

PULSE

ISSUE VIII



BASIN COMPARISON EDITION

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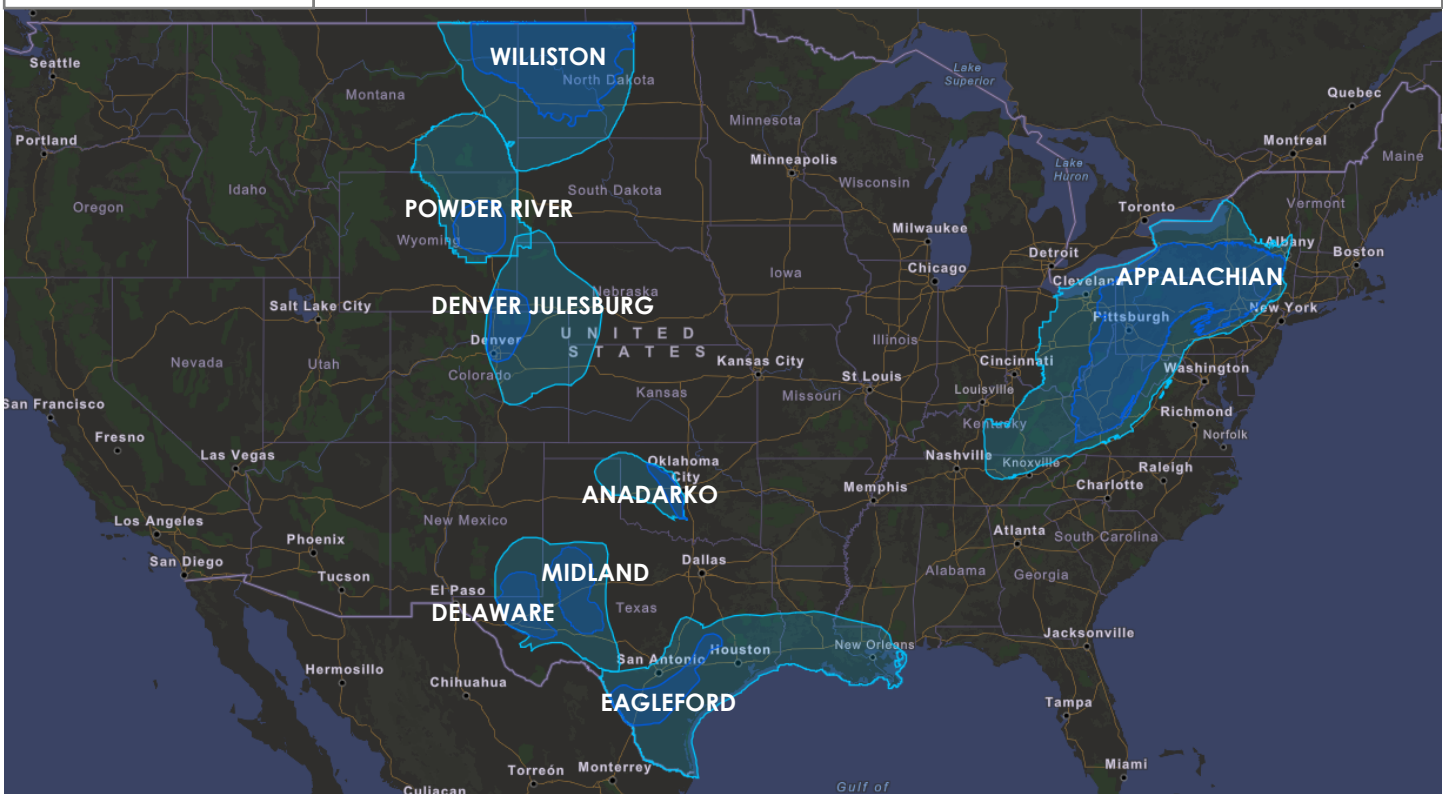
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INTRODUCTION

Welcome to the first Pulse edition of the year! This edition is unlike any other and contains a review and analysis of 2019 activity across eight prolific basins throughout the country. Based on requests from our subscribers, we have selected the following basins for this unprecedented issue; the Anadarko, Appalachian, Delaware, Denver-Julesburg, Eagleford, Midland, Powder River and the Williston Basins. This edition begins with a look at market movement to frame our analysis, and then we make our way to lease activity in each basin. Permit approvals and rig counts follow as we explore potential future development. From there, we report on DUC inventories, completions and production to grasp how each basin fared over the year. Our basin comparison wraps up with a financial review of the biggest transactions of the year and new private equity commitments.

