Chad Bourne – Engineer
Katherine McKenna – Engineer

Karthik Revana – Engineer
Ryan Long – Geotech

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# WEEKLY INDUSTRY UPDATE

### COVERING THE WEEK OF SEPTEMBER 10 – SEPTEMBER 17, 2018

## INDUSTRY METRICS - QUICK SNAPSHOT

| | Current | Last Week | WoW Change | % Change |
|---|---|---|---|---|
| Crude Oil Near-Month Price ($/bbl) | $68.99 | $67.75 | $1.24 | 1.83% |
| Natural Gas Near-Month Price ($/MMbtu) | $2.77 | $2.78 | ($0.01) | (0.36%) |
| Weekly Upstream-Deal Transaction Value ($MM) | $542 | $3,035 | ($2,494) | (82.16%) |
| Weekly Number of Upstream-Deal Transactions | 2 | 4 | (2) | (50.00%) |
| Current Total US Rig Count | 1,055 | 1,048 | 7 | 0.67% |
| US Field Crude Oil Production (MMbbl/day) | 10.9 | 11.0 | (0.1) | (0.91%) |
| US Field Dry Natural Gas Production (Bcf/day) | 83.2 | 82.8 | 0.4 | 0.48% |
| Commercial Crude Oil Stocks - Excluding SPR (MMbbl) | 396.2 | 401.5 | (5.3) | (1.32%) |
| Natural Gas Stocks - Working Gas Underground Storage (Bcf) | 2,636 | 2,568 | 68 | 2.65% |
| Total Drilled But Uncompleted Wells (DUC) | 8,269 | 8,031 | 238 | 2.96% |

## FRIDAY'S MARKET CLOSE

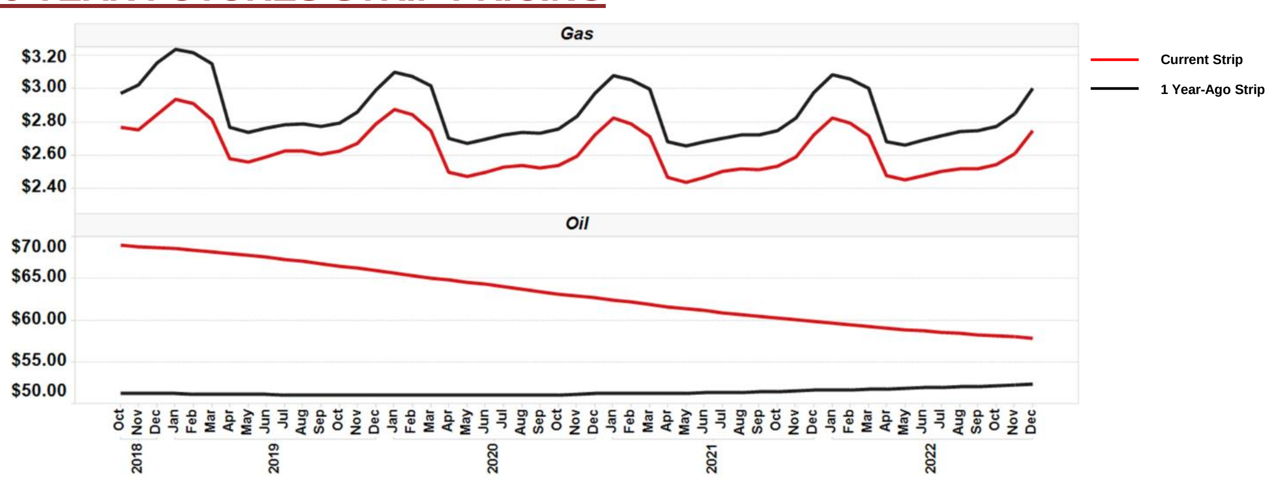
**NYMEX WTI CRUDE OIL FUTURES as of SEPTEMBER 14, 2018 CLOSE ($/bbl)**

| Period | Current | WoW Change | Last Week | 1 Yr Ago |
|---|---|---|---|---|
| 2018 | $ 68.81 | $ 1.25 | $ 67.56 | $ 51.20 |
| 2019 | $ 67.36 | $ 1.50 | $ 65.86 | $ 51.12 |
| 2020 | $ 64.13 | $ 1.54 | $ 62.59 | $ 51.08 |
| 2021 | $ 61.08 | $ 1.45 | $ 59.63 | $ 51.37 |
| 2022 | $ 58.70 | $ 1.32 | $ 57.38 | $ 51.97 |

**NYMEX HH NAT GAS FUTURES as of SEPTEMBER 14, 2018 CLOSE ($/MMBtu)**

| Period | Current | WoW Change | Last Week | 1 Yr Ago |
|---|---|---|---|---|
| 2018 | $ 2.79 | $ (0.02) | $ 2.81 | $ 3.05 |
| 2019 | $ 2.69 | $ (0.01) | $ 2.70 | $ 2.90 |
| 2020 | $ 2.61 | $ 0.01 | $ 2.60 | $ 2.83 |
| 2021 | $ 2.59 | $ 0.03 | $ 2.56 | $ 2.82 |
| 2022 | $ 2.60 | $ 0.04 | $ 2.56 | $ 2.83 |

## NYMEX 5 YEAR FUTURES STRIP PRICING




*Source – CME Group / Baker Hughes North America Rotary Rig Count / Energy Information Administration, United States (EIA)



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## RIG ACTIVITY BY US REGION

| Major Basin Variances | This Week | +/- | Last Week | +/- | Year Ago |
|---|---|---|---|---|---|
| Ardmore Woodford | 2 | 0 | 2 | 0 | 2 |
| Arkoma Woodford | 7 | 0 | 7 | -1 | 8 |
| Barnett | 2 | 0 | 2 | -5 | 7 |
| Cana Woodford | 66 | 0 | 66 | 2 | 64 |
| DJ-Niobrara | 27 | 2 | 25 | -1 | 28 |
| Eagle Ford | 78 | 0 | 78 | 7 | 71 |
| Granite Wash | 13 | 0 | 13 | -2 | 15 |
| Haynesville | 48 | 0 | 48 | 2 | 46 |
| Marcellus | 55 | 2 | 53 | 8 | 47 |
| Mississippian | 4 | 1 | 3 | 0 | 4 |
| Permian | 483 | -1 | 484 | 103 | 380 |
| Utica | 22 | 0 | 22 | -8 | 30 |
| Williston | 54 | 1 | 53 | 2 | 52 |
| LAND (INC OTHERS) | 1,030 | 4 | 1,026 | 115 | 915 |
| INLAND WATERS | 5 | 2 | 3 | 1 | 4 |
| OFFSHORE | 20 | 1 | 19 | 3 | 17 |
| US TOTAL | 1,055 | 7 | 1,048 | 119 | 936 |

| U.S. Breakout Information | This Week | +/- | Last Week | +/- | Year Ago |
|---|---|---|---|---|---|
| Oil | 867 | 7 | 860 | 118 | 749 |
| Gas | 186 | 0 | 186 | 0 | 186 |
| Miscellaneous | 2 | 0 | 2 | 1 | 1 |
| | | | | | |
| Directional | 71 | 6 | 65 | -3 | 74 |
| Horizontal | 921 | 3 | 918 | 126 | 795 |
| Vertical | 63 | -2 | 65 | -4 | 67 |

