

Halliburton drilled the longest horizontal well in the DJ Basin in record time

Halliburton drilled a 9,124-foot lateral section in 119 hours – in just one run with one bit



OVERVIEW

Halliburton has drilled more than 135 vertical and horizontal wells in the Denver-Julesburg (DJ) Basin, one of the United States' richest natural resources. The length of the laterals in the area have been steadily increasing. Extended-reach laterals enable operators to significantly increase production rates while minimizing costs and environmental impact. However, the extended-reach wells are much more complex than standard horizontal wells.

Halliburton leveraged its experience and technology from Baroid, Sperry Drilling and Drill Bits to overcome numerous technical and geological challenges. This helped an operator drill a record-setting, 16,020-foot horizontal well in just under 10 days with no non-productive time or safety incidents. Halliburton drilled the 9,124-foot lateral section in 119 hours – with one bit and one run. With most basin laterals averaging 4,000 feet, the record well essentially provided two wells in one by doubling reservoir contact from a single location.

CHALLENGE	SOLUTION
<p>Extended-reach lateral</p> <p>Most laterals in the DJ Basin average 4,000 feet. To maximize reservoir contact and minimize cost per foot drilled, the operator wanted to double the lateral length. However, with extended laterals come greater weight-transfer, friction, hole cleaning and tool maintenance challenges.</p>	<p>Halliburton optimized drilling performance</p> <p>Halliburton modeled, measured and optimized drilling performance in real time. Engineers compared model information to live data and optimized performance as they drilled by varying techniques, fluid designs and more. The result: efficient, effective, extended-reach lateral wells.</p>
<p>Torque and drag</p> <p>One of the biggest challenges in longer laterals is excessive torque and drag of the drill pipe caused by wellbore friction. Halliburton needed to predict and prevent torque and drag problems that might occur as a result of sticking or poor hole cleaning after the build.</p>	<p>Custom lubricant package and well planning</p> <p>To overcome friction and reduce torque and drag, Halliburton developed a custom lubricant cocktail and applied it early in the lateral. Teams also used Landmark's WELLPLAN™ program to create daily torque and drag models that affected drilling techniques.</p>
<p>Vibration on tools</p> <p>Vibration and stick-slip can put excessive wear and tear on the bottomhole assembly and reduce the life of the drill bit. Replacing a worn bit would require a time-consuming trip out of the hole. Halliburton needed to identify sources of vibrations and adjust drilling to eliminate that trip.</p>	<p>Review and adjust drilling procedures</p> <p>Halliburton analyzed data from previous wells and studied a test well to find possible causes of vibration and stick-slip in the area. Once contributing factors were identified, Halliburton adjusted drilling parameters and procedures to mitigate harmful vibrations and optimize performance.</p>

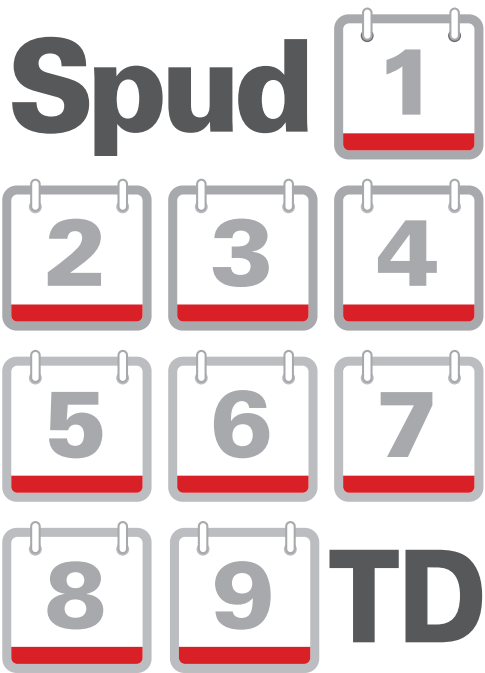
Record-setting

9,124-foot lateral

IN JUST 119 HOURS

by using the right tools and technology

Average lateral well - 4,000 feet



Halliburton drilled the entire 16,020-foot horizontal well in less than 10 days.