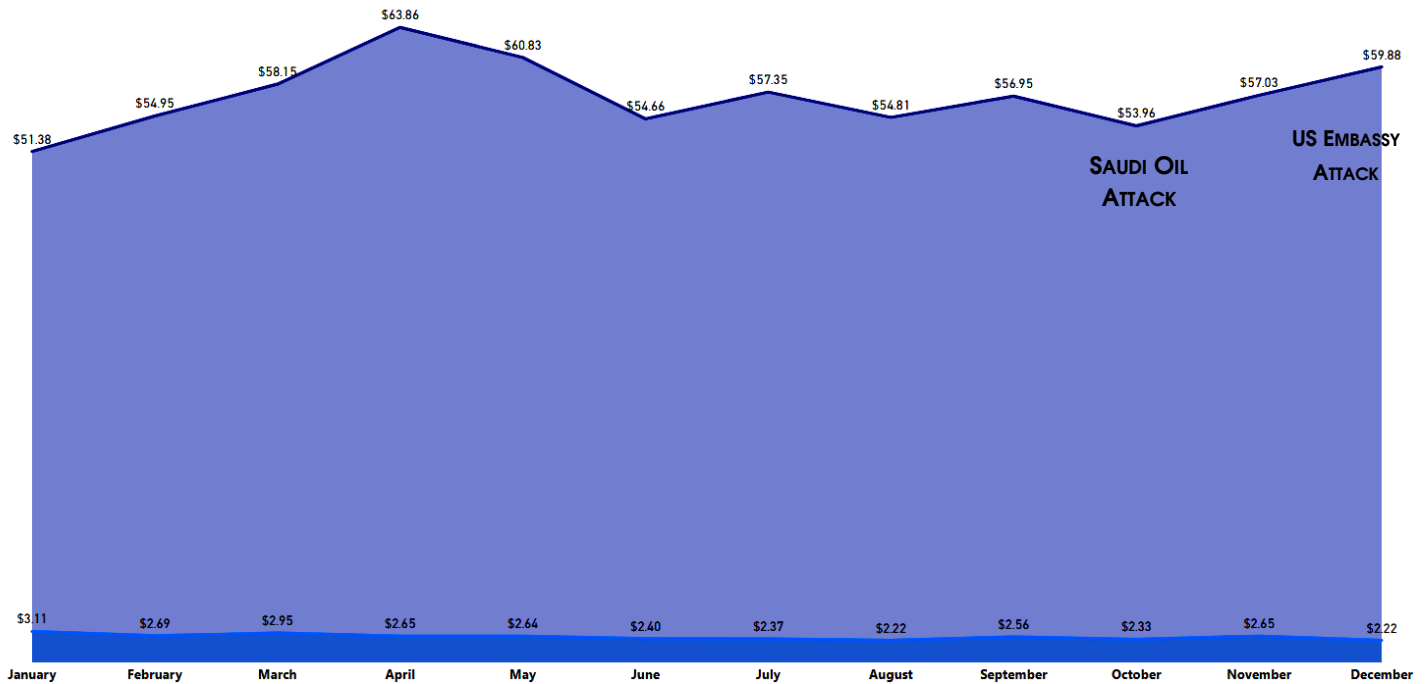
FEATURED BASINS



MARKET ACTIVITY

COMMODITY PRICES

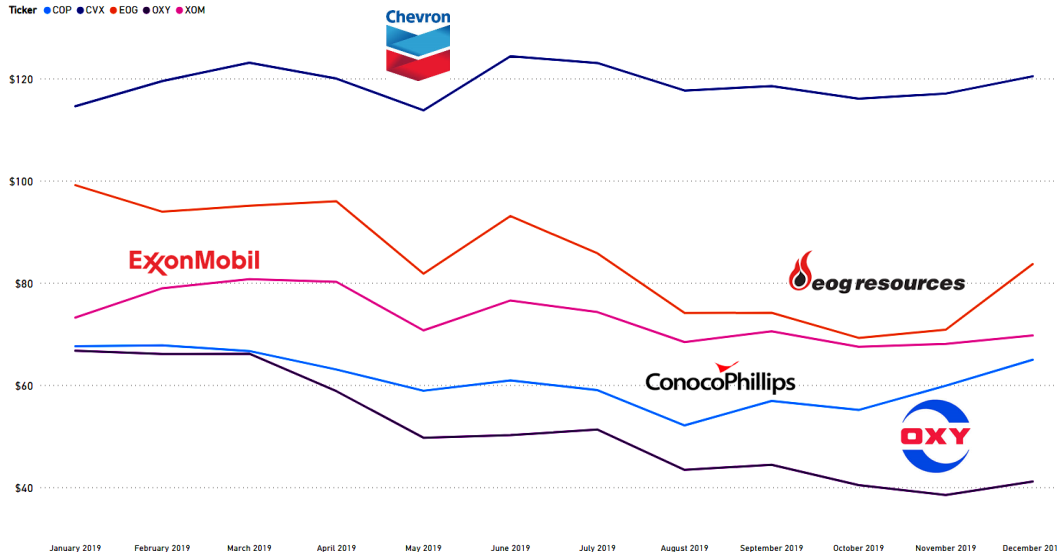
● Henry Hub Natural Gas Spot Price (Dollars per Million Btu) ● Cushing, OK WTI Spot Price FOB (Dollars per Barrel)



To begin our 2019 Year in review we thought a review of commodity and selected stock prices would provide an interesting frame of reference for our discussion. Natural gas remained below 3.00/MBtu for most of the year with a high of \$3.11/MBtu in January and a low of \$2.22/MBtu in August and December. Over the course of the year, natural gas ranged

STOCKS

Ticker ● CDP ● CVX ● EOG ● OXY ● XOM



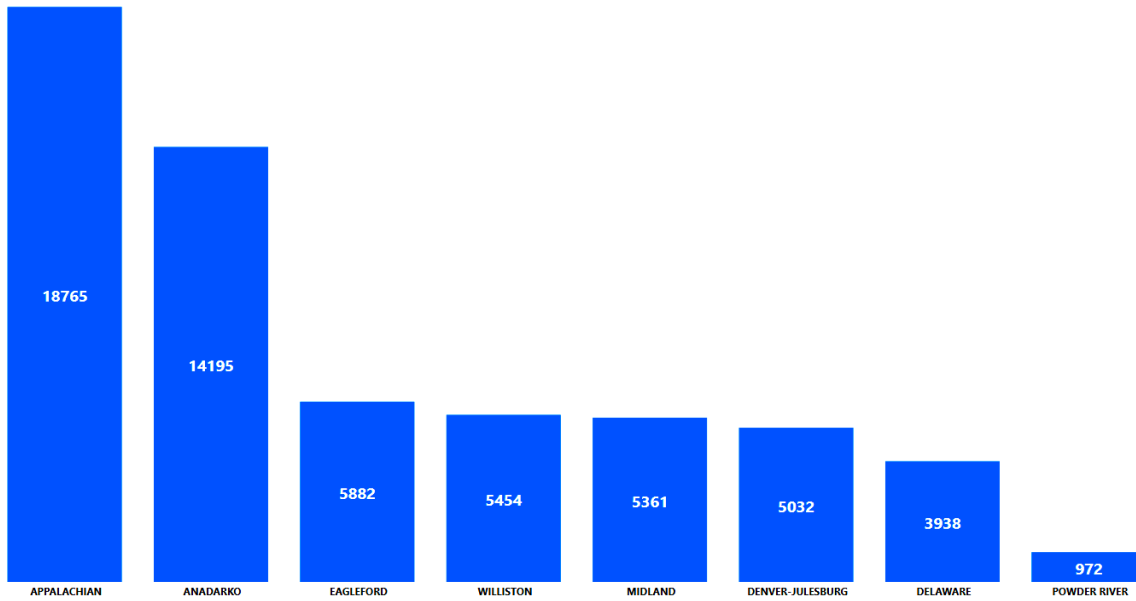
\$0.89/MBtu with a mean price of \$2.57/MBtu. Oil saw a high of \$63.86/Bbl in April and a low of \$51.38/Bbl in January. Keeping this in mind let's shift our focus to oil and gas stocks to see how they tracked commodity prices. Similar to oil and gas spot prices, stocks rose slightly in September and December following incidents in the Middle East. All five stocks showed a dip in May, as commodity prices were retreating from their April high. With the exception of Chevron, these energy stocks saw a steady decline across 2019.



