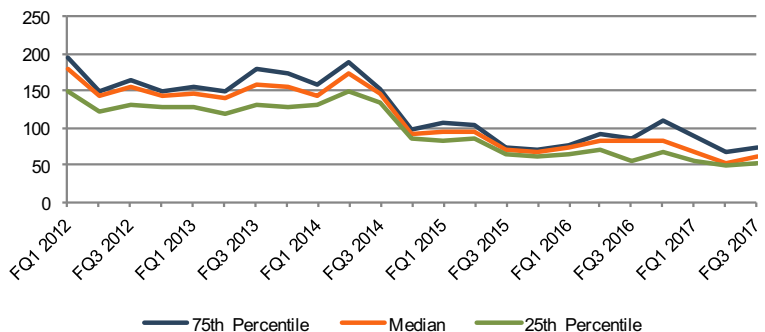
Source: Bloomberg L.P.

**Permian Rig EV/Total Production**



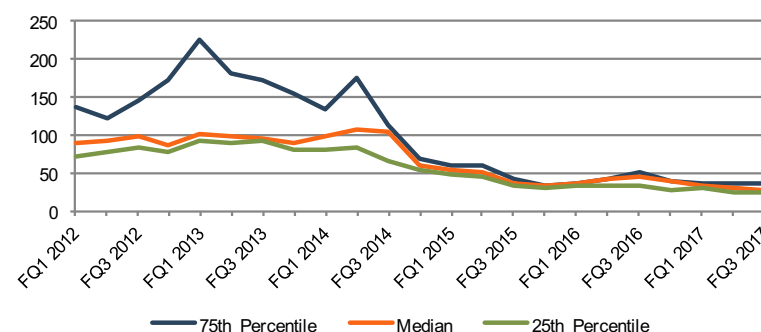
Source: Bloomberg L.P.

**Bakken Rig EV/Total Production**



Source: Bloomberg L.P.

**Marcellus & Utica EV/Total Production**



Source: Bloomberg L.P.

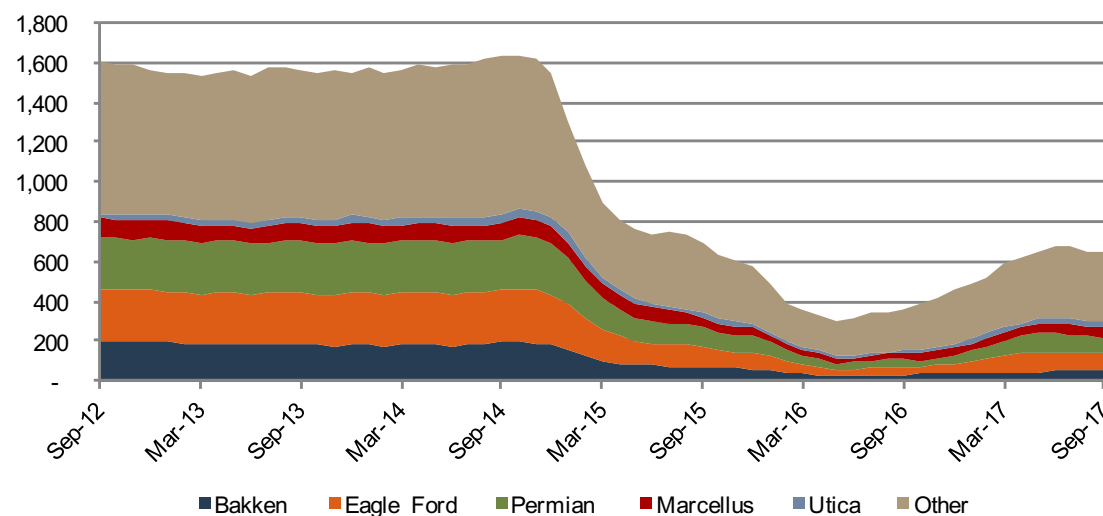
## Appendix E

# Rig Count

**Baker Hughes** collects and publishes information regarding active drilling rigs in the United States and internationally. The number of active rigs is a key indicator of demand for oilfield services & equipment. Factors influencing rig counts include energy prices, investment climate, technological changes, regulatory activity, weather, and seasonality.

The number of active rigs in the United States as of September 30, 2017, stood at 940, a 12% increase from September 2015, and an 80% increase from the same period in 2016. The increase reflects a pickup in drilling activity from the stabilization of oil prices around \$50/ bbl, enabling companies to increase drilling activities. The Bakken increased its activity in line with the total number of active rigs, but it is still down 25% from September 2015.