**Source – Baker Hughes North America Rotary Rig Count*



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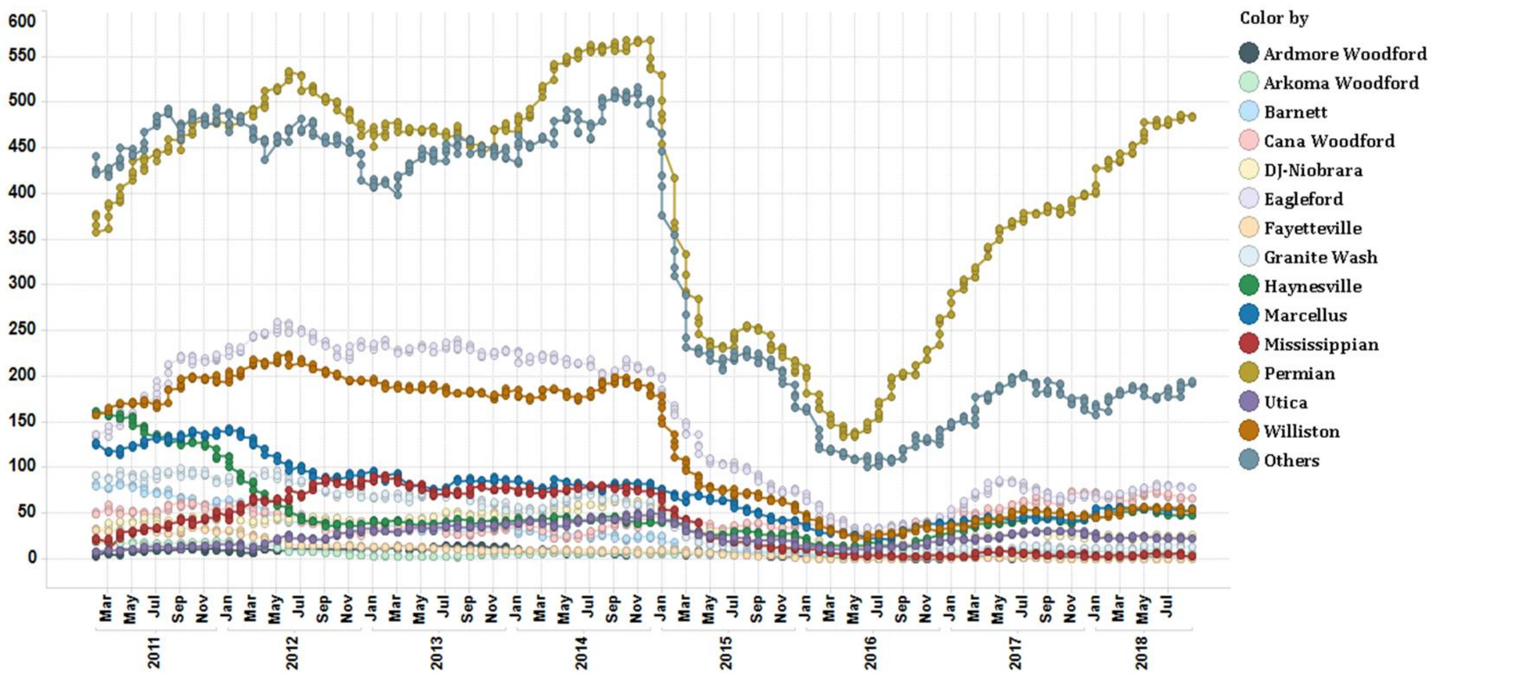
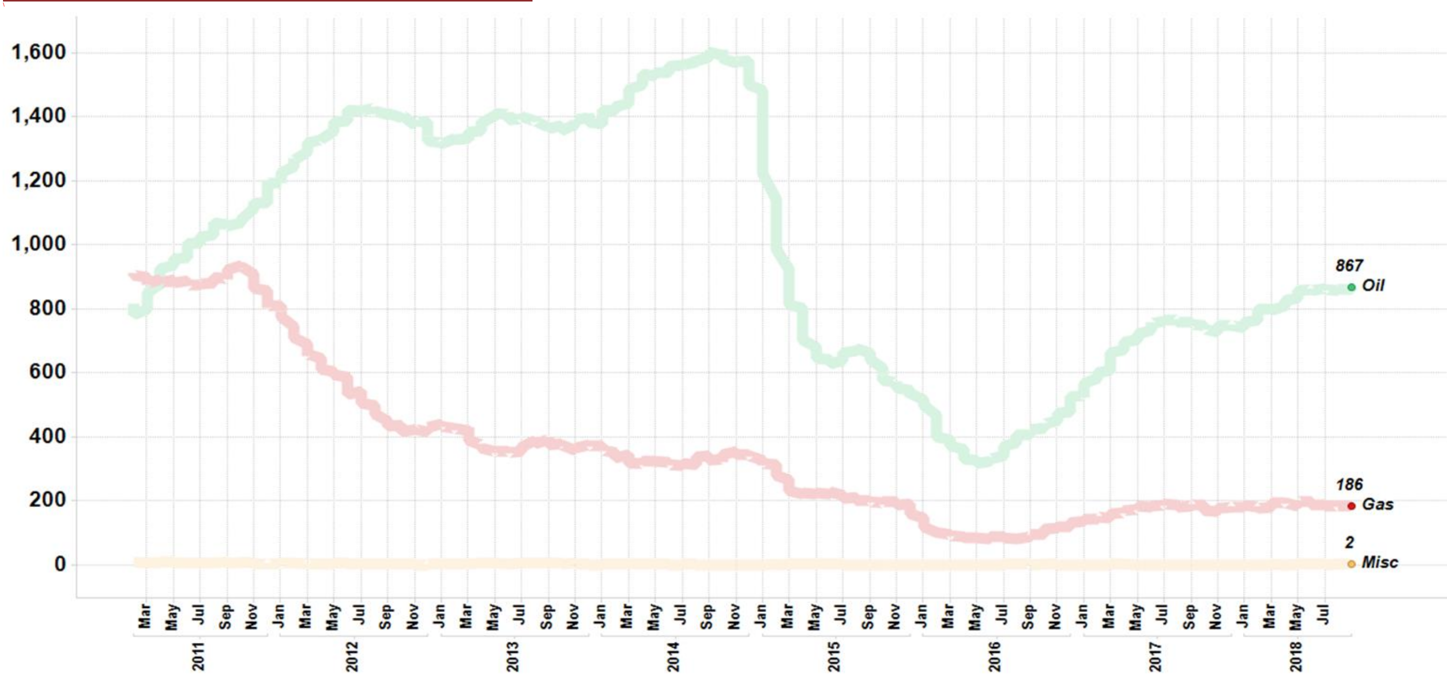
## TOTAL US RIG COUNT BY US REGION




## US RIG COUNT BY PRODUCT




**Source – Baker Hughes North America Rotary Rig Count*



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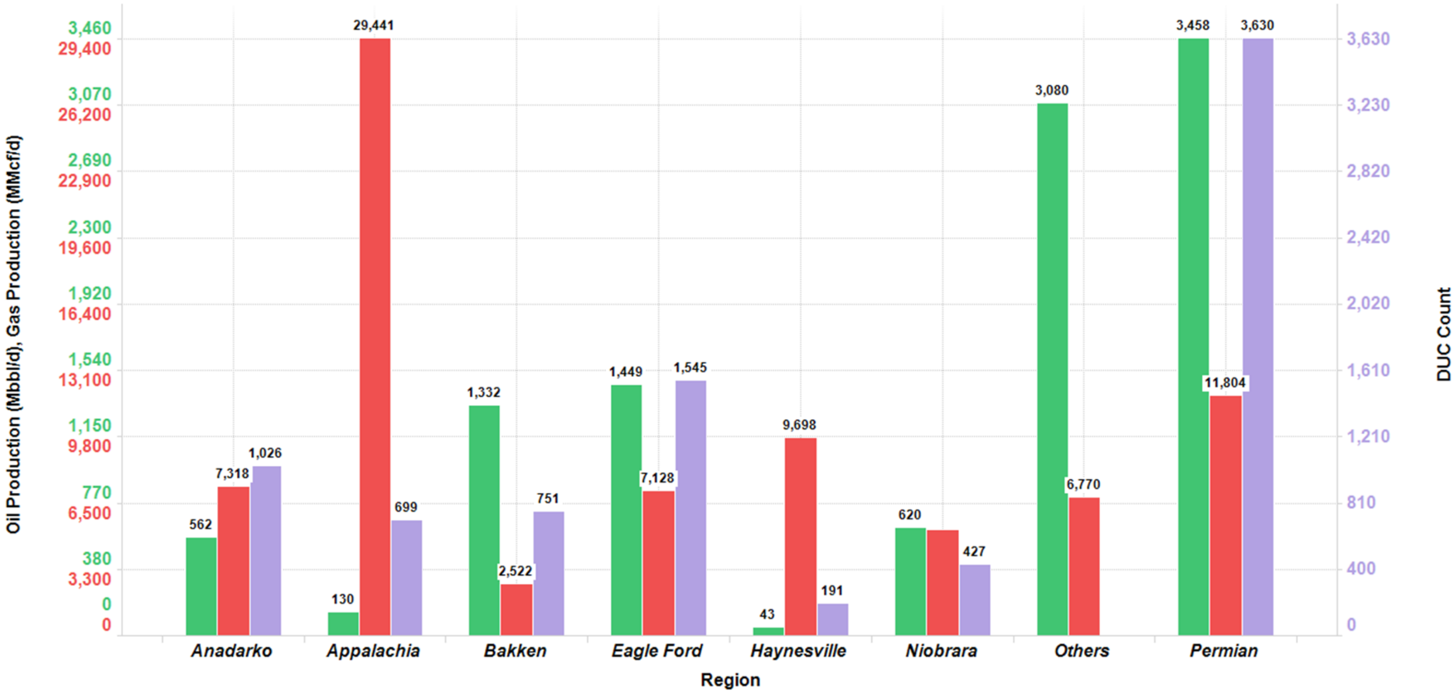
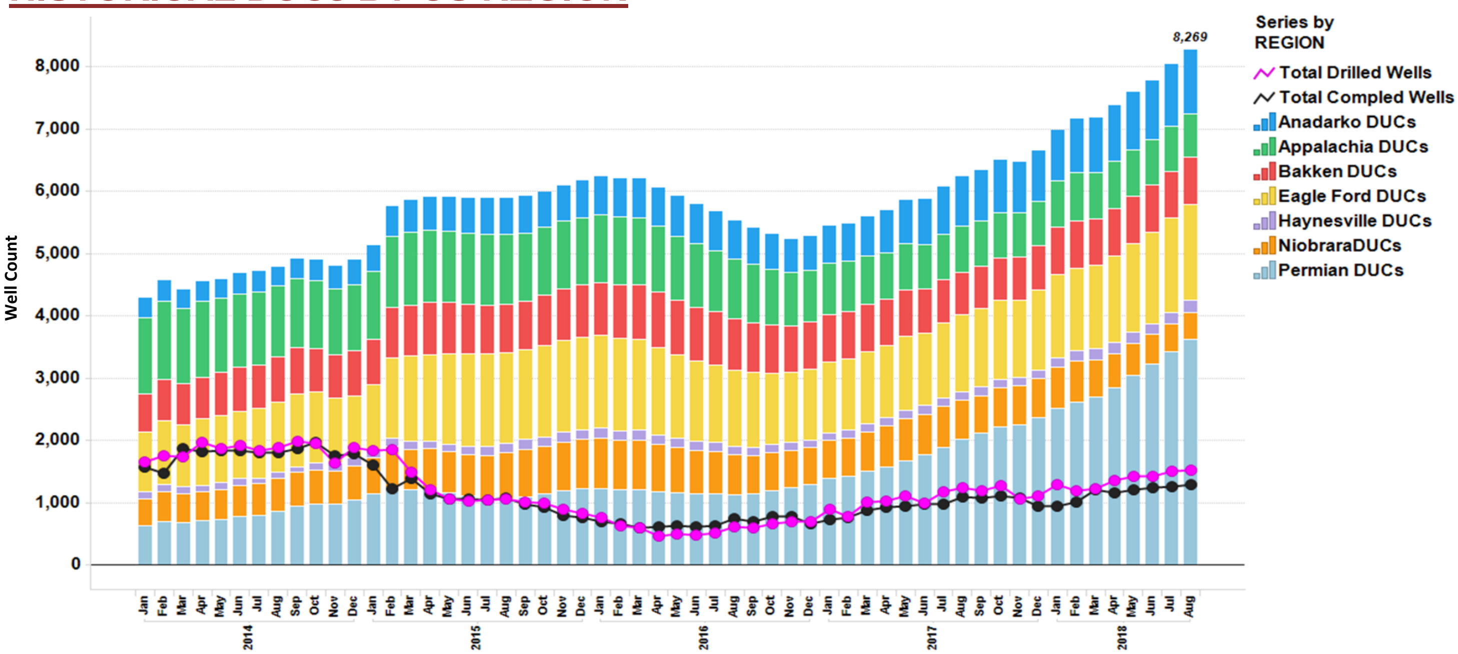
## PRODUCTION & DUCs BY US REGION (1)




