

Magnus[®] RSS Achieves a Central North Sea First by Drilling 17 1/2-in. Hole to Hod Formation in 1 Run

Objectives

- Drill starting at a 20-in. shoe in the tertiary formation, build from vertical to a 17° tangent, and hold the angle until total depth (TD) in the top chalk formations.
- Obtain recorded and real-time logging-while-drilling (LWD) data while avoiding nonproductive time (NPT).

Our Approach

- Before drilling, Weatherford initiated a rigorous drilling engineering process with four major steps: design, execution, evaluation, and optimization. The process entailed activities such as performing a risk assessment, optimizing the bottomhole assembly (BHA) and drilling parameters based on previous experience, and enlisting the support of the Real-Time Operations Center (ROTC) for flawless execution.
- The Weatherford drilling team recommended a solution with a Magnus 1100 rotary steerable system (RSS) and LWD technologies. The strategy included using the RSS on a second bit run to drill the 17 1/2-in. section to TD instead of a positive displacement motor as in previous offset wells. It also included LWD tools to acquire real-time and recorded data on temperature, bore and annular pressure, vibration, equivalent circulating density (ECD), gamma and near-bit gamma ray responses, resistivity, and compressional and shear slowness.
- Upon deployment, the RSS drilled from the shoe, built from vertical with dogleg severity (DLS) below 2°/100 ft (30 m), reached the tangent angle, and then continued in autopilot mode to minimize wellbore tortuosity. A detailed hydraulic analysis helped the team to optimize directional performance within required flow rates, maintain parameters within tool specifications, and manage ECD by comparing real-time data against the model.
- The team managed drilling parameters in real time to optimize the rate of penetration (ROP). This optimization helped to extend the bit run into the formation from the shoe—a feat that no other service provider or bit has achieved in the Central North Sea to date.
- Although the team anticipated a bit trip after drilling 90 ft (27.4 m) of the upper chalk formations, the RSS actually drilled 1,675 ft (510.5 m) in a single run for final well placement in the Hod chalk formation just 3.4 ft (104 cm) above and 0.3 ft (9 cm) to the left of the planned trajectory.

Value to Customer

- The Magnus RSS enabled drilling from a 20-in. shoe to the Hod formation in one run, thus achieving a Central North Sea first. In addition to extending the run length, it met all directional objectives.
- LWD technologies delivered 100% of the required data in real-time and recorded modes without NPT or issues with any of the BHA components.



The Magnus RSS uses proportional steering control along with autopilot mode to optimize wellbore quality and minimize downlink time.

LOCATION

United Kingdom North Sea

WELL TYPE

Offshore, J-shape

HOLE SIZE AND ANGLE

17-1/2 in., build from vertical to 17° inclination

DEPTH

3,902 to 11,366 ft (1,189 to 3,464 m)

RUN LENGTH

7,464 ft (2,275 m)

MAGNUS RSS 1100 RECORDS

- Drilling hours: 190.28
- Circulating hours: 248.47
- Operating hours: 334.75

PRODUCTS/SERVICES

- Magnus RSS
- SeaShield[®] Model 7875 rotating control device
- HEL[™] hostile environment logging system
- BAP[™] bore and annular pressure sensor
- HAGR[™] hostile azimuthal gamma ray tool
- TVM[™] true vibration measurement system
- IDS integrated directional sonde
- ShockWave sonic LWD tool
- RES reservoir evaluation system