**Rig Count by Region**

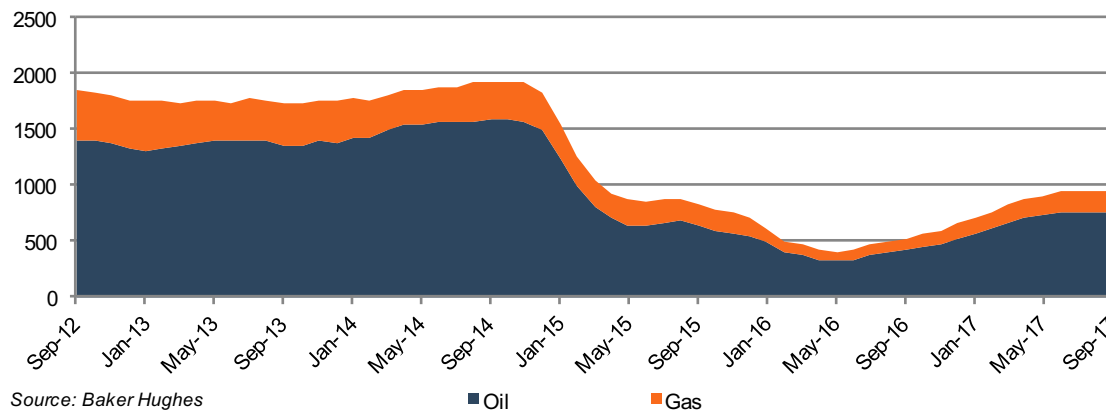


Source: Baker Hughes

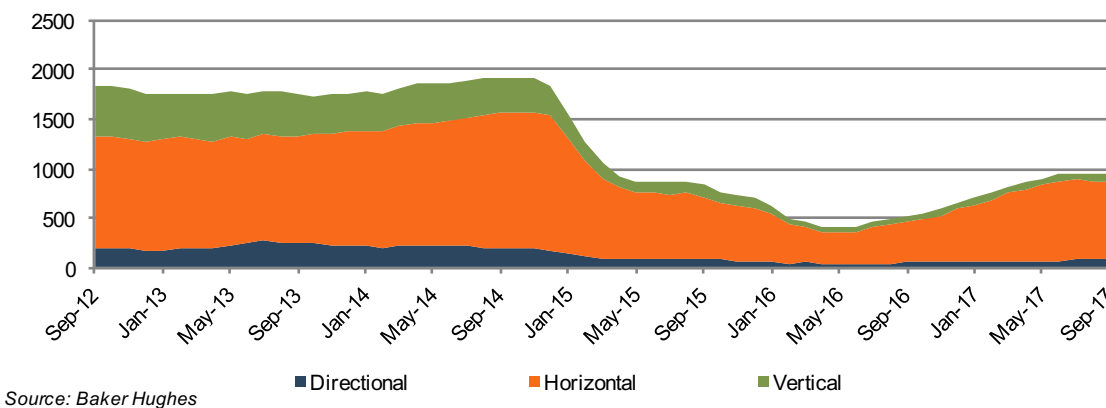
Appendix E

# Rig Count

**U.S. Rig Count by Oil vs. Natural Gas**



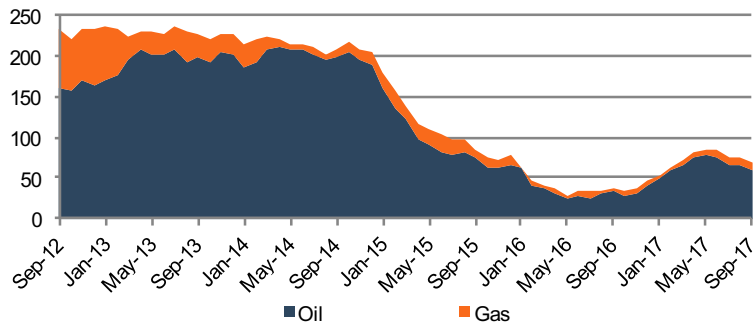
**U.S. Rig Count by Trajectory**



## Appendix E

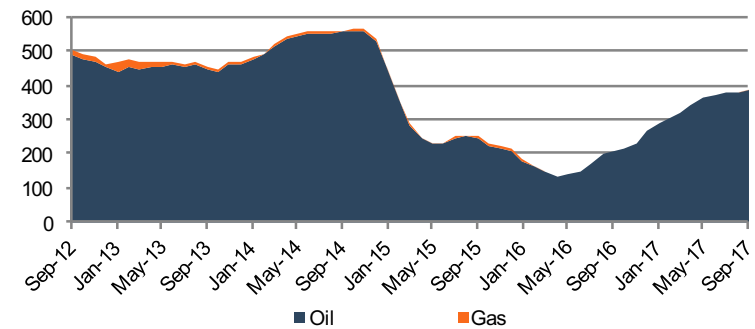
# Rig Count // Oil vs. Natural Gas

**Eagle Ford Rig Count by Oil vs. Natural Gas**



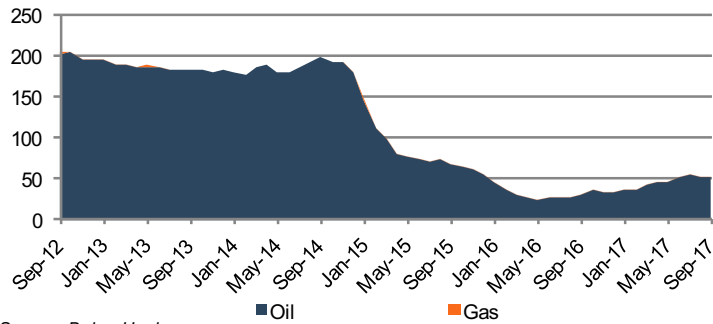
Source: Baker Hughes

**Permian Rig Count by Oil vs. Natural Gas**



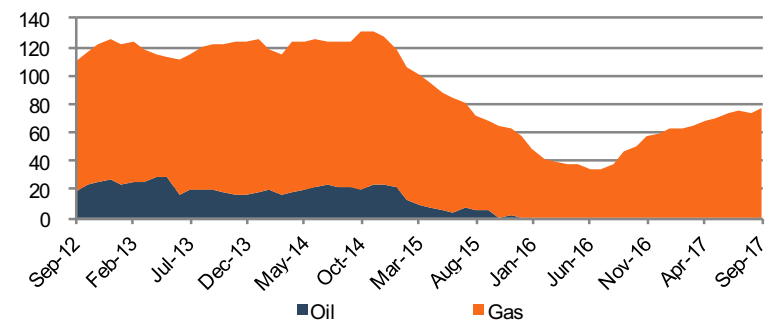
Source: Baker Hughes

**Bakken Rig Count by Oil vs. Natural Gas**



Source: Baker Hughes

