Magnus® Rotary Steerable System

Sets Field ROP Benchmark and Saves 9 Days of Rig Time, $1.1 Million in Iraq

Objectives

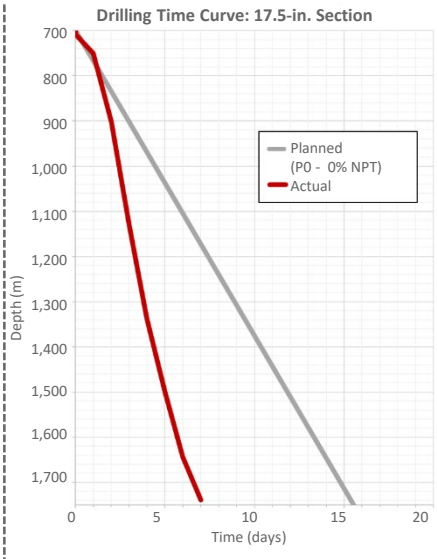
- Drill the 17.5-in. hole section in a single run by kicking off from vertical and building to a 39° inclination with a 3°/100 ft (30 m) dogleg while maintaining the tangent to section total depth (TD).
- Use a minimum of stabilization points in the bottomhole assembly (BHA) and the optimal mud weight and parameters for hole cleaning when drilling through the time-dependent, tectonically unstable Kolosh formation.
- Select a standard bit from the customer's existing inventory to minimize drilling cost.

Our Approach

- Using the Weatherford Drilling Engineering Standard and Process, the well delivery team conducted a comprehensive offset well review for the field to identify all risks, including stuck pipe, wellbore instability, and high torque and drag problems as the main issues.
- The Weatherford team recommended using the Magnus rotary steerable system (RSS)—a fully rotating, push-the-bit technology that uses proportional steering control—to achieve the best drilling performance while mitigating all drilling and tripping risks.
- The team deployed the Magnus RSS, kicked off from vertical, and built to a 39° inclination with a maximum dogleg of 3.75°/100 ft (30 m). The inclination held in autopilot mode through the Kolosh formation to section TD.

Value to Customer

- Using the Weatherford Magnus RSS enabled the customer to save 9 days of rig time and $1.1 million in associated rig costs when drilling the 17.5-in. hole section. Although the planned drilling time was 16 days, the RSS finished in only 7 days.
- The Magnus RSS achieved three times the expected on-bottom rate of penetration (ROP) and set a new benchmark ROP for the field. Specifically, it drilled 28.9 ft/hr (8.8 m/hr), which compares to the anticipated rate of 9.8 ft/hr (3 m/hr) based on offset wells.
- The RSS drilled the section in a single run without nonproductive time. Borehole tortuosity was minimized, hole quality was maintained in good shape, and the formation was exposed for a limited time, which mitigated issues with hole instability.
- The smooth borehole drilled by the Magnus RSS allowed the 13 3/8-in. casing to be run to bottom successfully without issues.



The above graph compares the actual time (red) and the planned time (gray) to drill the 17.5-in. hole section. The Magnus RSS reached section TD in only 7 days.

LOCATION
Erbil, North Iraq

WELL TYPE
Onshore, oil, J-type

FORMATION
Kolosh

HOLE SIZE AND ANGLE
17-1/2 in., vertical to 39° inclination

MAXIMUM DOGLEG SEVERITY
3.75°/100 ft (30 m)

DEPTH
- In: 2,323 ft (708 m)
- Out: 5,705 ft (1,739 m)
- Total: 3,383 ft (1,031 m)

PRODUCTS/SERVICES
- Drilling services
- Magnus RSS
- HEL™ hostile-environment-logging MWD system
- CrossWave® sonic LWD tool
- Downlink Commander® bidirectional communication technology

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