(1) 'Others' Region (includes Federal Offshore) is the difference between total daily US crude oil and natural gas production and the summation of the major US shale regions production

## HISTORICAL DUCs BY US REGION




*Source – Energy Information Administration, United States (EIA)



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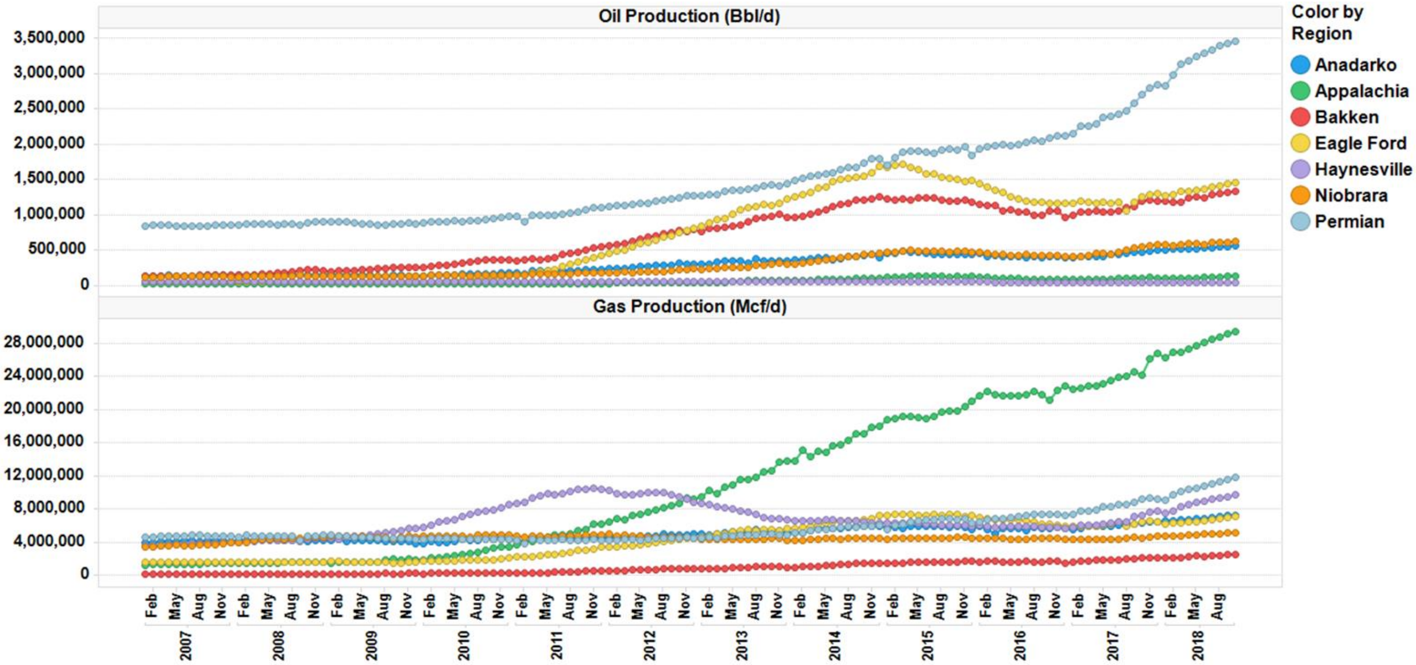
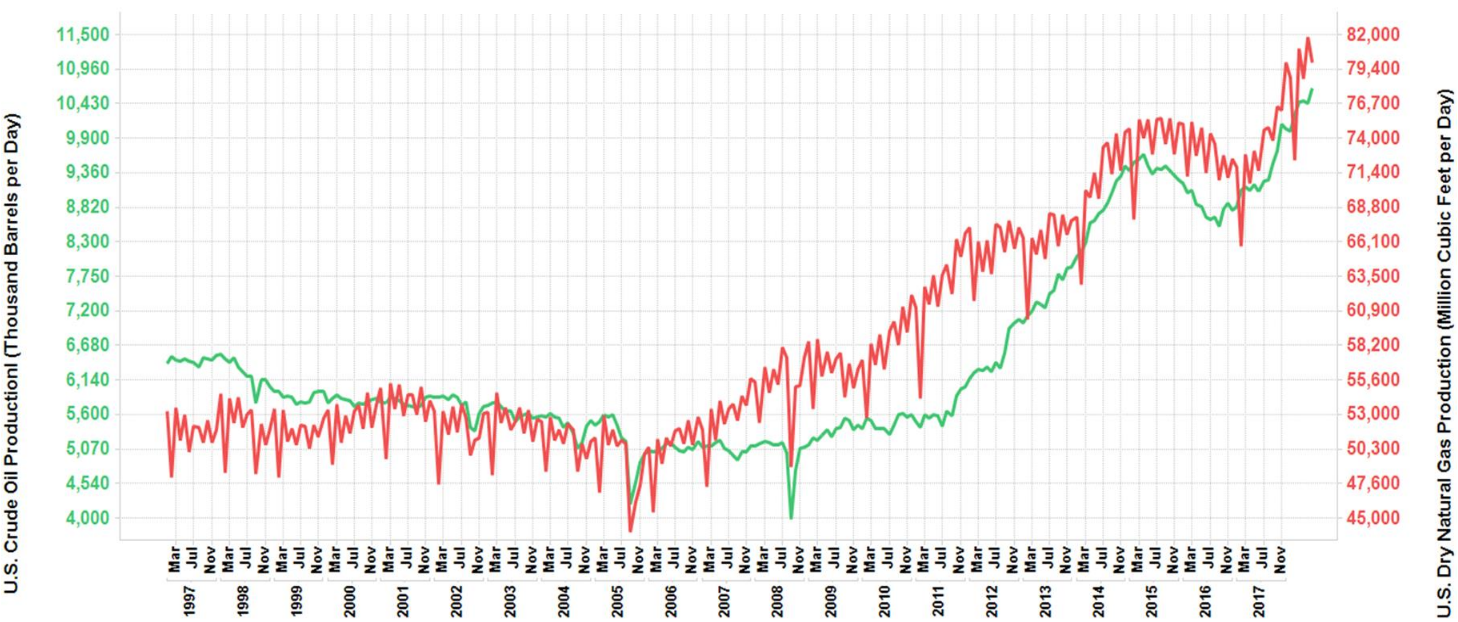
## HISTORICAL PRODUCTION BY US REGION




## US DAILY CRUDE (MBBL) AND DRY NATURAL GAS PRODUCTION (MMCF) (2)




*(2) Official historical monthly field production (average per day units) for crude oil and dry natural gas per EIA as of 5/31/2018, assuming an average of 30.44 days in a month*

**Source – Energy Information Administration, United States (EIA)*

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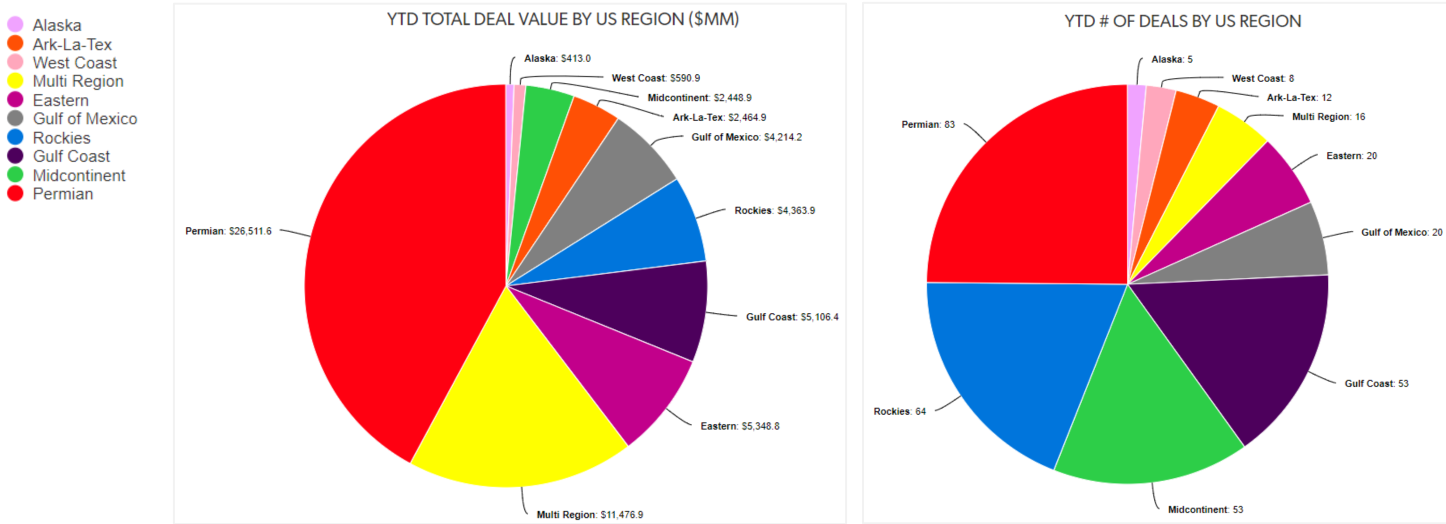
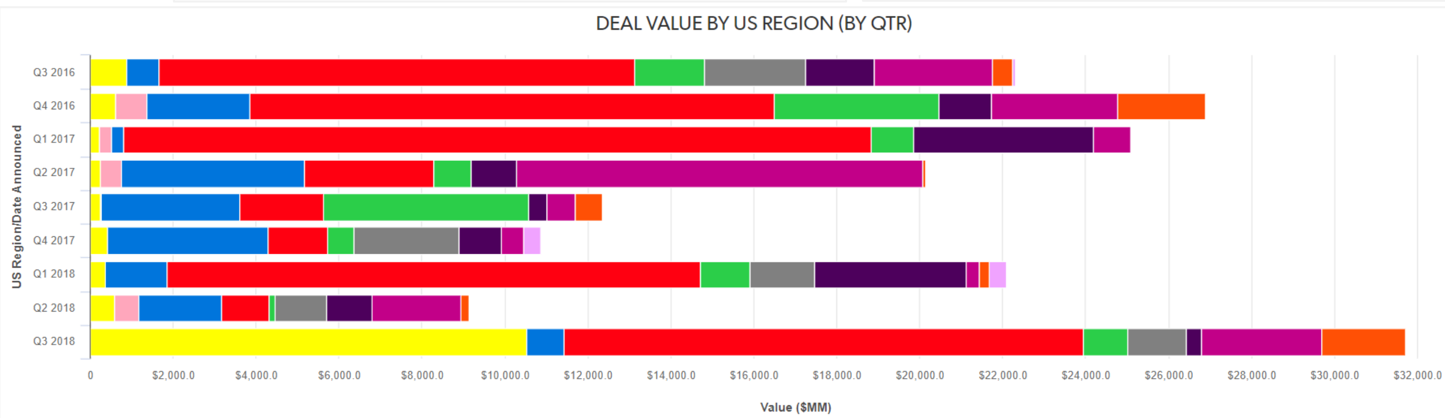
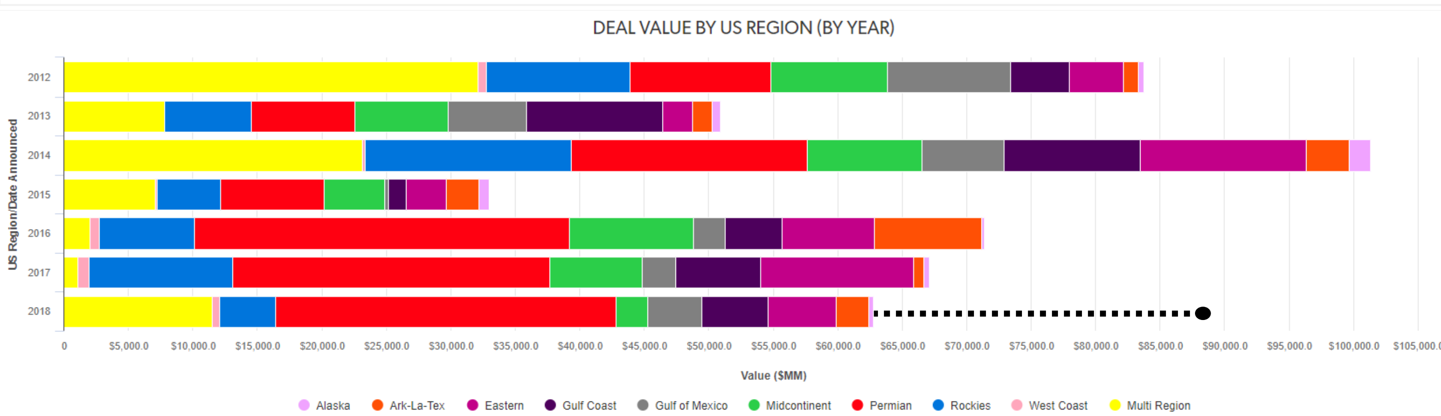
# UPSTREAM YEAR-TO-DATE TRANSACTIONS BY US REGION




