
S&P Global
Platts**US' Bakken, Three Forks have 15 billion barrels of recoverable oil: study**

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- * Estimates likely will be raised due to technology leaps
- * Without price boost, Bakken production may have peaked
- * Wells poised to produce at double rate, but profitability no guarantee

The Bakken and Three Forks formations in the United States may contain roughly double the amount of technically recoverable crude oil than federal regulators estimated just four years ago, according to the preliminary results of an ongoing study.

In addition, advances in production technology may allow these preliminary estimates to be significantly increased, the study's authors told S&P Global Platts.

The study, developed by the University of Texas at Austin's Bureau of Economic Geology, found the Bakken formations contain about 125 billion barrels of oil in place while the Three Forks formations contain about 75 billion barrels, according to preliminary, working estimates.

The study looked at the upper, middle and lower formations of the Bakken and the upper and middle formations of Three Forks.

The technically recoverable portion of the Bakken and Three Forks formations is 9 billion barrels and 6 billion barrels, respectively, or about 15 billion barrels of technically recoverable oil.

A US Geological Survey study released in April 2013 found the Bakken and Three Forks contained an estimated 7.4 billion barrels of undiscovered, technically recoverable oil.

But comparison of the USGS and University of Texas studies may be inappropriate, according to Scott Tinker, director of the Bureau of Economic Geology.

For one, the play outline used in the USGS study is different. But, more importantly Tinker said, the USGS study used a shorter production history.

Earlier studies by the USGS showed lower technically recoverable numbers, whereas the Bureau of Economic Geology study reflects significant improvements in technology and increases in recovery over time, resulting in the larger technically recoverable estimate.

"We are more granular and comprehensive than anyone else, and pay closer attention to changes in well productivity and its drivers, employing the most up-to-date statistical models using outputs from our 3D geocellular model," said Svetlana Ikonnikova, a research scientist at the Bureau of Economic Geology and principle investigator of the study team.

BIG PICTURE

The new study, developed by a team of geoscientists, engineers, statisticians and economists, used production and geological data from IHS, Drilling Info, North Dakota state surveys and some Bakken operators to build a 3D geocellular model and a comprehensive production outlook model including geologic, as well as engineering and economic analyses, Tinker said.

"It's different than any other study," he said. "In the big picture, we're able to look at all the data in a very integrated way."

But Tinker and Ikonnikova concede that their study may still not adequately gauge advancements in technology, including new completions with higher volumes of proppant and longer laterals.

"We've found we have been too conservative in our other studies," Tinker said. "Technology has marched on quicker than we gave it credit for."

In December 2014, North Dakota production reached nearly 1.23 million b/d, but persistently low oil prices have caused a decline in supply.

Statewide production fell to just over 942,000 b/d in December, before climbing to over 980,000 b/d in January, according to the latest data from the North Dakota Department of Mineral Resources.

But, at the same time, technological advances limited the drop in supply in North Dakota. For example, in December 2014 when North Dakota production hit nearly 1.23 million b/d, the state averaged 181 rigs, or about 6,800 b/d per rig. In December 2016, when production averaged 942,000, the state averaged 40 rigs, or 23,550 b/d per rig.

The study did not take into account any advances in technology since 2015, such as in refracking and in estimated ultimate recovery, Ikonnikova said.

These advancements have been a frequent theme among major Bakken operators for months.

"Through our application of lean manufacturing techniques, our Bakken team has achieved among the lowest drilling and completion costs and most productive wells in the basin, offering very attractive financial returns," John Hess, the CEO of Hess Corporation, said during an earnings call in January.

CREATIVE DRILLING

Platts Analytics shows Bakken breakeven at \$33.69/b for March, which assumes drilling and completion costs at \$5.3 million/well.

"Operators in this basin do something more creative every year," Tinker said. "They're stacking wells on top of one another; drilling multiple wells from a single pad; experimenting with the amount of sand and the type of sand. It continues to evolve and improve, so what you see is increasing recovery on a per area basis than what you have seen in the past."

Despite the decline in breakeven prices, though, production in the Bakken is likely more constrained than other US plays, such as the Permian, where production is expected to average nearly 2.29 million b/d this month, up from about 800,000 in 2008, according to the US Energy Information Administration.

Despite the technological advances, the study clearly shows Bakken production may have peaked in December 2014 and is not expected to climb above 1.4 million b/d over the next three decades unless prices average \$80/b going forward, the study says.

Bentek sees relatively modest growth for Bakken production, averaging 970,000 b/d this year, 1 million b/d next year, and not exceeding the 2014 peak of 1.2 million b/d until 2020.

Production in the Bakken is expected to average 974,000 b/d in March and fall to 964,000 b/d in April, according to the latest drilling productivity report from the EIA.

The study clearly shows Bakken and Three Forks will produce twice as much oil with new wells drilled through 2045 than what is expected to be recovered by the wells drilled through 2015. And if the price of oil were to return to \$80/b or higher, the play could see a new peak in daily production rate, Tinker said.

"Improved technology and increased production does not guarantee profitability," he cautioned. "But there is a lot of resource left, recovery factors are still quite low, and as long as there is demand for oil, operators are likely to find ways to extract more."

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