

Operator Saves USD 3.4 Million in Presalt Drilling

COMPREHENSIVE DRILLING SOLUTION INCLUDES UP FRONT PLANNING AND MODELING, REAL-TIME MONITORING, AND THE GEOPILOT® DURO™ RSS WITH ADVANCED FEATURES

BRAZIL

CHALLENGE

- » Reduced rig time and lower drilling costs by minimizing vibration, stick-slip, and torque in difficult-to-drill deepwater salt formation

SOLUTION

- » Upfront planning and modeling with COMPASS™ and DrillingXpert™ software; real-time monitoring by DES and ADT® specialists; and Geo-Pilot® Duro™ RSS with advanced features

RESULTS

- » Drilled 5,712-foot (1,741-meter) salt section in a single run with minimal stick-slip vibration and torque issues
- » Saved 5.7 days of deepwater rig time and an estimated USD 3.4 million in associated drilling costs

OVERVIEW

In Brazil's presalt deepwater reservoirs, being able to accurately drill to the well plan at water depths of over 6,800 feet (2,072 meters) is difficult because of the long and complex salt sections present before reaching the hydrocarbons. Common challenges that include high risks of stuck pipe due to salt fluidity/mobility, high levels of stick-slip torsional vibration, and high-torque environments result in longer well time, lower rates of penetration (ROPs), and nonproductive time (NPT).

An operator drilling in this environment was looking for a solution to reduce rig time and lower costs. To reduce well time and minimize stuck-pipe events in a single run, Sperry Drilling advised the operator to utilize a comprehensive drilling solution that included upfront planning and modeling, real-time monitoring, and the Geo-Pilot® Duro™ rotary steerable system (RSS) with advanced features.



OPERATOR NEEDS TO DRILL THROUGH DIFFICULT SALT SECTION IN SINGLE RUN

This operator was experiencing poor drilling performance due to issues such as high vibration, stick slip, and stuck pipe when drilling through problematic salt sections, and these problems were leading to low drilling efficiency and increased rig time. In addition, this particular salt section, characterized by different salt and igneous rock intercalations, made it difficult to drill in a single run because the hardness of the formation and interbedded drilling could prematurely wear out drill bits, causing tool failures and extra trips. The operator needed a solution that could drill through the 5,712-foot (1,741-meter) salt section in a single run in order to save rig time and to decrease drilling costs.

COMPREHENSIVE RSS SERVICE ADDRESSES DIFFICULT SALT SECTION

Through close collaboration with the operator, Drilling Engineering Solutions (DES) experts from Sperry Drilling engineered a drilling solution to deliver an optimized bottomhole assembly (BHA) and improve drilling performance. The recommended solution included upfront planning and modeling, real-time monitoring, and Geo-Pilot Duro RSS with advanced features. These components enabled the operator to have increased drilling parameters for higher drilling performance in harsh environments, while minimizing NPT and reducing shock and vibration. Upfront planning included the COMPASS™ directional well path planning software and DrillingXpert™ software to help ensure safety, efficiency, and optimal wellbore positioning.

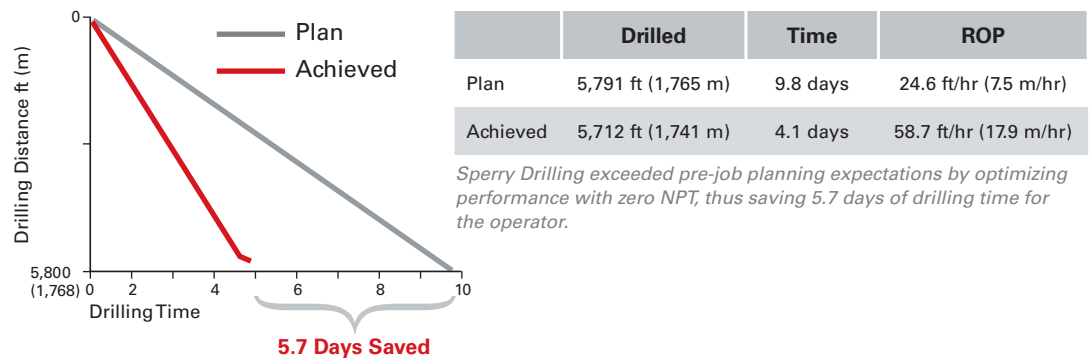
As compared to the original plan, total drilling time was reduced by 5.7 days (a reduction of 60 percent), saving deepwater rig time and all the associated costs.

To address the difficult salt section of the well, the Geo-Pilot Duro RSS was deployed in what would be its first application in Brazil. The Geo-Pilot Duro RSS was engineered for improved durability and performance in harsh environments, where optimal drilling efficiency and trip time are essential. With the highest torque rating in the market, the ruggedly built RSS offers enhanced shock and vibration performance, along with improved stick-slip tolerance. It also allows higher drillstring rotation speed and drilling parameters to overcome torsional resistance. The Geo-Pilot RSS is a true point-the-bit RSS that does not rely on the formation to steer, which is especially advantageous in salt sections. In order to deliver a quality borehole, the DES team placed the EZ-Sleeve™ stabilizer, an improved bit sleeve design from Halliburton Drill Bits and Services, at the bottom of the RSS and just above the bit. Keeping the wellbore in gauge reduces the onset and severity of vibration and wellbore friction, resulting in lower torque and drag values and increased drilling efficiency.

DES and Applied Drilling Technology (ADT®) specialists monitored drilling operations and provided advice on drilling parameters in real time, leading to maximized drilling performance. Directional drilling and measurement-while-drilling/logging-while-drilling (M/LWD) services were also implemented to monitor key parameters such as vibrations and bottomhole pressures to improve drilling efficiency. Correlation with formation evaluation data and subsurface drilling parameters enabled corrective actions to be taken to reduce vibration and improve performance. An active heave compensator (AHC) system was also used to minimize stick-slip vibration.

ENGINEERED DRILLING SOLUTION HELPS OPERATOR MAXIMIZE ASSET VALUE AND REDUCE TOTAL DRILLING TIME BY 5.7 DAYS

With a comprehensive drilling solution that included the Geo-Pilot Duro RSS, the operator was able to drill the salt section in a single run. Compared to the original plan, total drilling time was reduced by 5.7 days (a reduction of 60 percent), significantly saving deepwater rig time and lowering drilling costs by an estimated USD 3.4 million, maximizing the value of the operator’s deepwater asset. Approximately 5,712 feet (1,741 meters) of the salt/carbonates section were drilled with an average ROP of 58.7 feet/hour (17.9 meters/hour). The trajectory was corrected without problems, accurately placing the well in the target area. Stick-slip vibration was also minimized during the drilling operation with high rotational speeds (180 to 190 rpm) and a soft speed-enabled top drive to vary the RPM according to the torque fluctuation and AHC system. The operator stated that it was impressed with the Sperry Drilling team’s technical expertise, reservoir insight, and execution – therefore, the operator plans to use the Geo-Pilot Duro RSS combined with upfront planning, modeling, and real-time monitoring in the salt sections on future wells in order to reduce total well time.



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