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Outlook 2018: E&P technology

Outlet
Inside FERC's Gas Market Report

Text

Exploration and production companies are expected to continue driving technological advances in drilling and completions during 2018.

In 2017, producers went all in on the use of technologies such as drilling extra-long laterals, dramatically increasing the volumes of water and proppants used in fracturing, and employing so-called "big data" analytics to enhance their production, often with impressive results.

The impact of this trend is reflected in basins across North America.

During Chesapeake Energy's recent third-quarter conference call, executives said that by using a combination of longer laterals and other enhanced completion techniques, Chesapeake had seen its average initial production rates in the gas-rich Haynesville Shale play climb to 30 MMcf/d, compared with average IP rates of only 12 MMcf/d just three years ago. At the same time, the producer said it had improved its capital efficiency in the basin by about 30%.

During the third quarter, Noble Energy said it had boosted its oil production in Colorado's DJ Basin by 7% and increased gas volumes by 5% to 191 MMcf/d. Sales volumes out of its Wells Ranch and East Pony fields in Weld County, Colorado, increased by about 10% quarter over quarter.

The producer said it employed big data techniques, constantly monitoring and analyzing data streaming in from the rig, to drill a 9,616-foot lateral in Wells Ranch at a company-best time of four days.

Looking forward, integrated major oil and gas company ExxonMobil said it hopes to use advanced drilling and completion technology, such as longer laterals, to more than quadruple its oil and gas production in the Permian Basin from just 187,000 barrels of oil equivalent per day in Q3 2017, to 800,000 boe/d by 2025.

While the producer's current average lateral well length in the Permian is about 10,000 feet, the company is targeting longer lengths in the play, with the recent completion of a 12,500-foot lateral in the Delaware Basin and plans for ExxonMobil's first three-mile lateral there.

Limits seen to drilling technology advances

However, some industry experts foresee a limit to the efficiency and production gains that E&P companies can wring from such technology.

"The upstream segment will be hard-pressed to see more incremental benefits from efforts to drive further costs and productivity from the system," analysts with S&P Global Ratings said in a recent report, "Industry Top Trends 2018: Oil and Gas."

"Additional productivity gains from longer laterals, cluster spacing and adding more proppant are limited," the report said. "Although not expected for the next few years, we believe that shale production will begin to decline at some point as the inventory of tier I wells begins to deplete and shale continues to contend with rapid decline curves."

However, in 2018 and beyond, producers are expected to increasingly turn to technology and well optimization strategies to improve drilling economics and efficiencies, according to Platts Analytics.

E&P companies are beginning to abandon the old "drill and complete" paradigm of drilling and completing a single well before moving on to the next well in the field. Instead, they have realized it can be much more efficient and less costly to drill every well in the field before coming back and completing the wells.

Using the latter development strategy enables producers to reduce the number of crews needed, optimize proppant usage, and coordinate the spacing between the parent and the child wells in a field, according to Platts Analytics.

Optimizing the techniques for drilling and completing wells and making use of big data to guide those drilling and completion decisions remains the best strategy for increasing efficiencies and improving production metrics, researchers at the University of Texas at Austin said.

"On the drilling side, in 2014 and 2015 what operators immediately did was to try to optimize the supply chain, to reduce costs by renegotiating their contracts. That's played itself out," Eric van Oort, a professor in the University of Texas Petroleum and Geosystems Engineering Department, said in an interview.

Big data analytics in hunt for opportunities

"What operators now are doing is really starting to look at their data and applying big-data analytics techniques to look for opportunities to improve."

Among the techniques that van Oort sees being increasingly employed by E&P companies in 2018 are "longer horizontal laterals, 10,000 feet or sometimes even more; increasing the number of clusters in frack stages, and pumping more fluid and more proppant and trying to think about fracks in a more clever way."

Oilfield service companies, such as Nabors, Schlumberger and NOV are expanding the technological solutions they offer to upstream companies, moving beyond their traditional role as simple rig contractors, van Oort said. Service companies "are starting to offer integrated rig solutions, with integration of downhole and surface sensors and doing advanced analytics on the data," he said.

Producers that are on the forefront of adopting these new technologies include ConocoPhillips, Apache, Hess and Pioneer Resources.

"Anadarko [Petroleum] is really gearing up its resources to capitalize on big-data analytics. But then, all the companies are doing it," van Oort said.

Svetlana Ikonnikova, a research scientist at UT's Bureau of Economic Geology, said some producers are drilling their wells in a stacked manner, trying to develop more of the vertical interval.

"We also see that companies were experimenting with spacing of their wells to see how close they can drill the wells together or how many wells they can put in a square mile," she said in an interview.

These innovations are in addition to drilling longer well laterals, which is becoming standard in the industry.

"Lengthening the wells gives the economies of scale because now instead of drilling one vertical stem, you can drill longer laterals, so you're saving on costs," Ikonnikova said. "And by making fracks more efficient, you can recover more per unit of volume from the rock."

Platts Analytics said it is difficult to predict what effect improvements in technology will have on oil and gas production in the future. Even with the most sophisticated technology available, producers still are only able to recover between 10% and 15% of the available hydrocarbons in the ground.

Currently, the focus is on increasing the depletion rate out of wells — producing a significant percentage of the potential oil and gas from a well as quickly as technically possible, according to Platts Analytics.

Jim Magill