LEASE ACTIVITY

2019 BASIN LEASE TOTALS

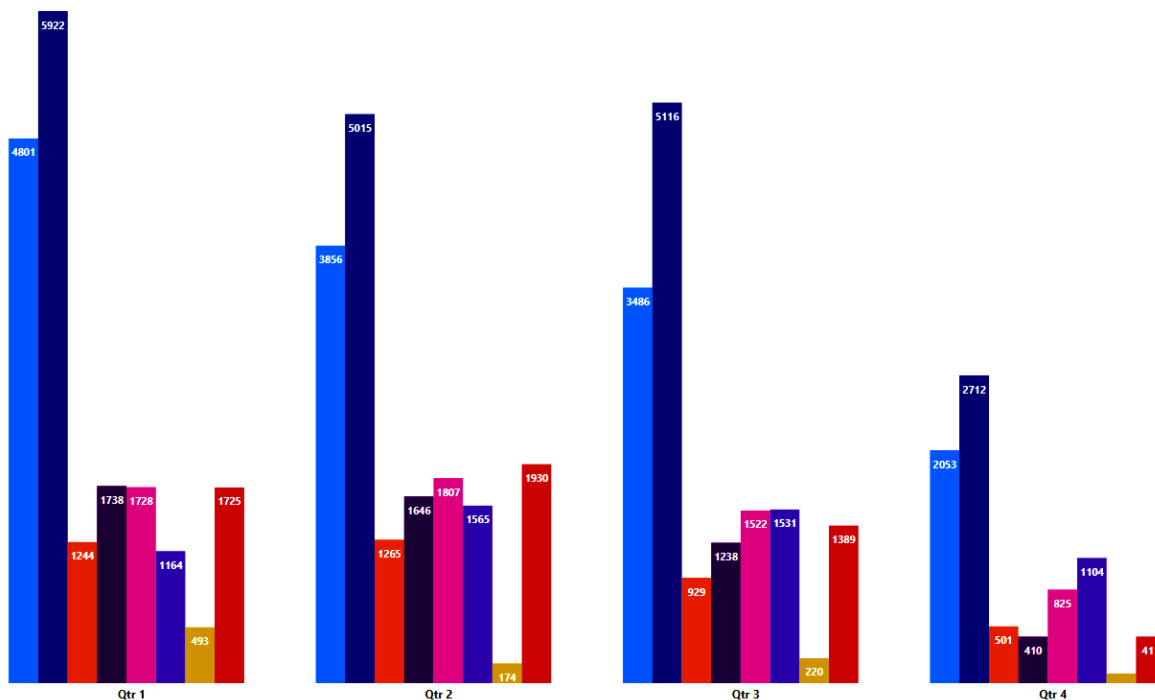
After establishing an overall frame of reference with commodity and stock prices, we can begin to delineate activity across basins and by fiscal quarter. The Appalachian Basin had the most new leases in 2019 with 18,765. Next, was the Anadarko Basin with 14,195 leases, followed by the Eagleford with 5,882. The predominant reasons behind this disparity are varied.



For example, the Appalachian Basin's activity can likely be attributed to lease expirations and unpaid options from leases taken years ago when bonus prices were significantly higher. The Delaware Basin, which enjoyed high rates of other activity, simply did not have much open acreage available to lease or many acres that were not held by production.

QUARTERLY LEASE TOTALS

Basin ● ANADARKO ● APPALACHIAN ● DELAWARE ● DENVER-JULESBURG ● EAGLEFORD ● MIDLAND ● POWDER RIVER ● WILLISTON



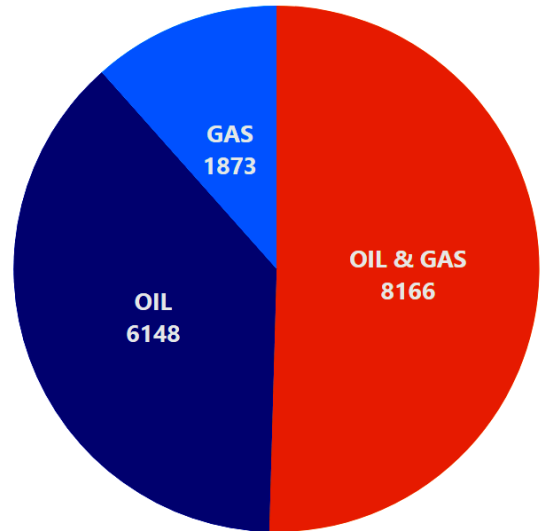
Below, we looked at quarterly leasing activity. The most active quarter was the first quarter, when oil prices were on the rise. There were a total of 18,815 new leases in the first quarter across the eight basins included in this edition. The lowest activity was seen in the fourth quarter overall and for each basin individually.



PERMIT ACTIVITY

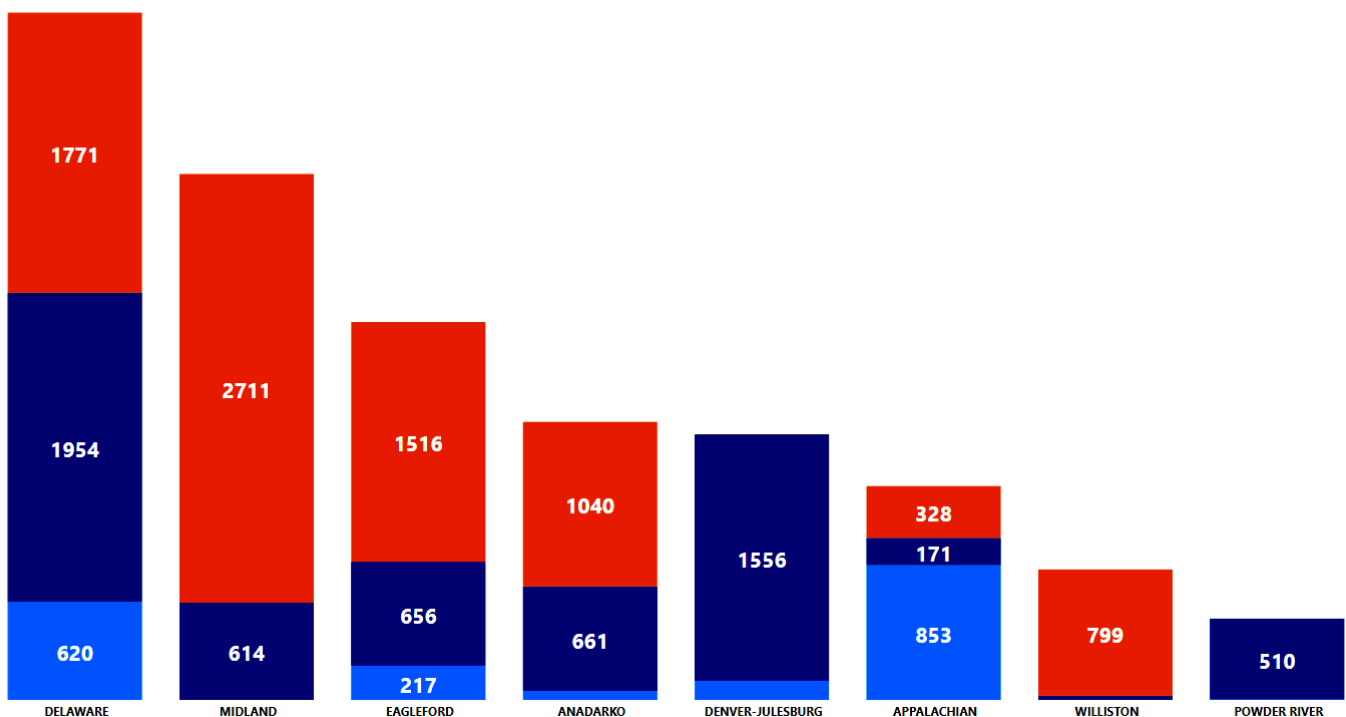
APPROVED PERMITS BY BASIN AND PRODUCTION TYPE

