Schlumberger

Rhino XC Reamer and AxeBlade Bit Save 48 Hours and USD 240,000 in Tripping-Related Costs

PEMEX uses on-demand multiactivation reamer and ridged diamond element bit to maximize ROP and footage, Gulf of Mexico

CHALLENGE

- Perform a hole-enlargement-while-drilling (HEWD) operation on a section of an offshore exploratory well that contains interbedded sand, salt, and shale formations.

SOLUTION

- Use a Rhino XC* on-demand hydraulically actuated reamer and an AxeBlade* ridged diamond element bit to complete the operation in a single trip.

RESULTS

- Achieved multiactivation and drilled to TD in a single run, saving 48 hours and USD 240,000 in tripping-related costs.

Perform a HEWD operation through interbedded formations

PEMEX wanted to drill a 12¼-in hole while simultaneously enlarging it to 14½ in for an offshore exploratory well. The section, from 4,028-m to 5,516-m MD [13,215-ft to 18,097-ft MD], was made up of interbedded sand, salt, and shale formations with an unconfined compressive strength (UCS) between 3,000 and 12,000 psi [20.7 and 82.7 MPa].

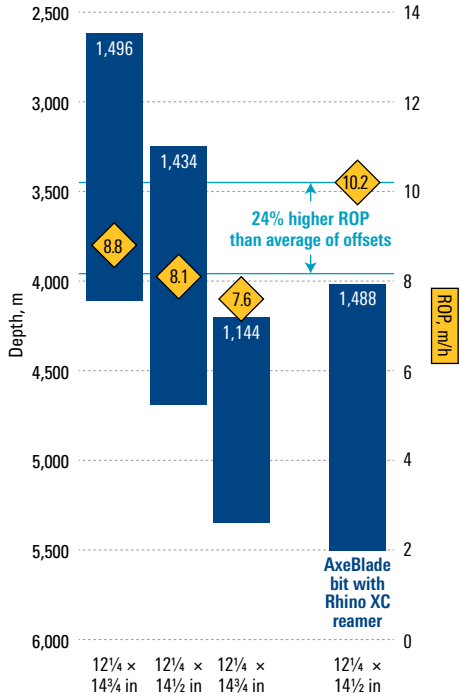
At approximately 4,800-m [15,744-ft] MD, PEMEX would decide whether to continue drilling or run the contingency 11⅞-in liner. If PEMEX decided to continue drilling, it would require a reamer with the ability to activate multiple times. This would eliminate the extra trip required to replace the BHA.

Use the Rhino XC reamer and an AxeBlade bit for a single-run operation

By using the IDEAS* integrated dynamic design and analysis platform, PEMEX was able to achieve optimized drilling BHA dynamics and determine bit, reamer, RSS, and measurement tool compatibility. Well HOK-1 presented an excellent opportunity to demonstrate the successful and reliable activation and deactivation capabilities of the Rhino XC reamer. In addition, Schlumberger proposed that PEMEX use 13-mm Predator* cutter blocks and a 12¼-in X616Z AxeBlade bit to maximize ROP and footage drilled.

Saved USD 240,000 in tripping-related costs

At 4,804-m [15,761-ft] MD, PEMEX decided to deactivate the Rhino XC reamer and continue drilling with the AxeBlade bit to TD at 5,516-m [18,097-ft] MD.



The AxeBlade bit drilled the footage at a high ROP.

The Rhino XC reamer showed little to no wear.

The section was completed in a single run, with a total of 1,488 m [4,882 ft] drilled at an average ROP of 10.2 m/h [33.5 ft/h]. Combined with the increased ROP provided by the AxeBlade bit, the Rhino XC reamer saved 48 h and USD 240,000 from tripping and BHA replacement costs. The bit and reamer experienced little wear.

Throughout the run, there were zero service quality incidents and zero NPT related to the Rhino XC reamer and AxeBlade bit. In addition, there was no shock and vibration recorded. The 9⅞-in casing was subsequently run to TD without issue.