**Marcellus & Utica Rig Count by Oil vs. Natural Gas**



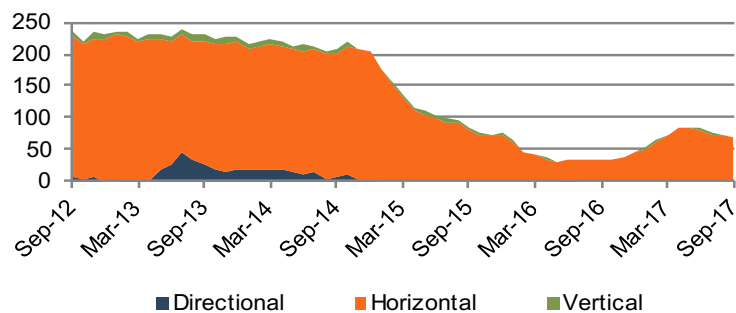
Source: Baker Hughes



## Appendix E

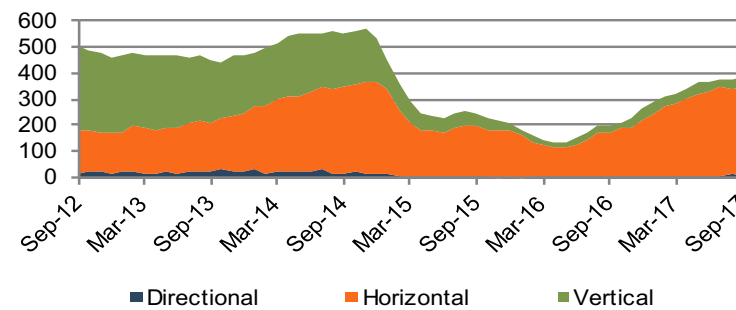
# Rig Count // Trajectory

**Eagle Ford Rig Count by Trajectory**



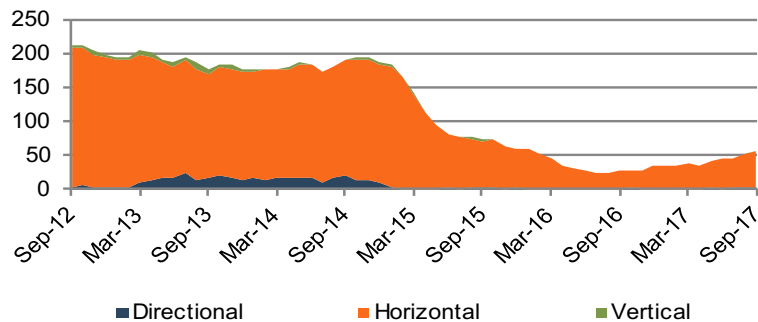
Source: Baker Hughes

**Permian Rig Count by Trajectory**



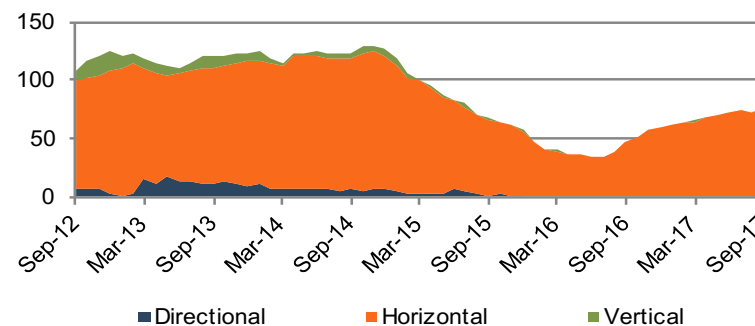
Source: Baker Hughes

**Bakken Rig Count by Trajectory**



Source: Baker Hughes

**Marcellus & Utica Rig Count by Trajectory**



Source: Baker Hughes



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