Permits can be an indicator of future drilling activity. In this issue, we tracked permits approved in 2019 as a potential preview for 2020 drilling efforts. We segmented the permits by type, and it's no surprise that gas well permits are significantly lower than oil wells. Additionally, it is little wonder that around half of the gas well permits are in the Appalachian Basin. The graph below shows the distribution of permit approvals by basin. For the most part, this distribution follows the rig counts we examine on the next page, and this is where things get interesting. The Denver-Julesburg Basin had only 20 rigs running at the end of 2019. However, there were 1,055 wells completed last year. The only way to close in on that total in 2020 would be another significant bring down of the DUC inventory, currently standing at 873 in the D-J Basin.



Another interesting note is that the Williston Basin saw 825 permits approved in 2019, yet there were 878 wells completed last year. Either Williston operators are planning to slow down drilling or planning to ramp up their permit submissions this year. Sadly, our wager is on the former.

Permitted Well Type ● GAS ● OIL ● OIL & GAS

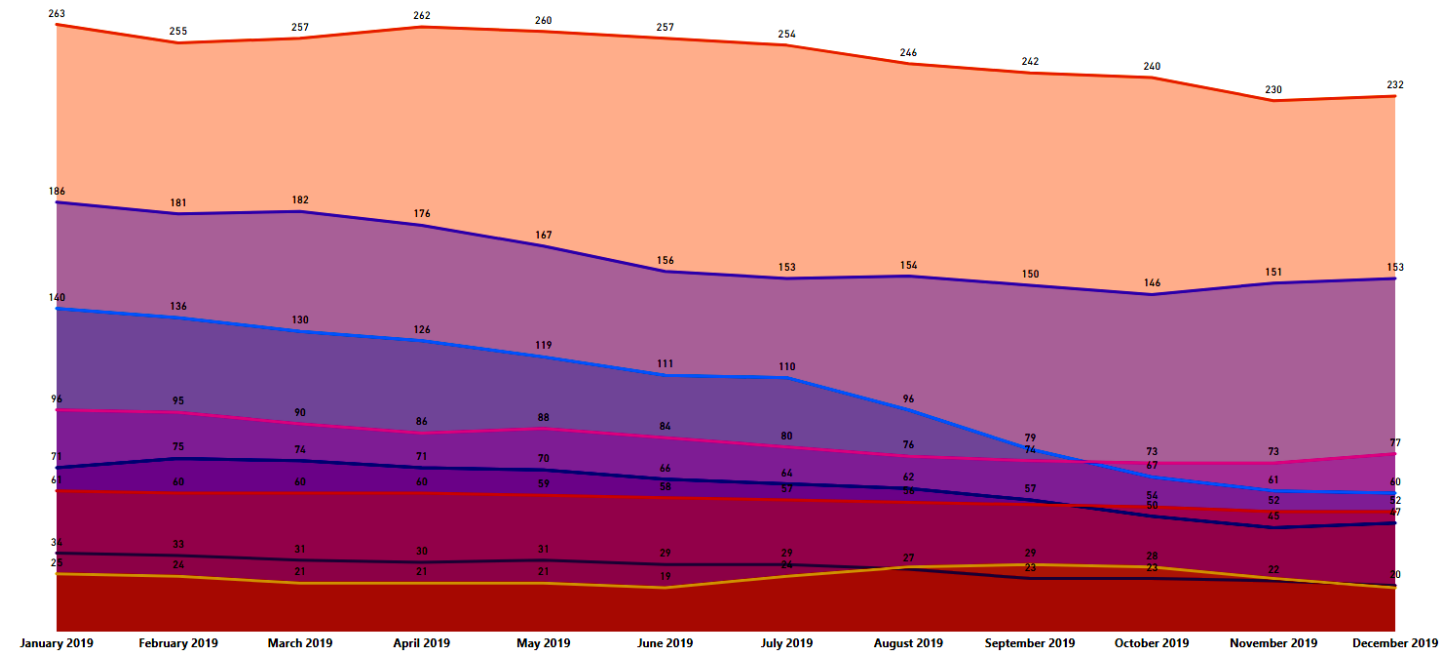




RIG ACTIVITY

MONTHLY RIG COUNTS

Basin ● ANADARKO ● APPALACHIAN ● DELAWARE ● DENVER JULESBURG ● EAGLEFORD ● MIDLAND ● POWDER RIVER ● WILLISTON



BASIN COMPARISON

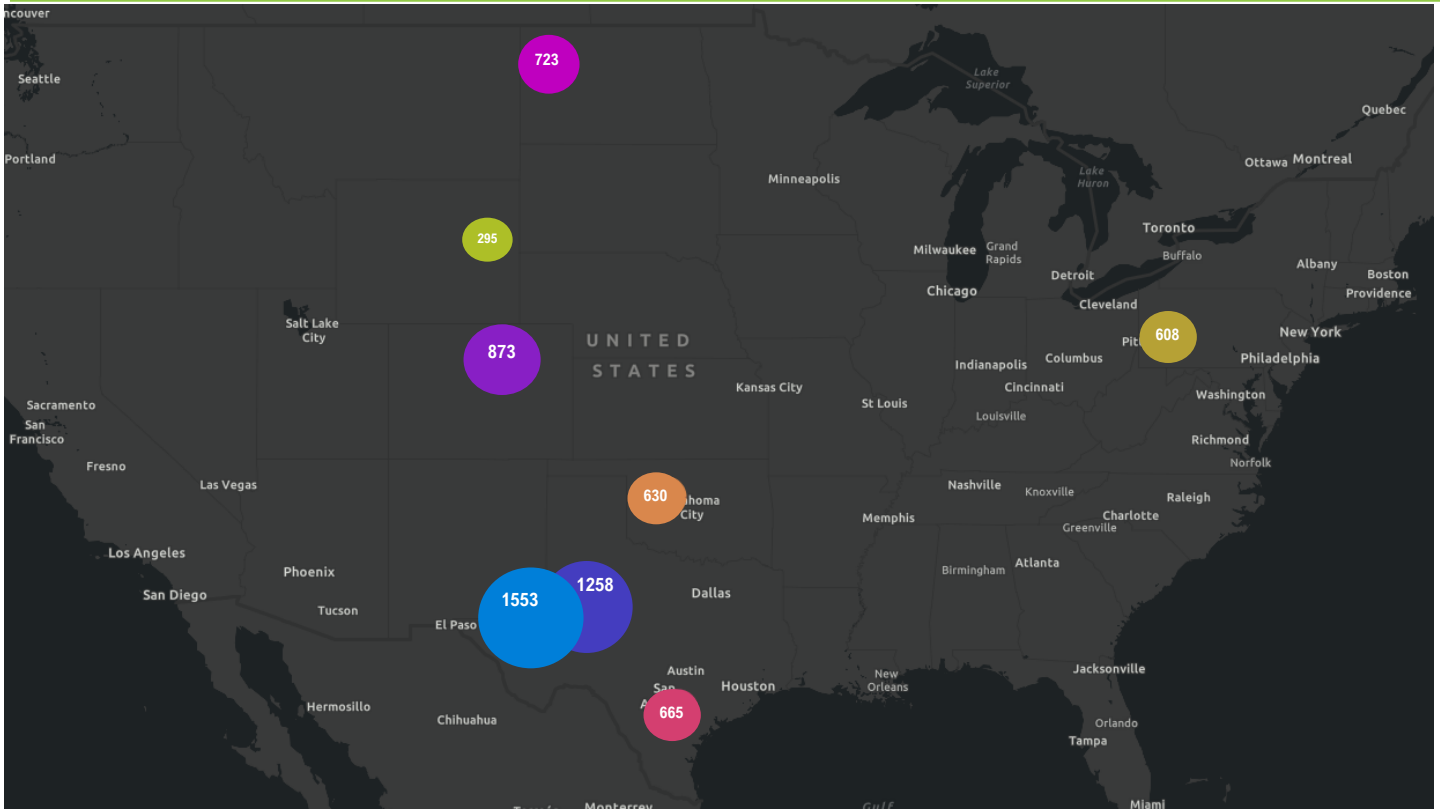
Month	ANADARKO	APPALACHIAN	DELAWARE	DENVER-JULESBURG	EAGLEFORD	MIDLAND	POWDER RIVER	WILLISTON	Total
January	140	71	263	34	96	186	25	61	876
February	136	75	255	33	95	181	24	60	859
March	130	74	257	31	90	182	21	60	845
April	126	71	262	30	86	176	21	60	832
May	119	70	260	31	88	167	21	59	815
June	111	66	257	29	84	156	19	58	780
July	110	64	254	29	80	153	24	57	771
August	96	62	246	27	76	154	28	56	745
September	79	57	242	23	74	150	29	55	709
October	67	50	240	23	73	146	28	54	681
November	61	45	230	22	73	151	23	52	657
December	60	47	232	20	77	153	19	52	660
Percent Change	-57%	-34%	-12%	-41%	-20%	-18%	-24%	-15%	-25%

