Motorized Magnus® RSS Sets Performance Benchmark With 25% ROP Improvement in a Middle Eastern Field

Objectives

- Drill a challenging 16-in. hole section in a single run.
- Kick off and build from vertical with a 1.4 to 1.8° dogleg to an angle of 21.5°.
- Actively monitor the borehole annular pressure to optimize rheological and pore pressure properties for a stable wellbore.
- Geostop at the right depth using real-time data to avoid hole collapse and caving when drilling in problematic formations that require high mud weights and proper control.

Our Approach

- After a detailed in-house review of offset wells drilled in the field, Weatherford compiled a Front End Engineering Document (FEED). This FEED contained an engineering analysis of the various risks and a design-for-success approach to ensure drilling the well section in a single run at improved performance levels.
- The operations team deployed a motorized Magnus rotary steerable system (RSS) to drill the well section. While the Magnus RSS 1100 provided independent pad control, an integrated near-bit gamma ray sensor enabled geostopping in real time before entering the problematic formation, and a borehole annular pressure (BAP) sensor offered active monitoring of wellbore equivalent circulating density.
- Throughout the operation, drilling experts at the Weatherford Real-Time Operations Center (RTOC) in the Middle East provided support by monitoring job performance to optimize well delivery.
- The motorized Magnus RSS drilled the section in 38.2 hours and achieved an average rate of penetration (ROP) of 24.6 ft/hr (7.5 m/hr), which surpassed the previous field record.
- The streamlined design enabled proper hole cleaning and a smooth trip in and out of the hole to facilitate subsequent event-free well-construction success.

Value to Customer

- The Magnus RSS 1100 drilled a 16-in. hole section in one run and set a new benchmark ROP for the field. With the ROP improvements alone, the customer saved 12 hours of rig time equivalent to US $32,000.
- The BAP sensor enabled the customer to manage hole cleaning and eliminate a mid-section wiper trip, which saved hours of rig time.
- With the success of these services and technology, Weatherford has established a presence as a performance leader in this highly competitive market.

The Magnus RSS 1100 improved upon the previous field record for ROP, which by itself saved half a day of rig time.

LOCATION
Northern Arabian Gulf

WELL TYPE
Onshore, directional, deep gas

FORMATION
Sandstones, limestone interbedded with shales, and anhydrites interbedded with limestones and shales

HOLE SIZE AND ANGLE
16-in. hole built to 21.5°

CASING SIZE
Drilled out of 18-5/8 in.

PRODUCTS/SERVICES
- Magnus RSS 1100
- HEL™ measurement-while-drilling system
- Near-bit gamma ray
- BAP sensor
- RTOC

Weatherford®