Optimized drilling practices minimized stick-slip by 32 percent, enabling one bit to be used for the entire length of the lateral.



Halliburton helped the operator drill the record well with no drilling-related, non-productive time or safety incidents.

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9,124-foot lateral set DJ Basin record

By leveraging field experience and advanced technology, Halliburton recently helped an operator drill a record-setting lateral in the DJ Basin. At 9,124 feet, the lateral more than doubles the basin's average lateral of 4,000 feet.

To achieve this, Halliburton implemented its "model, measure and optimize" method. Teams analyzed data from previous wells, created detailed models, optimized a solution and reviewed well performance in real time. The long-reach horizontal well dramatically improved reservoir exposure and well production while minimizing surface footprint.

Torque and drag modeling helped prevent drilling problems

As laterals increase, so do technical hurdles. The extreme distances make torque and drag issues difficult to overcome. Without proper measures in place, excessive torque and drag can lead to many drilling problems, such as reduced directional control, sticking, doglegs and poor hole cleaning. Halliburton optimized drillstring design and applied a custom lubricant cocktail to optimize wellbore friction and improve drilling efficiency. Then, teams used Landmark's WELLPLAN™ Torque and Drag Analysis program to run daily models of the wellbore. Throughout drilling, the real-time data showed no evidence of excessive torque or drag.

32 percent stick-slip reduction enabled a one-bit, one-run lateral

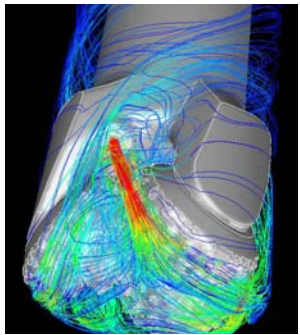
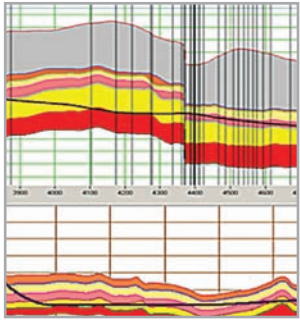
Excessive stick-slip and vibration can damage the bottomhole assembly and reduce the life of the drill bit. Halliburton used a test well to identify potential causes of downhole shocks and vibration in this geology. Then, Halliburton adjusted drilling parameters, ultimately reducing stick-slip by 32 percent.

"Choosing the right bit for the formation was crucial," said Jeff Sack, Business Development Sales Manager at Halliburton. "We needed a bit that could last and successfully navigate 9,000+ feet. By minimizing stick-slip, we were able to use one bottomhole assembly throughout the entire length of the lateral – and drill it all in just one run."



Halliburton used custom tools and real-time technology to drill the longest horizontal well in the DJ Basin. In less than 10 days, Halliburton drilled the entire 16,020-foot horizontal well, including its record-setting 9,124-foot lateral section.

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Real-time modeling, monitoring and optimization

“The implementation of the ‘measure, model and optimize’ method turned data into usable information,” said Sack. “We were able to look at the data in real time, compare it to the models and make downhole adjustments instantly.”

For example, Halliburton used StrataSteer® 3D geosteering service to make immediate geosteering decisions, navigate through faulted zones and maximize contact with the reservoir. To monitor the hydraulics of the well, Halliburton used Baroid’s Drilling Fluid Graphics (DFG™) program. The DFG program allowed users to simulate fluid properties and cuttings removal in real time.

Total depth in 10 days with zero NPT or safety incidents

Continuous optimization, real-time collaboration and in-depth planning helped Halliburton push the limit of horizontal wells in the DJ Basin. The record-setting lateral was drilled in 119 hours using just one bit in one run. And the entire 16,020-foot well was drilled in just under 10 days – with zero drilling-related non-productive time or safety incidents.

“Based on the information we had, we were confident that we were going to achieve the results, but the efficiency in which we did so was beyond expectations,” said Sack.

“The operator recently set a goal to drill standard horizontal wells in 10 days. Now we have drilled an extended-reach well in the same time frame.”

Jeff Sack, Business Development Sales Manager, Halliburton