Case study: Johnson County, Wyoming

LATIDRILL water-based fluid system provided excellent wellbore stability

The Baker Hughes **LATIDRILL™ high-performance, water-based fluid system** was used on an extended-reach, exploratory well located in Johnson County, Wyoming. While drilling the 12 ¼-in. hole at 7,536 ft (2297 m) with a water-based mud (WBM), wellbore conditions deteriorated and the drillstring became stuck. The operator worked the drillstring until it became free. To provide a more stable wellbore, the operator used the LATIDRILL fluid system to displace the original WBM.

The remainder of the section was drilled without issue. The 9 5/8-in. casing was run and cemented successfully at 10,131 ft (3098 m). While drilling cement and the casing shoe, rheological properties were easily managed. Proprietary Baker Hughes **Advantage™ software** was used throughout the well to capture torque and drag data and provide hole-cleaning analysis to minimize the formation of cuttings beds in the lateral section.

The operator wanted to core four separate zones using the LATIDRILL system. The Baker Hughes **LATIRATE™ rate of penetration (ROP) enhancer and lubricant** was pumped as a sweep to minimize torque issues while coring. Torque was reduced by 75% while retrieving the cores and the operator was able to retrieve 100% of each core.

The lateral section of the well was drilled from 12,945 ft to 17,250 ft (3946 m to 5258 m) measured depth. After coring, the well was plugged back and the curve was drilled from 11,575 ft to 12,945 ft (3528 m to 3946 m) measured depth with a total vertical depth of 12,517 ft (3815 m) at 89°. The Baker Hughes **LATIMAGIC™ wellbore stabilizer and lubricant** provided a gauge wellbore throughout the section and contributed to hole stability, particularly during 25 days of open hole. The LATIRATE lubricant was again pumped as a sweep.

Torque and drag were reduced by 50 to 75% in the two sections and ROP was improved by 40 to 60 ft/hr (12 m/hr to 18 m/hr). The LATIRATE enhancer and lubricant was used in sweeps at a concentration of 5% v/v.

Rheological properties were easily maintained and there was no cement contamination. There were no problems with hole cleaning or sliding while building the curve. After being used for more than two months, the LATIDRILL fluid was stored for use on the next well.

The LATIDRILL system saved the customer $13,000 USD in drilling fluid costs alone. It also eliminated non-productive time caused by drilling fluid-related issues and further reduced costs by cutting the number of trips needed for additional bits and to address bottomhole tool-related issues.

Challenges

- The hole was open for 28 days while coring and logging
- The hole was open for 25 days while drilling the lateral section

Results

- Avoided hole cleaning issues
- Avoided cement contamination issues
- Supplied efficient operations for four 60-ft coring runs
- Delivered 100% retrieval of the four cores
- Extended Wireline logging without a wiper trip
- Provided excellent wellbore conditions
- Provided two days of successful logging operations
- Provided excellent wellbore stability
- Avoided sliding while building the curve
- Ensured stable mud properties for the entire interval
- Ensured successful liner operations