Monthly rig counts in each basin demonstrate a steady decline across the country, averaging a combined 25% decline across these basins. The rate of decline is a more compelling statistic. Overall, the Delaware Basin fared the best with only a 12% rig decline and 232 rigs remaining at year's end. The Williston and Midland Basins also fended off steep declines in 2019, 15% and 18% respectively. Conversely, basins like the Anadarko and Denver-Julesburg suffered much steeper declines. The Anadarko Basin started the year with 140 rigs and finished with 60, a 57% reduction. The D-J Basin witnessed a 41% drop and ended the year with only 20 rigs.



DUC INVENTORY

DUC INVENTORY



DUCS BY BASIN

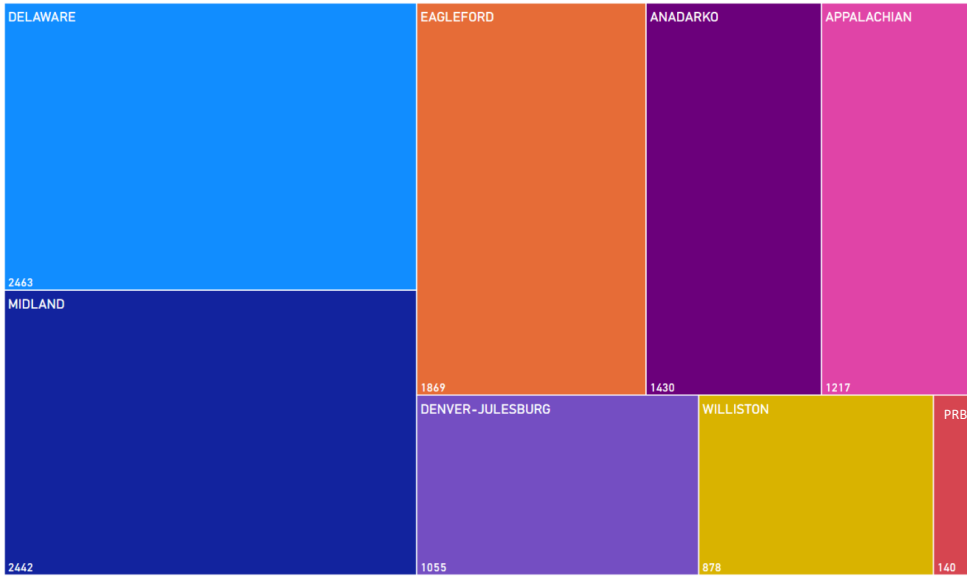
Basin	SPUD DATE						Total
	2014	2015	2016	2017	2018	2019	
DELAWARE	1	6	1	12	179	1354	1553
MIDLAND	2	3	1	7	56	1189	1258
DENVER-JULESBURG	1	3		6	143	720	873
WILLISTON	3	1		6	116	597	723
EAGLEFORD	2	3		3	49	608	665
ANADARKO	44	14	12	27	91	442	630
APPALACHIAN	24	60	16	50	94	364	608
POWDER RIVER	7	4	6	10	60	208	295
Total	84	94	36	121	788	5482	6605

Drilled and Uncompleted Well (DUC) inventory in the examined basins is depicted on the map above. The Delaware Basin has the highest number of DUCs with 1553. The Midland Basin follows close behind with 1,258, followed by the D-J Basin with 873, the Williston with 597 and the Eagleford with 665. What's interesting to note is the number of DUC wells compared to the number of active wells. The Delaware Basin's DUC inventory is 4% the number of active wells in the basin. Similarly, the PRB and D-J Basins' DUC inventory is 3.7%

compared to the number of active wells. We only looked back to wells drilled in 2014 or later to eliminate wells that are likely to remain uncompleted indefinitely. According to Bloomberg, the steepest DUC bring-down in three years occurred between May to November. The decline in DUCs has been seen as a sign that shale drillers have slowed drilling, you can read more about that [here](#).

