Integrated BHA Enables Drilling 3,146 ft and Underreaming 6,422 ft to Reach TD in One Run

Rhino XC 9250 reamer and PowerDrive X6 RSS perform efficient HEWD operation with low stick/slip in swelling shale, Alaska

CHALLENGE
Execute hole enlargement while drilling (HEWD) in unstable shale formation while minimizing shock and vibration, stick/slip, and rig time and while maintaining wellbore integrity.

SOLUTION
Use an integrated drilling solution that included the Rhino XC* 9250 on-demand hydraulically actuated reamer, PowerDrive X6* rotary steerable system, and low-solids nondispersed (LSND) fluids from M-I SWACO, a Schlumberger company.

RESULTS
- Drilled ahead closed for 3,146 ft [959 m], then underreamed a 6,422-ft [1,957-m] interval in one run while maintaining wellbore stability.
- Improved hole cleaning by circulating for 173 total hours and 288 hours below rotary with two tool indexes.
- Ensured excellent 7½-in casing run to 13,460-ft [4,103-m] MD with manageable tight spots encountered near TD.

Enlarge hole while drilling in unstable shale formation
An operator in Alaska wanted to enlarge a 9½-in pilot diameter to 11 in during a drilling run. However, the shale formation in which the operator would be drilling was highly unstable and posed significant challenges, including shock, vibration, and stick/slip. The operation required a customized BHA that would meet drilling objectives while minimizing rig time and upholding operational integrity.

Run Rhino XC reamer and PowerDrive X6 RSS in integrated BHA
Schlumberger was chosen for the job because it offered a track record of success in its portfolio of RSS, logging, fluid, and underreaming services. After considering the field’s parameters and the customer’s drilling objectives, Schlumberger recommended an integrated BHA that included the Rhino XC 9250 reamer, which eliminates time-consuming pumpdown activation and can be placed anywhere in the drillstring. It features a one-piece, balanced design that increases torque and load-carrying capacity while reducing drilling-generated vibrations.

The drillstring also included the push-the-bit PowerDrive X6 RSS, which delivers full directional control while rotating the drillstring. Full rotation reduces drag, improves ROP, decreases the risk of sticking, and achieves superior hole cleaning.

Additionally, for maintaining wellbore stability, the Schlumberger team suggested running LSND fluids and closely monitored the fluids’ properties during the operation.

Meet drilling objectives in one run with minimal reamer wear
Using the integrated BHA, the operator drilled ahead dormant for 3,146 ft [959 m] then underreamed from 6,946-ft [2,117-m] MD to 13,368-ft [4,075-m] MD in one run. Wellbore stability was well maintained. The Rhino XC reamer activated at the opening depth, deactivated at TD, and enabled circulating 173 hours and 288 hours below rotary with two tool indexes.

The BHA drilled a collective 9,568 ft [2,916 m]. When POOH after reaching TD, the Rhino XC reamer was found with 1-1 WT dull grade—no notable dull characteristics. The operator also achieved an excellent 7½-in casing run to 13,460-ft [4,103-m] MD and easily overcame tight spots that were encountered near TD.