***Projected Annualized Total Deals Value for 2018 @ Current Weekly Rate***

**Source – PLS M&A Database*

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## UPSTREAM ACQUISITIONS & DIVESTITURES – LATEST US DEALS

- **Vanguard Natural Resources sells Arkoma Basin and DJ Basin assets ($14.5MM)**
- **The Carlyle Group signs Delaware Basin Drillcos with Diamondback ($527MM)**

## LATEST INDUSTRY NEWS

***Large Drop in US Oil Inventories Helps Push WTI up ~2%***

The WTI front month contract rose $1.24/bbl last week to settle at $68.99/bbl on Friday, Sept. 14. Monthly reports by the IEA and EIA as well as US/China trade tensions and upcoming sanctions on Iran affected the market. On Monday Sept. 10, WTI fell 21 cents to settle below the 100-day closing average at $67.54/bbl. Pulling the market downward, the US indicated it would be willing to tax all Chinese imports, igniting further trade war fears. On the price support end, South Korea became the first of Iran's top three customers to cut oil purchases to zero ahead of the early November deadline. Iran's exports are projected to fall to 1.5 MMbo/d from 2.3 MMbo/d in June, according to sources in the Iranian regime. There are concerns that Saudi Arabia and Russia may not be able to replace the lost volumes as they are already trying to cover deficits of other members of the Vienna Agreement such as Libya and Venezuela. Libya's production returned to nearly 1.0 MMbo/d in August but an attack by militants on the National Oil Company's headquarters that killed two people stoked fears that unrest could spread. On Tuesday, Sept. 11, WTI rose $1.71 to $69.25/bbl. The EIA released its short term energy outlook. US production rose 120,000 bo/d in July to 10.9 MMbo/d and is expected to average 10.7 MMbo/d for all of 2018.

The agency revised 2019 production figures down 200,000 bo/d to 11.5 MMbo/d, which would still be a record Also on Tuesday, Hurricane Florence's expected arrival in the Carolinas by the end of the week caused spikes in fuel prices. On Wednesday, Sept. 12, WTI jumped $1.12 to a seven-week high of $70.37/bbl. The EIA announced a 5.4 MMbbl drop in US crude inventories to 396.2 MMbbl for the week ended Sept. 7. Inventories are 3% below the five-year average for this time of the year and hadn't fallen below 400 MMbbl since Feb. 2015. Analysts surveyed by the Wall Street Journal had anticipated a 1.6 MMbbl drop in stocks. Crude inventories at Cushing fell 1.2 MMbbl and US crude imports rose 300,000 bo/d to 1.8 MMbo/d. Oil production was down 100,000 bo/d to 10.9 MMbo/d. Motor gasoline stocks rose 1.3 MMbbl (8% above the five-year) and distillate stocks jumped 6.2 MMbbl (3% below the five-year). On Thursday, the front month contract fell $1.78 to $68.59/bbl. In its monthly oil report the IEA said that OPEC production rose by 420,000 bo/d in August to 32.64 MMbo/d. The cartel's highest monthly increase in two years— and its nine-month high—was driven by a rebound in Libyan prodcution, near record Iraqi output and higher volumes from Nigeria and Saudi Arabia. But if Venezuelan and Iranian exports continue to fall, markets could tighten and oil prices could rise without offsetting production increases from elsewhere. Tanker data shows the IEA already seeing a 500,000 bo/d reduction in Iranian crude exports. The IEA's global demand growth outlook for 2018 is unchanged at 1.4 MMbo/d. In 2019 growth will accelerate slightly to 1.5 MMbo/d, but there are risks to the forecast because of escalating trade disputes and rising prices if supply is constrained. On Friday, Sept. 14, WTI settled up 40 cents to $68.99/bbl. The number of oil rigs running in the US rose by seven to 867, according to Baker Hughes.

**Source – PLS Quick Price*



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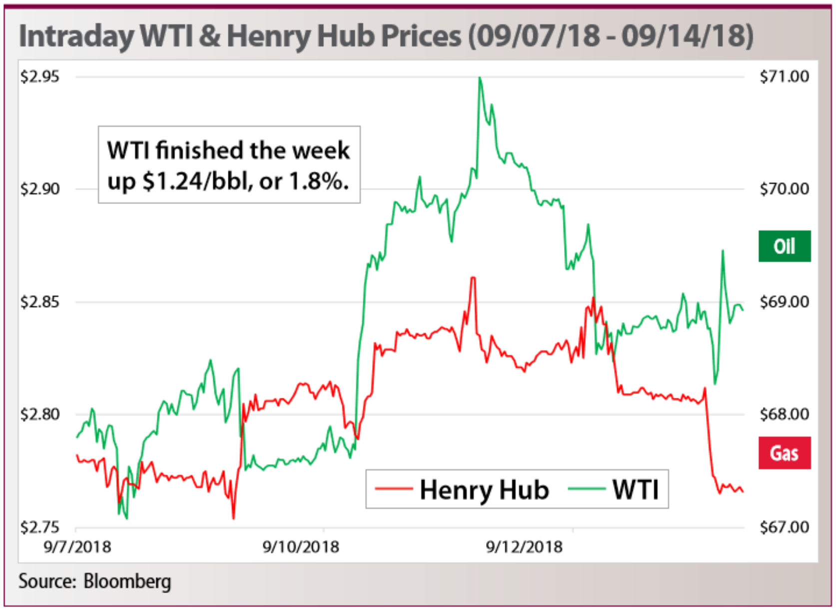


***Southwestern Buying Back $1.1 Billion in Debt & Equity***

Southwestern Energy Corp. launched a tender offer for $900 million aggregate principal amount of its debt on Sept. 4. First priority will be given to the company's 4.10% senior notes due 2022, then its 4.05% senior notes due 2020 and its 4.95% senior notes due 2025, all of which will have no sub-caps. The company placed $50 million subcaps on the other notes in the tender offer—7.50% senior notes due 2026 and 7.75% senior notes due 2027, which are fourth and fifth priority in terms of repurchase. The company will pay $950 per $1,000 face amount of the 2022 notes validly tendered and not withdrawn by the Oct. 1 offer deadline, $975 for each $1,000 of the 2020s and $960 for the 2025s. It is also offering $1,002.50 for each $1,000 of the 2026 notes and $1,010 for the 2027s. Holders who tender their notes by the Sept. 17 early tender deadline will receive an extra $50 premium for each $1,000 principal amount.

Concurrent with the tender offer, the Company is soliciting consents from the noteholders to change the indenture underlying the notes including the removal of certain covenants and events of defaults. Holders delivering consents must also tender their notes. The company will have pro forma debt of around $2.3 billion resulting from completing the tender offer and the $1.865 billion sale of its Fayetteville assets, also announced Sept. 4. In a definitive agreement with Flywheel Energy, LLC, backed by Kayne Private Energy Income Funds, it will sell 915,000 net acres, 4,033 operated producing wells, 3.7 Tcf of YE17 proved reserves, anticipated 2019 production of 225-230 Bcf and related midstream infrastructure and compression in the Fayetteville. The deal also includes the assumption of nearly $438 million of future contractual liabilities related to hedging. Southwestern said some of the proceeds would replace cash flow the Fayetteville assets may have generated for use in its liquids-rich assets in West Virginia, where it has seen rising activity. The Fayetteville sale will save the company $60-75 million in annualized interest and other costs. Southwestern said it is targeting a long-term sustainable debt/EBITDA ratio of 2x by 2020. The proceeds will also finance a $200 million common share repurchase plan, according to President and CEO Bill Way, who called the transaction a "significant milestone in advancing our strategic plan." Southwestern's NYSE-traded common shares closed at $5.34 on the day of the announcements, 5% above the $5.07 midpoint for its 52-week high/low of $6.72/$3.42. Two days later, the shares had given back 7% to the market at $4.97.