COMPLETIONS

COMPLETIONS BY BASIN

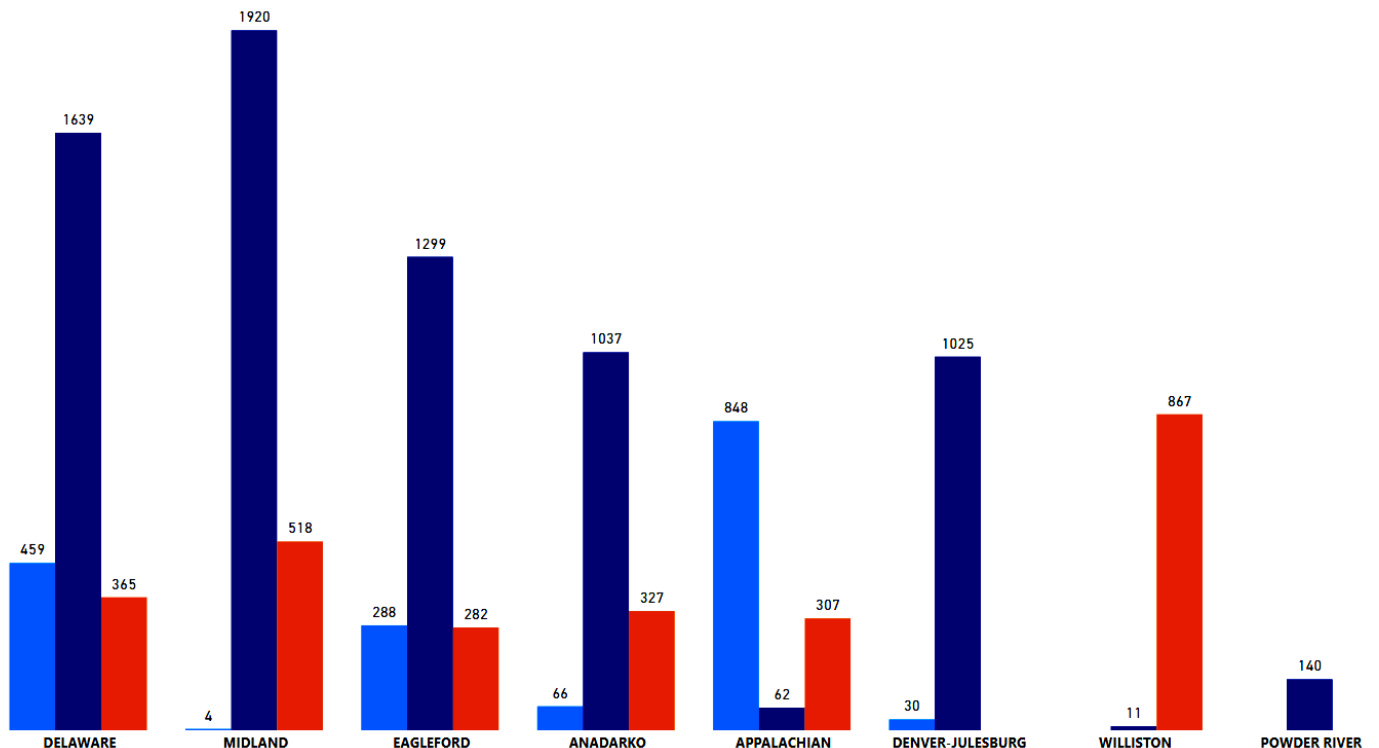


Keeping Permian shareholders happy, the Delaware Basin had the most completions in 2019 with 2,463. The Delaware was followed closely by its Permian comrade, the Midland Basin, with 2,442 completions. The bronze medal was found by traveling across the state of Texas to the Eagleford with 1,869. Infill drilling likely makes up the bulk of these completions, and we would welcome the opportunity to prove up our hypothesis. Let us know if you have similar queries

and we would be happy to dig in further. Rounding out the top five for 2019 completions, was the Anadarko Basin with 1,430 and the Appalachian Basin with 1,217 total. However, those 1,217 completions represented the most for natural gas wells.

