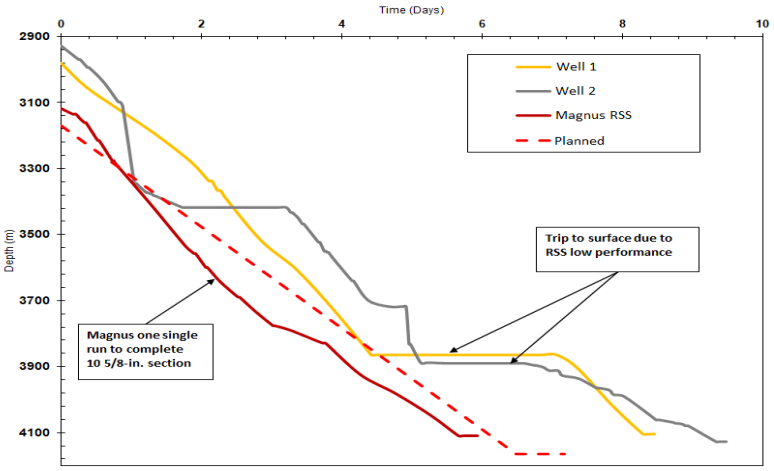
Magnus RSS, MFR LWD Technology Maintained Planned Trajectory, Completed Section in One Run, Reduced NPT by 1 Day, Saved $73,000 USD



Time vs. depth comparison showing the efficiency and precision of the Magnus RSS.

Objectives

- Drill a 10 5/8-in. hole section through intercalated formations with high uniaxial compressive strength (UCS) up to 10,000 to 40,000 psi (68.9 to 275.7 MPa) and low pore pressure.
- Deploy a rotary steerable system (RSS) with the versatility to use a specific sacrificial fluid—seawater—with low viscosity and minimum corrosion treatment.
- Log the entire section with logging-while-drilling (LWD) technology, ensuring the last 656 ft (200 m) is logged with near-bit gamma ray.

Our Approach

- According to offset wells information, the main challenges for this section were fluid losses, influx, high drilling torque, and torsional vibrations. Significant damage in directional tools related to corrosion had been seen in previous jobs.
- The push-the-bit Magnus® RSS was proposed to minimize stabilized points on the bottomhole assembly (BHA). The versatility of the Magnus RSS features enough stabilized points to mitigate vibrations and ensure operations continuity without sacrificing the needed steerability. In addition, the independent pad control delivers a smooth hole to prevent high drags and helps to successfully run the casing. The capability to set the tool in steering off allows the Magnus RSS to drill through zones with high vibrations and minimize tool wear which means more operational hours.

LOCATION
Mexico

WELL TYPE
Offshore development, J-type

FORMATION
Paleocene, Cretaceous, and Jurassic

HOLE SIZE AND ANGLE
10-5/8 in., 21°

LINER SIZE
9-5/8 in.

TEMPERATURE
183°F (84°C)

DEPTH
In: 10,213 ft (3,113 m)
Total Depth: 13,484 ft (4,110 m)

PRODUCTS/SERVICES
- Magnus RSS
- MFR™ multi-frequency resistivity sensor
- HEL™ hostile-environment-logging measurement-while-drilling system
- CENTRO Well Construction Optimization Platform
- OneSync® drilling optimization software platform

Weatherford®

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Our Approach (continued)

- A fit-for-purpose bit—developed by collaboration with the bit provider as part of the drilling engineering process (evaluation and optimization)—provided a specific cutting structure to meet the expected rate of penetration (ROP) and mitigate torsional vibration.
- The CENTRO™ Well Construction Optimization Platform collected hole data, and the drilling parameters were monitored by the Weatherford Real-Time Operations Centre (RTOC), discarding hole instability during hole drilling, especially where wellbore stability gradient was close to mud weight and the evaluation of torque and drag with software simulation versus actual values was critical to continue drilling.

Value to Customer

- The Magnus RSS effectively overcame the expected challenges (lateral vibrations, stick-slip, high-frequency torsional oscillation (HFTO), tool damage and corrosion) by using a fit-to-purpose design of pads and pad housing to resist the hostile environment. The independent pad control, steering-off mode capability, and specific bit design enabled a stable torque that minimized tool wear and allowed the 10 5/8-in. section to be drilled in one run.
- The newly developed bit design minimized erratic oscillating torques with values of 18,000 to 20,000 lb-ft (24,404 to 27,116 N-m) and low torsional vibrations. Due to limitations of the drilling equipment, the ROP only reached 30.1 ft/hr (9.19 m/hr), an efficiency rate of 84%.
- The 3,271-ft (997-m) run was delivered in 134.82 circulation hours, eliminating a second run, saving 1 day of rig time and associated costs, approximately $73,000 USD.
- The survey distance separation to directional plan was 10.4 ft (3.17 m), incurring no nonproductive time (NPT) related to the directional drilling service.