**Source – PLS Capital Markets*



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**Capitalize Upstream Public Equity Offerings YTD** PLS

| Date | Company | Description | Amount ($MM) | Net Proceeds ($MM) | Shares (MM) | Offer Price /Share |
|---|---|---|---|---|---|---|
| 8/16/18 | Carrizo Oil & Gas | Common Shares | $218.50 | $214.20 | 9.50 | $23.00 |
| 8/13/18 | Spartan Energy Acq.* | Common Shares | $480.00 | $253.60 | 48.00 | $10.00 |
| 8/2/18 | Viper Energy Partners | Common Units | $281.30 | $273.00 | 9.00 | $31.25 |
| 7/27/18 | Berry Petroleum Corp.* | Common Shares | $182.60 | $171.70 | 13.00 | $25.00 |
| 5/28/18 | Kimbell Royalty Partners | Ser. A Pfd | $110.00 | $107.80 | 0.10 | $1,000.00 |
| 5/25/18 | Callon Petroleum | Common Shares | $261.60 | $259.50 | 22.00 | $11.89 |
| 5/16/18 | Matador Resoources | Common Shares | $231.20 | $226.60 | 7.00 | $33.03 |
| 5/2/18 | PermRock Roy Tr | Common Shares | $106.25 | $95.00 | 6.25 | $17.00 |
| 4/19/18 | Torchlight Energy Res | Common Shares | $5.80 | $5.40 | 5.00 | $1.15 |
| 4/16/18 | Pure Acquisition* | Common Units | $360.00 | $352.80 | 36.00 | $10.00 |
| 4/6/18 | Northern Oil & Gas | Common Shares | $88.00 | $84.90 | 58.70 | $1.50 |
| 3/7/18 | Centennial Res Dev | Common Shares | $497.50 | $487.50 | 25.00 | $19.90 |
| 2/23/18 | Ring Energy Inc | Common Shares | $75.04 | $71.29 | 5.36 | $14.00 |
| 2/8/18 | Halcon Resources | Common Shares | $55.20 | $52.85 | 8.00 | $6.90 |
| 2/7/18 | Cal Resources | Common Shares | $51.05 | $50.00 | 2.34 | $21.78 |
| 1/30/18 | Lilis Energy | Conv. Pfd | $100.00 | $98.00 | 0.10 | $1,000.00 |
| | | | $3,104.04 | $2,804.14 | | |

*Initial public offerings
Source: Capitalize

***<u>Marathon Begins Offer for $3.375 Billion of Andeavor Debt</u>***

In anticipation of the combination of refining companies Marathon Petroleum Corp. and Andeavor Inc., the companies launched tender offers and consent solicitations related to Andeavor's $3.375 billion in long-term debt outstanding for the same amount of new notes to be issued by Marathon, and cash. A portion of the debt was issued prior to Tesoro Corp.'s $6.8 billion acquisition of Western Refining, Inc. in the summer of 2017, which resulted in the rebranding and name change to Andeavor. The tender offers cover six separate issues paying 3.8-5.375% in interest with maturities from 2022 to 2048. In all six cases, holders of the notes would receive $970 principal amount of new Marathon notes with identical maturities and interest rates and $1.00 in cash for each $1,000 face amount of Andeavor notes validly tendered. In addition, holders who tendered prior to the Sept. 12 early tender deadline received a premium of $30 payable in the new notes for each $1,000 face amount of the Andeavor notes. The regular tender deadline is Oct. 1.

In conjunction with the tender offers, Andeavor is soliciting consents to amend indentures underlying existing notes to eliminate some covenants, restrictive provisions and default events. The companies issued proxies to shareholders Aug. 3 for concurrent special meetings Sept. 24 in San Antonio and Findlay, Ohio, to approve the buyout. The Marathon proxy has proposals to increase its authorized shares to 2.0 billion from 1.0 billion, and to enlarge the board of directors to 14 members from the current 12. Marathon agreed to buy Andeavor on April 30 in a $35.6 billion deal that will create the largest US refiner. Under the definitive agreement, Marathon will pay Andeavor shareholders 1.87 shares of its stock, which closed at $81.43 a share on April 27, or $152.27 in cash for each of their shares, with the cash portion of the consideration prorated and capped at 15% of shares outstanding. The offer represents a 24.4% premium to Andeavor's prior-day close. The equity value of the deal amounts to $23.3 billion. Marathon and Andeavor shareholders will own about 66% and 34% of the combined company, respectively.

Separately, Marathon announced on Aug. 28 that it signed a new $5.0 billion revolving credit facility for five years and a $1.0 billion revolving credit agreement for 364 days. Joint lead arrangers and bookrunners for the facilities were JPMorgan Chase, Wells Fargo, Barclays, Citibank, Merrill Lynch, Mizuho, MUFG and RBC Capital Markets. Under terms of the new agreement, Marathon has an option to increase the aggregate commitments by up to $1.0 billion, subject to lender consent. It can also request up to two one-year extensions of the maturity date of the five-year facility. The new five-year facility includes a swing-line sub-facility for up to $250 million, and allows for letters of credit of up to $2.2 billion, which can be increased to $3.0 billion with additional commitments.

**Source – PLS Capital Markets*



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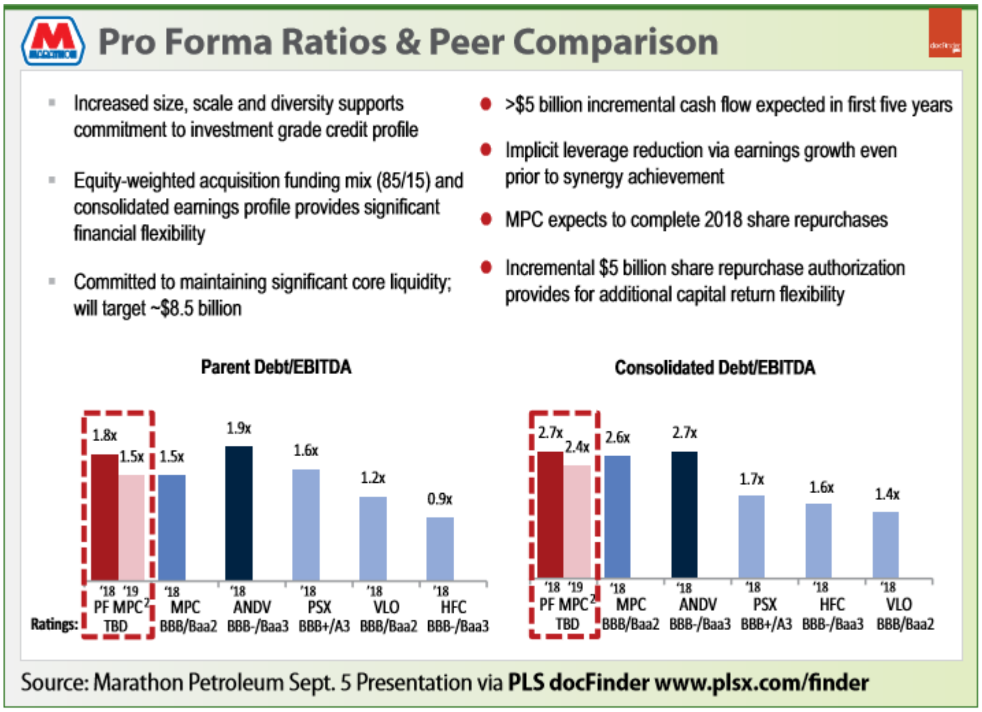


***OPEC Sees Need to Keep Oil Supply Deal as Demand Faces Headwinds***

OPEC needs to keep working with other oil producers to manage global supplies as demand for crude faces “headwinds,” the head of the organization said. The historic supply deal between Saudi Arabia, Russia and other producers reached in late 2016 needs to become permanent, Mohammad Barkindo, secretary-general of the Organization of Petroleum Exporting Countries, said Sunday in an interview in Dubai. Oil demand is “robust,” though crude use “is beginning to face some headwinds,” he said, without elaborating. “There is no viable alternative on the table other than to institutionalize and make this cooperation between ourselves and our good partners from non-OPEC in a permanent fashion,” Barkindo said. Low crude prices hit the oil industry and starved it of investment, leaving continued cooperation among producers as they only way to maintain stability in markets, he said. Crude is averaging about $72/bbl this year, and the International Energy Agency warned last week that prices could rise above $80/bbl unless producers make up for lost supply from OPEC members Iran and Venezuela. While trade disputes and financial woes in some emerging markets threaten to erode crude demand, the IEA, a watchdog of the industry, said that supply risks outweigh those concerns. Saudi Arabia and Russia led OPEC and allied producers in agreeing to cap output starting in January 2017 to curb a glut. They changed course in June and have since pledged to ensure that supplies are adequate to meet demand. A committee of OPEC members and allied producers is set to meet next week in Algeria to review compliance with their production targets, though it’s unclear whether the committee will try to enforce output quotas for individual countries. Khalid Al-Falih, the Saudi energy minister, and his Russian counterpart Alexander Novak met Saturday and “re-emphasized their joint commitment to ensuring the adequacy of oil supplies, especially considering market uncertainties on the horizon,” the Saudi energy ministry said Sunday in a statement. The ministers reviewed “the state of the global economy, oil demand and potential risks to supply,” according to the statement. Iran’s crude sales are falling as the U.S. prepares to restrict Tehran’s ability to sell oil and participate in global financial markets. Fellow OPEC-member Venezuela is pumping half as much oil as it did in 2016 and faces further declines amid economic upheaval. Russia is ready to boost production to record levels, should the market require it, Energy Minister Novak said last week. Saudi Arabia, which has never pumped more than 11 MMbpd, says it can produce at least 12 million. The kingdom is OPEC’s biggest producer and holds most of the group’s spare capacity.