COMPLETIONS BY BASIN & PRODUCTION TYPE

Production Type ● GAS ● OIL ● OIL & GAS

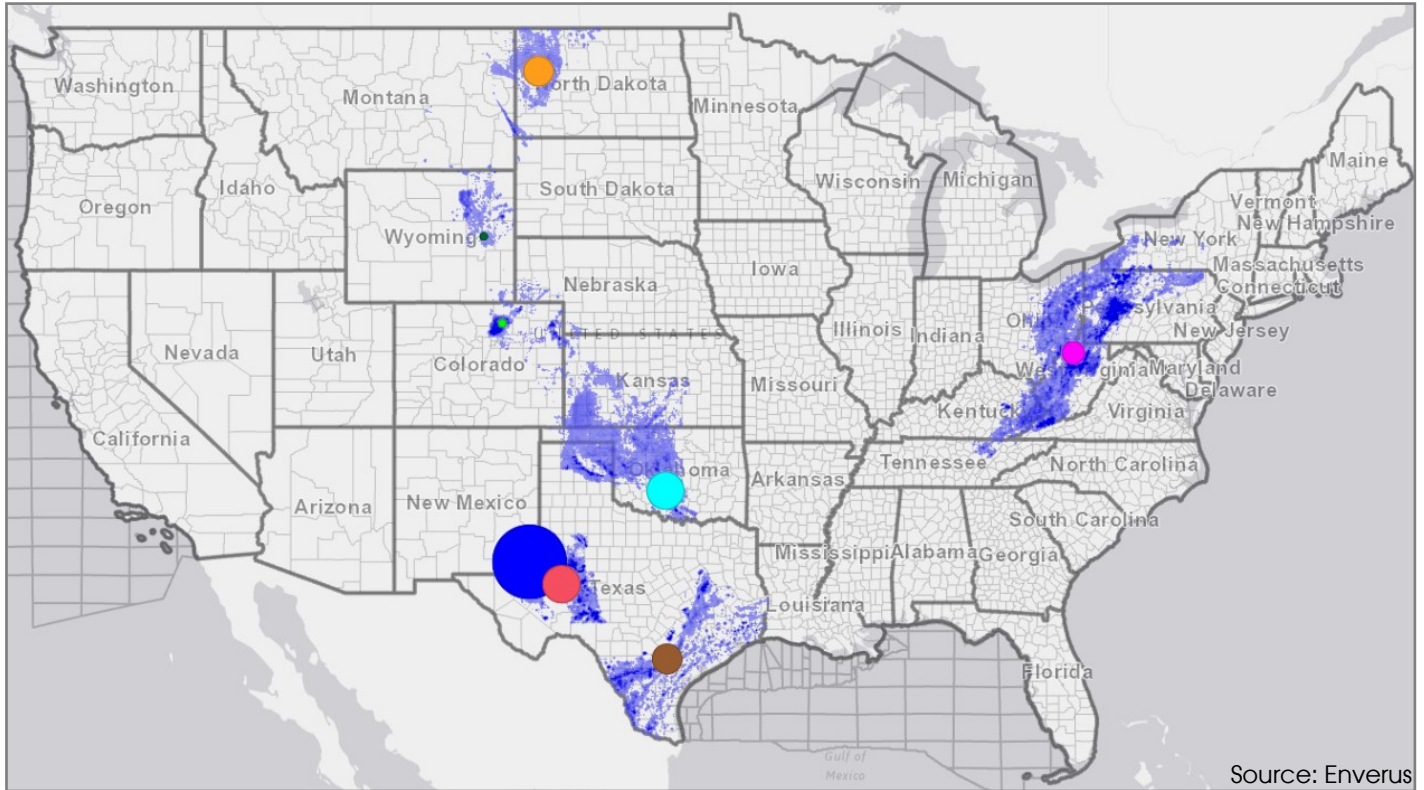




COMPLETIONS

BIGGEST WELLS IN EACH BASIN

2019 COMPLETIONS



The biggest well results for 2019 completions, in each basin, are mapped above. Of note, the wells are ranked by the second month reported production. Congratulations to each of the operators below, and their success mastering the intricacies of each targeted basin.

BIGGEST WELLS IN EACH BASIN

BASIN	API	OPERATOR COMPANY NAME	WELL/LEASE NAME	WELL NUMBER	COUNTY	STATE	PRAC IP BOE
DELAWARE	3002545624	CHISHOLM ENERGY HOLDINGS LLC	GRAMA RIDGE EAST 34 STATE COM 3BS	004H	Lea	NM	10,043
ANADARKO	3505124257	GULFPORT ENERGY	JEANNIE	1-27X04H	Grady	OK	5,369
MIDLAND	4246140799	CONCHO RESOURCES	PEGASUS FIELD UNIT 3	1406LH	Upton	TX	5,121
WILLISTON	3305308213	EXXON MOBIL	RAVIN	21X-15EXF	McKenzie	ND	4,590
EAGLEFORD	4225535985	CONOCOPHILLIPS	BRYSCH-KITCHEN USW A	1	Karnes	TX	4,174
APPALACHIAN	4709502535	ANTERO RESOURCES	REMINGTON UNIT	2H	Tyler	WV	3,260
POWDER RIVER	4900934205	CHESAPEAKE ENERGY	BB 2-35-71 USA A TR	16H	Converse	WY	1,498
DENVER-JULESBURG	0512345076	PDC ENERGY	BATH-SCHMIER	6N	Weld	CO	1,149



PRODUCTION

2019 PRODUCTION

● 2019 Gas Production ● 2019 Oil Production — Count of Producing Wells



PRODUCTION BY BASIN

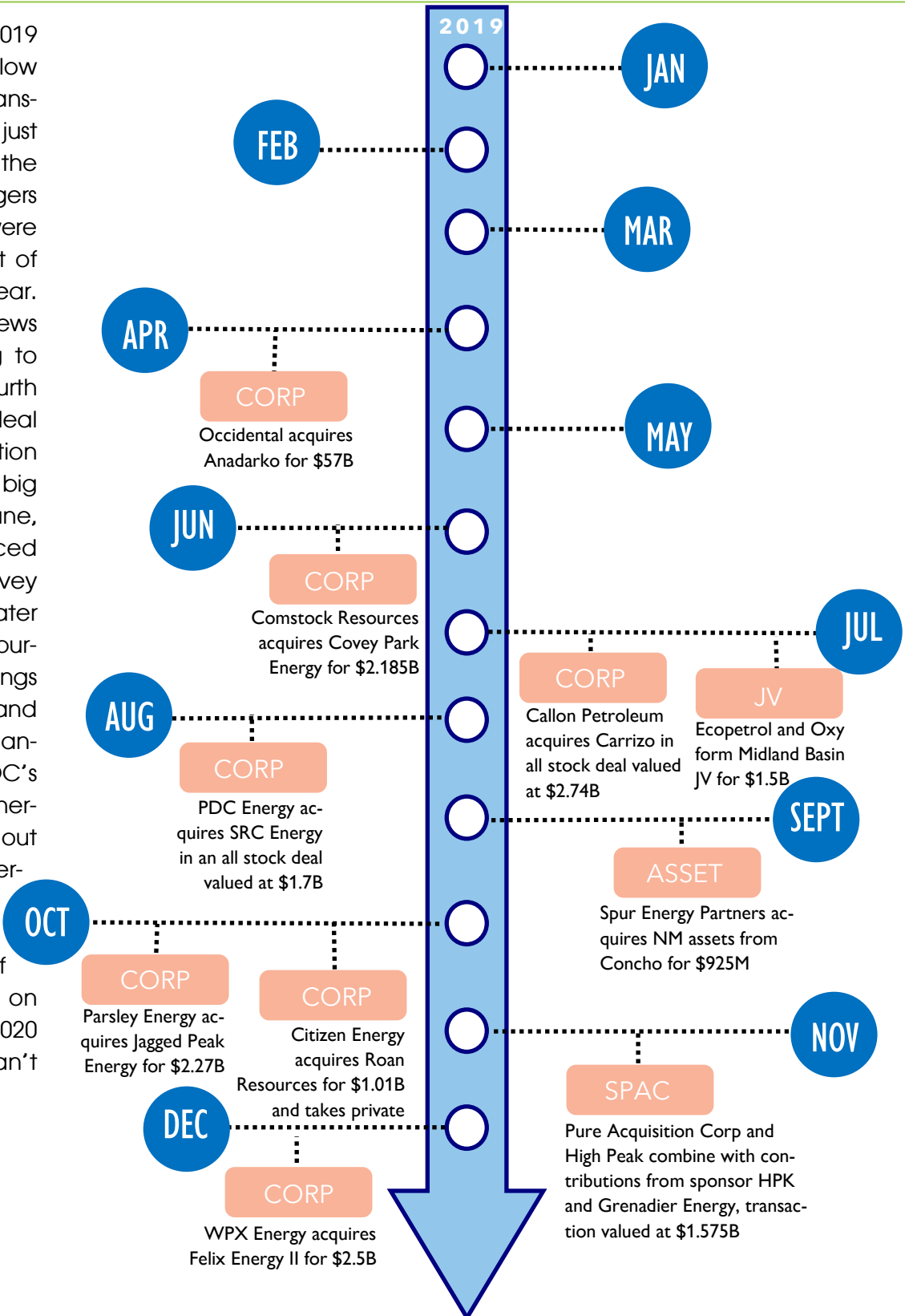
The graph above shows oil and gas production in 2019 for each basin along with the number of wells attributable to the production. Leading the way for natural gas production is the Appalachian Basin with 11.62Bcf of gas produced and 188,916 wells. Second for natural gas production and first for oil is the Delaware Basin, with 3.02Bcf of gas, 708MMbbls of oil and 33,967 wells. The well count is an interesting addition to this graph because all wells, and all basins for that matter, are not created equal. Comparing the Delaware and Anadarko Basins provides evidence of this. Natural gas production is comparable, with 3.02Bcf and 2.94Bcf, respectively, while the oil production from the Anadarko Basin (233.69MMbbls) is roughly one-third that of the Delaware (707.69MMbbls). The biggest difference between the basins can be seen looking at the well count. The number of active wells in the Delaware is 40% of the active wells in the Anadarko Basin. Looking from this high level perspective doesn't account for a number of other factors like well cost, decline curve, EUR, and months produced, and we certainly recognize the opportunity for additional analysis.



