Magnus® RSS and RipTide® Reamer Drill and Enlarge Well in 1 Run, Save 2 Days of Rig Time

Objectives

- Drill and enlarge the 8 1/2- × 9 1/2-in. hole section of a well in the Cretaceous formation in a single run.
- Achieve an average on-bottom rate of penetration (ROP) of no less than 29 ft/hr (9 m/hr).
- Stay within 16 ft (5 m) of the planned well trajectory and keep the dogleg severity (DLS) less than 3.0°/100 ft (30 m) to minimize borehole tortuosity and maintain good hole quality.

Our Approach

- Before the job, the Weatherford drilling and evaluation team met with the customer to establish the scope of work and analyze offset well data. To counteract torsional vibration while improving drilling efficiency, the team recommended a different bit with specialized cutter technology.
- Using proprietary drilling engineering software and criteria, the team performed an extensive analysis on the drilling BHA. The analysis included BHA stabilization, torque and drag analysis, hydraulics modeling, bit nozzle optimization, bending stress test, and more.
- The team deployed the BHA, including the Magnus rotary steerable system (RSS), RipTide drilling reamer, HEL™ hostile-environment logging system, and MFR™ multi-frequency resistivity sensor. The RSS and reamer combination enabled drilling to improve hole conditions, save rig time, and optimize casing running.
- The Magnus RSS kicked off through the whipstock and built up to a maximum inclination of 36.58° with a maximum DLS of 2.92°/100 ft (30 m). The RSS maintained the tangent, and then it dropped inclination with a maximum DLS of 2.65°/100 ft (30 m) to enter the vertical.
- The RipTide drilling reamer achieved an ROP of 40 ft/hr (12.1 m/hr), or 35% faster than the programmed ROP of 33 ft/hr (10.0 m/hr).
- A Drilling Engineering and Drilling Optimization team at a real-time operation center (RTOC) analyzed live data transmitted from the rigsite via WITSML to optimize the drilling process, which resulted in 208 circulating hours—the most on a Magnus RSS run to date.
- The RSS drilled for 5,367 ft (1,636 m) until reaching total depth (TD) at 13,741 ft (4,107 m). The entire underreaming-while-drilling operation was completed without nonproductive time (NPT).

Value to Customer

- The Magnus RSS and RipTide drilling reamer enabled the customer to reach TD in one run without NPT. Compared to an operation with separate drilling and reaming runs, the combination saved 2 days of rig time valued at US $270,000.
- Together, the RSS and reamer increased the actual ROP versus the planned by 35%.
- The drilling technologies enabled achieving the planned trajectory of 2.0°/100 ft (30 m) while keeping the DLS below 3.0°/100 ft (30 m).

Pictured above, the Magnus RSS and RipTide drilling reamer combined to perform drilling and reaming operations on the same run.

LOCATION
Villahermosa, Mexico

WELL TYPE
Onshore, S-type, oil

HOLE SIZE AND ANGLE
8.5 × 9.5 in., 36°

DEPTH
13,741 ft (4,107 m)

PRODUCTS/SERVICES
- Magnus RSS
- RipTide drilling reamer
- HEL MWD system
- MFR multi-frequency resistivity sensor
- RTOC

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