**Source – World Oil*

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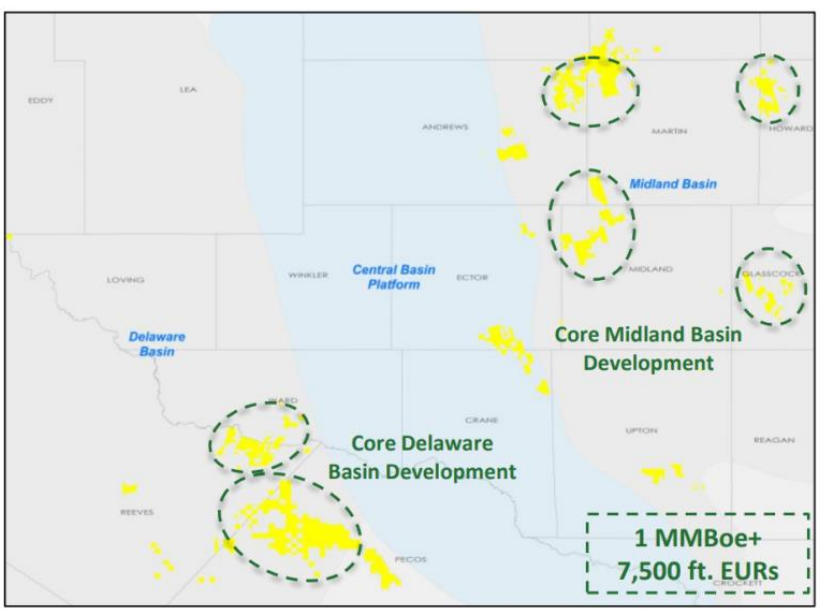
***Tale of Two Oil Markets: Brent Bulls Split from U.S. Optimists***

For oil investors, this is both the best of times and the worst of times, depending on which crude benchmark you trade. While money managers pile up on bets that Brent futures will rise as supplies from Iran shrink, even Hurricane Florence wasn't enough to get investors excited in the U.S. Bullish wagers on West Texas Intermediate fell for the eighth time in 10 weeks, and its discount to Brent is near the biggest gap in more than three years. The two markets are drifting apart as a pipeline crunch in the Permian Basin erodes profits for shale explorers. "You've got these Iranian sanctions that are looming. They're coming sooner than later. Global oil prices are likely to move higher," said Rob Thummel, managing director at Tortoise, which manages $16 billion in energy-related assets. At the same time, "the ability to export oil in general is limited in the U.S. and it's going to be for a while." While Hurricane Florence had traders initially worried about gasoline shortages, focus quickly reverted to how difficult it's become to ship crude from the Permian to the Gulf Coast for refining and export. That's forcing producers to sell their crude for less. At the same time, weekly U.S. crude production remains near a record 11 MMbpd, and the oil rig count rose by the most in five weeks as explorers boost drilling in other plays like the Bakken of North Dakota. Meanwhile, Iranian sanctions are already seen crimping global supply levels, with France and South Korea reducing imports. HSBC Holdings Plc said a Brent surge above $100/bbl can't be ruled out because scarce spare production capacity worldwide makes the market highly vulnerable to any further major outage. "This market was in the process of getting all bulled up again over the concrete signs we're seeing that countries are pulling back already from buying Iranian barrels," said John Kilduff, a partner at New York-based hedge fund Again Capital LLC. Hedge funds' net-long position -- the difference between bets on higher prices and wagers on a drop -- in Brent rose 5.6% to 440,074 contracts, ICE Futures Europe data show for the week ended Sept. 11. That's the highest level in two months. Longs rose, while shorts slid to the lowest since May. Meanwhile, the net-long position in WTI crude declined 5.1% to 346,327 futures and options, according to the U.S. Commodity Futures Trading Commission. Longs slid 5%, while shorts dipped 3.2%. A pipeline bottleneck in the Permian Basin of West Texas and New Mexico is restricting frack work and forcing producers to sell their crude at a large discount. Plans to build new lines and expand existing ones won't bring any reprieve until at least the second half of next year. The lingering question is "how much U.S. oil production can ramp up given the struggles of transportation coming out of the Permian," said Rob Haworth, who helps oversee $151 billion at U.S. Bank Wealth Management in Seattle.

***Diamondback Energy, Carlyle Group to Rendezvous in the Permian***

The Carlyle Group and Diamondback Energy are joining forces in the Permian. The two are forming a new JV to develop Permian assets held by Diamondback. The Carlyle Energy Mezzanine Opportunities Fund II will join with Diamondback to develop assets in the San Pedro area of Pecos County, where Diamondback owns significant acreage. The majority of Diamondback's Delaware acreage is in Pecos County, in large contiguous blocks. The San Pedro area is a block on the eastern edge of Diamondback's Delaware holdings, and is not one of the company's current focus areas.

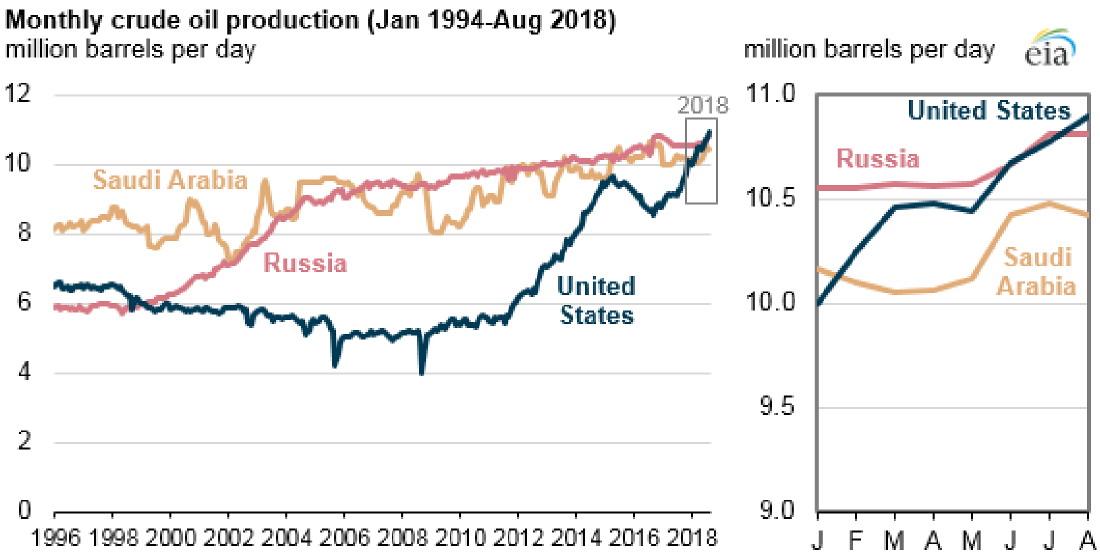



**Source – World Oil / Oil and Gas 360*

This JV likely does not target acreage that Diamondback acquired in its purchase of Energen last month, as Energen only holds a minor position in Pecos County. Carlyle will fund up to 85% for the development of the area over the next five years. After certain performance hurdles are achieved, Carlyle's interest will largely revert to Diamondback. The Carlyle Group was silent on further details, including the number and timeline of planned wells. The JV is a positive for Diamondback, as it provides an opportunity for the company to develop acreage it was not planning to target soon. Diamondback CEO Travis Stice commented on this potential, saying "This joint venture will allow Diamondback to bring forward present value on the southeastern portion of our Pecos County acreage, with added benefit to our minerals and midstream businesses. We look forward to our partnership with a group as well respected as The Carlyle Group."

***USA is Again the World's Largest Crude Producer: EIA***

The U.S. has, at long last, retaken the crown as the world's largest crude oil producer, surpassing Saudi Arabia and Russia. The EIA reports that preliminary numbers indicate U.S. crude output in August surpassed that of Russia, with the U.S. producing nearly 11 MMBOPD. This is the first time American oil production has exceeded that of Russia since February 1999. The U.S. surpassed Saudi oil output earlier this year, first producing more oil in February.




This is the most recent major global oil and gas production milestone the U.S. has achieved through the power of the shale revolution. The U.S. has produced world-leading volumes of natural gas since 2010 and is well above Russia in that category. The U.S. has also led the world in petroleum production, which includes crude oil, heavy oil, NGL, natural gas plant liquids and other liquids, since 2013. The U.S. produced a combined 30 MMBOEPD in 2017, and it is on track to significantly exceed this level in 2018.

The U.S. would likely have achieved this honor around 2016 if not for the downturn, which saw crude oil production in the U.S. fall by 1.13 MMBOPD from April 2015 through September 2016. Producers adapted to lower oil prices rapidly, however, and soon after prices bottomed out activity began another boom. After reaching as low as 8.52 MMBOPD in September, American oil output has roared to all-time highs. Preliminary data indicates the country is producing 10.75 MMBOPD, meaning oil output is currently growing even faster than it was before the downturn. Russian and Saudi Arabian production, on the other hand, have shown only gradual change over the past decade. Crude production in both countries have risen, with Russia showing a steady rise and Saudi output more variable. However, neither has compared to the rapid growth seen in the U.S. over the past decade. It is likely the U.S. will retain the crown of "world's largest oil producer" for the near future, as neither Russia or Saudi Arabia is expected to significantly increase output. While Russia could theoretically bring sufficient production back online to outproduce the U.S., the U.S.'s current growth rate means it would return to world's largest oil producer rapidly, likely within mere months.