A&D LOOK











BIGGEST TRANSACTIONS

The first quarter of 2019 proved to be VERY slow regarding notable transactions, but this was just the calm before the storm. In fact, mergers and acquisitions were the most exciting part of the industry last year. April saw colossal news with Anadarko selling to Occidental in the fourth largest oil and gas deal in history. This acquisition triggered a wave of big transactions. In June, Comstock announced the acquisition of Covey park, and weeks later Callon revealed their purchase of Carrizo. Things continued to roll, and August brought the announcement of PDC's acquisition of SRC Energy. The year closed out with news of Felix Energy's sale to WPX Energy. Investors are loving the merger of equals trend going on right now. What is 2020 going to bring? We can't wait to find out!



PRIVATE EQUITY

2019 PRIVATE EQUITY COMMITMENTS

	COMPANY	PRIVATE EQUITY SPONSOR	DATE	COMMITMENT AMOUNT	BASINS TARGETED
	HATCH RESOURCES	RIDGEMONT EQUITY PARTNERS	JANUARY	UNDISCLOSED	PERMIAN
	SEQUEL ENERGY GROUP II LLC	GSO CAPITAL PARTNERS (BLACKSTONE)	FEBRUARY	\$500M	LOWER 48
	RED WOLF NATURAL RESOURCES, LLC	PEARL ENERGY INVESTMENTS	MARCH	\$150M	MIDCONTINENT AND ROCKIES
	FIREBIRD ENERGY	REDBIRD CAPITAL PARTNERS	MAY	UNDISCLOSED	MIDLAND
	SPUR ENERGY PARTNERS	KKR	MAY	>\$1B	LOWER 48
	PACHIRA OIL & GAS	FULCRUM ENERGY CAPITAL FUNDS	JULY	UNDISCLOSED	EAGLEFORD
	WILDFIRE ENERGY I LLC	WARBURG PINCUS AND KAYNE ANDERSON	JULY	\$1B	LOWER 48
	OSSIDIANA ENERGY	WARBURG PINCUS	AUGUST	UNDISCLOSED	ROCKIES
	INDIANOLA ENERGY LLC	KAYNE ANDERSON	AUGUST	\$100M	NORTH AMERICA
	WING RESOURCES IV LLC	NGP	AUGUST	\$100M	PERMIAN BASIN

Many companies are turning away from Wall Street and towards the open arms of private money to start new oil and gas ventures or expand existing ones. Instead of starting as a public company, “...many oil and gas E&Ps have been launched with private money and then taken public to grow through an IPO or via the ‘back door’ as a reverse merger into a public shell or an inactive public equity vehicle,” explains Bevo Beaven of Oil & Gas 360. Their full in-depth report can be found [here](#). No matter the proposed end-game, one thing is certain, private equity investments are still going strong. [Hart Energy](#) reported in October that investment firms are still seeking opportunities, despite uncertainty in the market. Ten of those private equity commitments announced in 2019 are shown above. The most interesting in our opinion are the new companies formed by the former WildHorse Resource Development Corporation executive team. In May, former Wildhorse CEO Jay Graham formed Spur Energy Partners LLC with a commitment from KKR whose Managing Director commented that the partnership is expected “...to be a multi-billion dollar investment partnership”. Just a few short months later, in July, the former WildHorse President Anthony Barr and former COO Steve Habachy landed a one billion dollar commitment from Warburg Pincus and Kayne Private Energy Income Funds to form WildFire Energy I LLC. Both companies are targeting assets in the Lower 48 with growth potential. It will be interesting to see what the future holds for each of them.



Probus Energy Services was founded with a vision to offer world-class land services while championing relationships. We value uncompromising accuracy and apply a rigorous standard to every project. What sets us apart is that we pride ourselves on relationships, and we view them distinctly different than anyone else. It is vital that we provide outstanding service to our clients, and we see information as a collection of relationships. This view delivers unique insight on the industry and unlocks a deeper level of understanding. In turn, this allows for innovative and ultimately more effective solutions. Bottom line, we love data and we love helping our clients be successful!

We created the Pulse to be the perfect union and natural product of our love for data and staying informed about what’s happening in the major oil and gas basins in the United States. The Pulse is a monthly report, focused on a different basin in each edition. If there is somewhere you want to know more about, just let us know.

Probus is a comprehensive land service company, and we want to assist you in using your information more efficiently. Let us help you with your next project, deliver solutions and reach your goals. Our team is skilled at all things land; prospect identification, acquisitions, title, due diligence and curative...we do it all.

We love hearing from you, drop us a line and let us know what you think. Can’t wait for the next edition of the Pulse? Our email subscribers get the first look, sign up on our website.

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