**Source – Oil and Gas 360*



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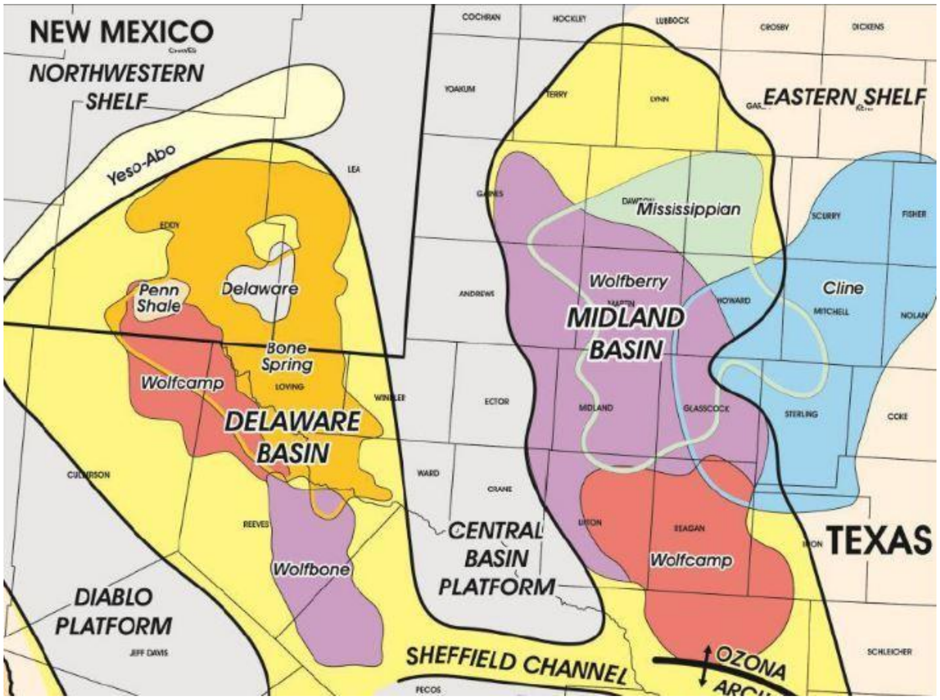
***NGL Energy Partners Adds Water Sources for Oil & Gas Operators in the Permian***

NGL Energy Partners LP has purchased another Permian Basin ranch, adding 9.6 million barrels of annual fresh water rights to its Permian Basin water portfolio. NGL said it bought the 36,000-acre Beckham Ranch, which sits atop the Carlsbad, Capitan, and Jal Water Basins located in southeastern Lea County. In July NGL bought the McCloy Ranch, located in Eddy and Lea Counties, New Mexico, which is 87,000 acres of land and an associated 2 million barrels of annual water rights.




NGL's available freshwater volumes in the Delaware Basin now exceed 30 million barrels annually. The partnership said the deal adds locations for 20 saltwater disposal wells and 11.6 million barrels of annual fresh water rights in New Mexico, potentially making it one of the largest midstream water infrastructure companies for oil and gas producers in the basin, the company said. Total cost of the acquisitions was approximately $93 million with an estimated full year run-rate Adjusted EBITDA contribution of $18 million, NGL said in a statement. NGL said it is developing multiple water pipelines, including the Lea County Express Pipeline that will originate in the area of the acquired ranches and transport produced water to certain NGL water disposal facilities in Texas and New Mexico. NGL currently operates 27 active saltwater disposal facilities with over 1 million barrels per day of disposal capacity and more than a dozen approved permits in the Delaware Basin. Earlier this year, the partnership announced the acquisition of 55 miles of pipeline rights-of-way from Pecos, Texas to the New Mexico State Line which it has earmarked for the Western Express Pipeline System in Reeves County, Texas, which includes wastewater transportation pipelines ranging from 16 to 24 inches in diameter, connecting 20 of NGL's Delaware Basin SWD facilities. This portion of the Western Express system consists of approximately 750,000 barrels per day of wastewater injection and disposal capacity. The Western Express Pipeline System is being expanded into New Mexico via two 24-inch pipelines from NGL's SWDs near Loving, New Mexico to the Texas State Line. The Western Express Pipeline System is expected to ultimately consist of more than 200 miles of gathering and transportation pipelines connecting over one million barrels per day of wastewater injection capacity spanning from Loving, New Mexico to Pecos, Texas.

***Weekly Oil Storage: Further Draw***

Crude oil stocks fell by 5,296 MBBL last week to 396,194 MBBL from 401,490 MBBL. This is 15% below the 468,241 MBBL that was in storage at this point last year, and is 3% below the five-year average. This week's draw exceeded expectations, as the average analyst prediction called for a draw of 1,580 MBBL. Gasoline inventories increased by 1.3 MMBBL this week to 235.9 MMBBL.

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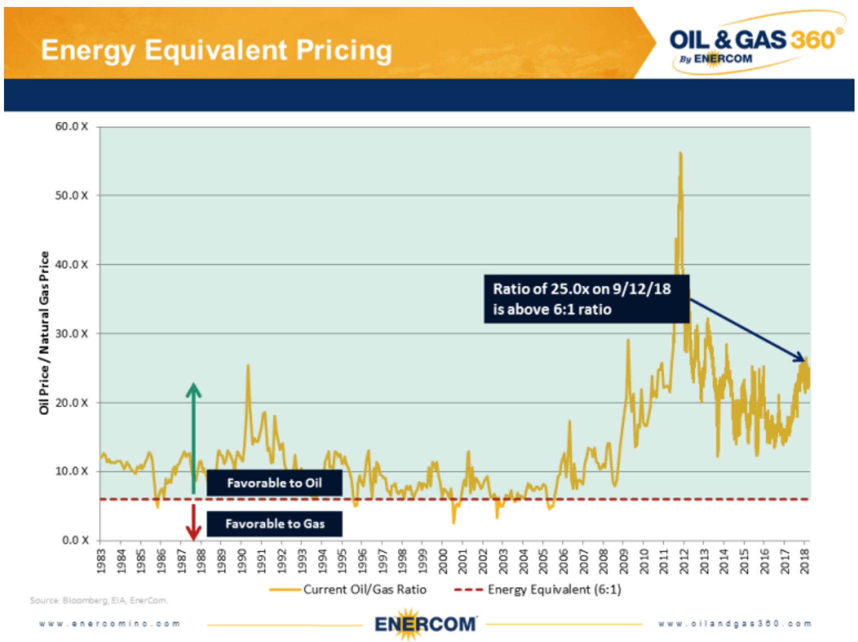
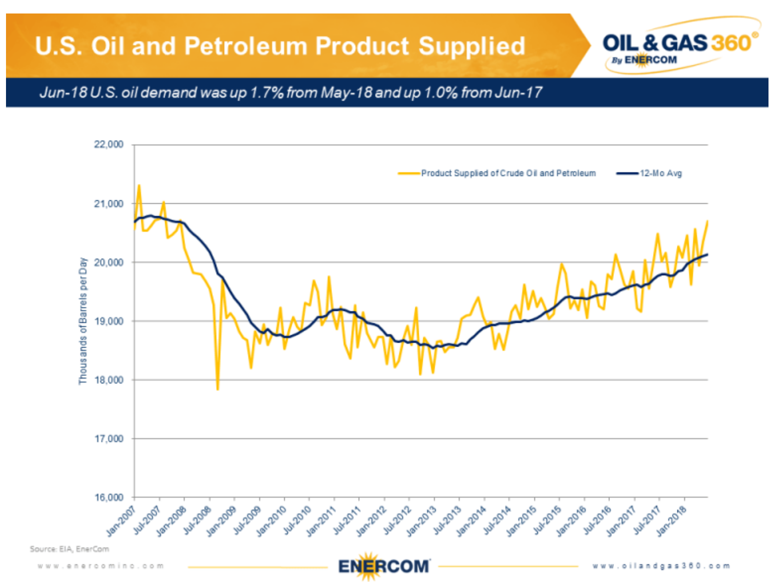
Fuel oil inventories rose by 6.2 MMBBL to 139.3 MMBBL. Overall, petroleum stocks excluding the SPR increased by 10.1 MMBBL to 1,236.7 MMBBL. Preliminary data suggests over the past four weeks the U.S. produced 10,975 MBOPD, imported 7,577 MBOPD and exported 1,568 MBOPD. The four-week average total crude oil inputs to refineries are 17,741 MBOPD. This means refineries are running at 97.1% of capacity. American refineries produced an average of 10,247 MBBLPD of gasoline and 5,395 MBBLPD of distillate fuel oil over the past four weeks.




**Source – Oil and Gas 360*

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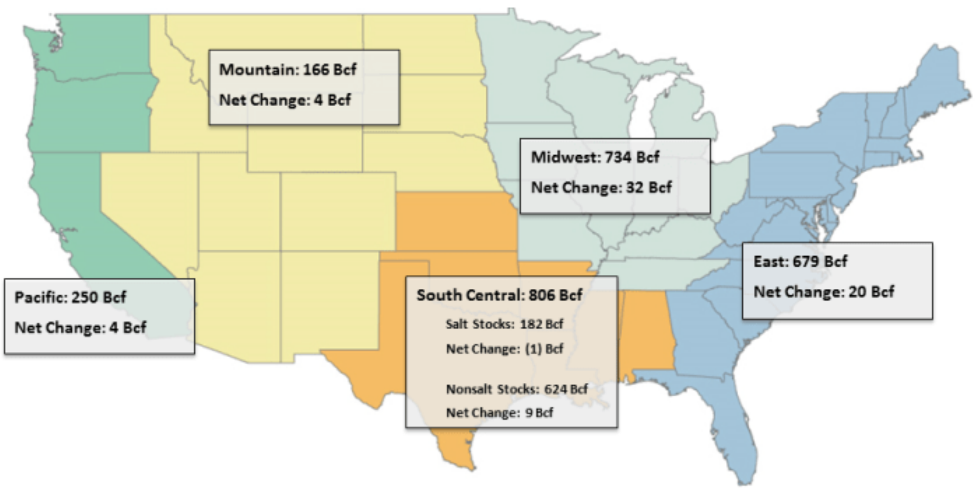
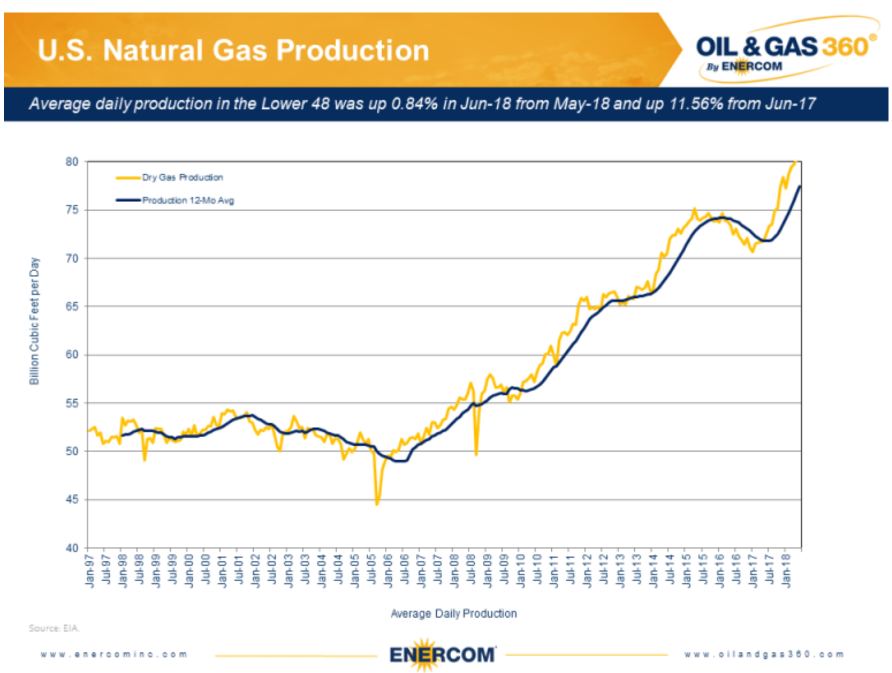
***Weekly Gas Storage: Steady Build Continues***

In total, the EIA reports natural gas stocks rose by 69 Bcf last week, increasing to 2,568 Bcf from 2,505 Bcf. This is 20.1% below the 3,298 Bcf that was in storage at this point last year, and is 18.4% below the five-year average of 3,232 Bcf. This week's storage build was in line with expectations, as analysts predicted a build of 66 Bcf. Inventories decreased by 1 Bcf in the salt stocks in the South Central region, the only draw this week. The largest increases came in the East and Midwest regions, which added 20 Bcf and 32 Bcf, respectively. Stocks in every region are below the five-year average. Gas in storage in salt stocks in the South Central region is the farthest below the five-year average for the area, at 32.1% below the average.




**Source – Oil and Gas 360*



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# BASIN STUDY: APPALACHIAN BASIN

## *Cursory Overview – Powder River Basin*

The Powder River Basin is located in southeast Montana and northeast Wyoming and known for its rich coalbed methane potential - which currently supplies approximately 40% of the United States' coal. Coal Bed methane production peaked around 500 BCF/year in 2008-2010. While the current overall interest in coal as an industry has not been extremely popular, the Powder River Basin remains a relatively active target for certain basin specific operators due to its great rock properties(high porosity and permeability), low to moderate drilling cost, healthy GOR and pressure, and abundant takeaway due to its relative immaturity in the development cycle. The Powder River Basin contains major deposits of petroleum, including the giant Salt Creek Oil Field. The oil and gas are produced from rocks ranging from Pennsylvanian to Tertiary, but most comes from sandstones in the thick section of Cretaceous rocks.

There is a recent resurgence in oil and gas production in the Powder River Basin due to horizontal drilling and hydraulic fracturing that are able to produce oil untouched by vertical wells. This resurgence is occurring mainly in the Powder River (Wyoming) area of the basin, which is historically known as the source of the basin's oil. **Figure 1** demonstrates the active horizontal wells drilled from 2015 to present day, it shows that a large majority of the activity over the years has been concentrated in Campbell, Converse, Weston and Niobrara counties respectively. The Greater Green River and Big Horn areas also demonstrate some activity; with 2016 showing a slowdown in activity as compared to other years.

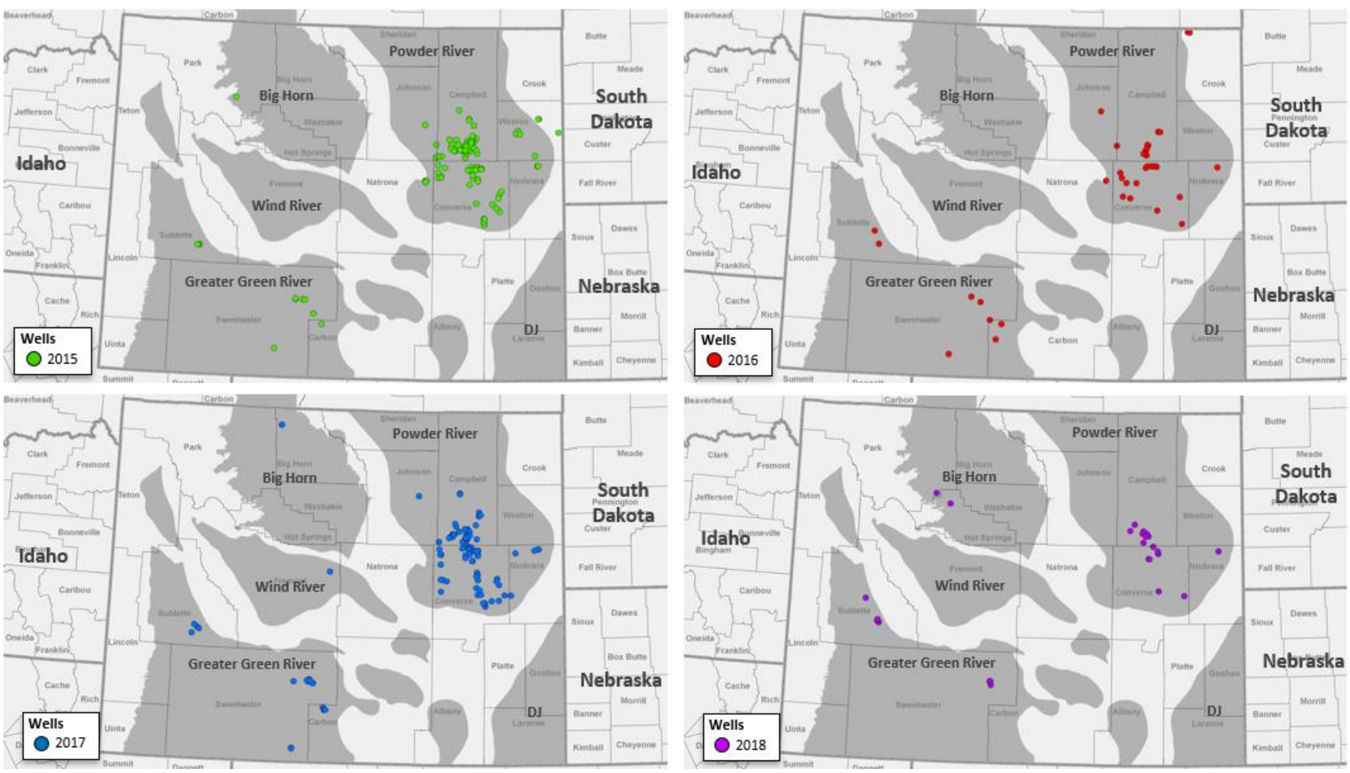


**Figure 1- Powder River Basin Horizontal Wells 2015-2018**

**Source – Drilling Info*



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**Figure 2** demonstrates the 2018 permit activity in the state with the highest concentration in Campbell and Converse Counties. There is also activity in the Northern and Northeastern areas of the Greater Green River. As expected, active rigs are located in and around the highest concentrations of permit activity for 2018. **Figure 3** further expands into the current horizontal permits by geologic formation in the Powder river basin with the majority of permits being in the Niobrara formation followed by the Turner and Parkman formation. Again, these permits concentrate in and around Campbell and Converse Counties.

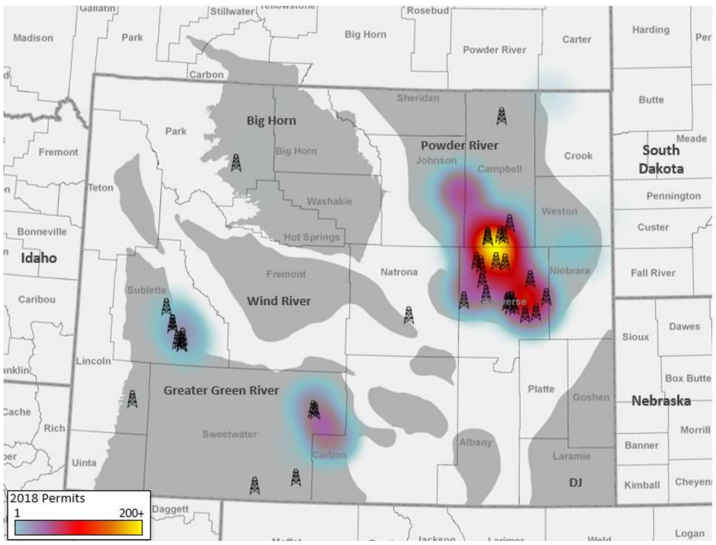


**Figure 2- Powder River Basin Permit Activity Heat Map and Active Wells**

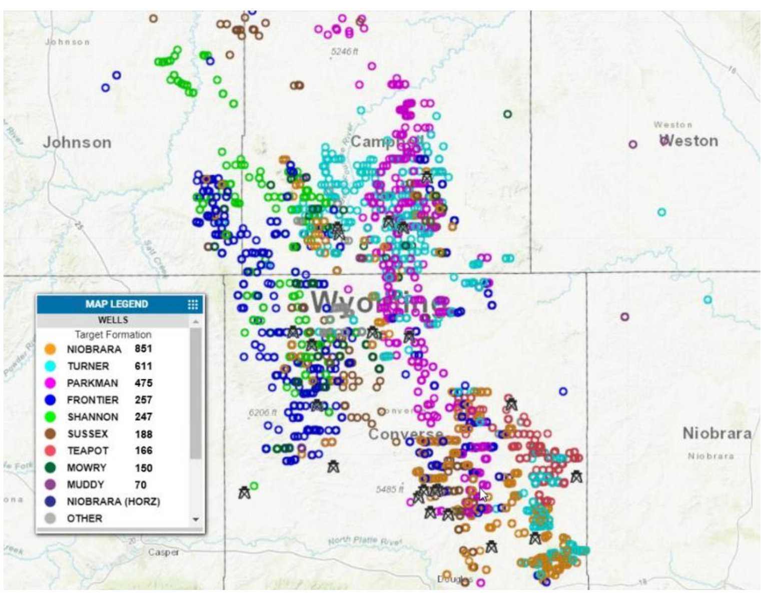


**Figure 3- Current Horizontal Permits by Geologic Formation**

**Source – Drilling Info*



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