

Case study: Directional Drilling

Location: Argentina

Aligned with United Nations Sustainable Development Goals:
13 — Climate action.

Vista Oil & Gas Drills Shoe to Shoe in a Single Run Through Interbedded Formation, Onshore Argentina

Integrated technologies helped the operator save 2 days while drilling a horizontal well, enabling lower carbon emissions

Emissions Reduction:
Lowered CO₂ by 46 metric tons

Vista Oil & Gas used a DynaForce* high-performance drilling motor with PowerDrive Orbit G2* rotary steerable system (RSS) to drill a complex well shoe to shoe in a single run, saving 2 drilling days and reducing carbon emissions by 46 metric tons.†

Reduce the amount of time to drill a complex, horizontal well

The Medano de la Mora Field located onshore Argentina lies in the Quintuco and Vaca Muerta interbedded and fractured rock formations. Given the field's high-vibration environment, the operator wanted to efficiently execute its horizontal well plan. The attempts to drill curves and laterals in this environment increased the risk of downhole tool failures and undesirable trips to change the BHA.

The previous approach using a conventional motor BHA required spending time to slide the well with low ROP due to hanging and stalling issues. The complexity of the wells is high and required managed pressure drilling (MPD) for well control due to narrow mud-weight windows, which sometimes caused fluid losses that had to be addressed while drilling to TD. Unplanned trips have significant impact, increasing the well cost and time delivery. Simultaneously, the wells were also challenged by risky dynamic drilling scenarios, including stick/slip, shocks, and often times temperatures up to 145 degC while geosteering a narrow window in the horizontal sections.

The production section of the well was initially planned for two runs: one for the curve and one for the lateral. However, there was opportunity to reduce the time cost of the project utilizing the right technology.

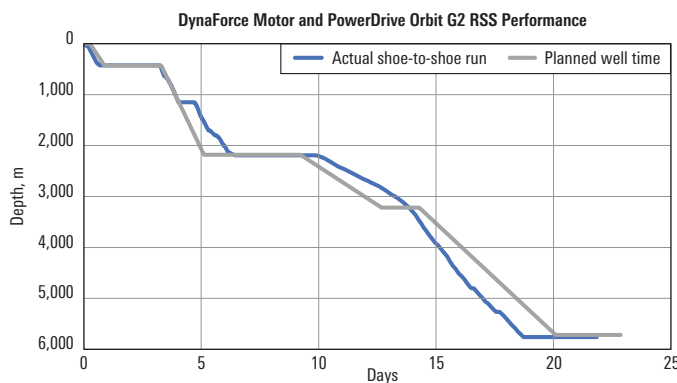
Drill shoe to shoe using an integrated engineering solution

To increase the distance drilled using an integrated engineering solution, Schlumberger proposed a BHA that combined a DynaForce high-performance drilling motor with a PowerDrive Orbit G2 RSS to efficiently drill the curve and lateral. Designed for challenging well profiles and harsh environments, DynaForce motors improve ROP with increased torque output to drill a smooth wellbore per trajectory requirements. PowerDrive Orbit G2 RSS delivers the power and precision required to place wells with greater accuracy and safety to minimize stuck pipe incidents, maximize drilling efficiency, maintain borehole quality, and enhance hole cleaning. It is also capable of providing near-bit extended-range gamma ray measurements that transmit additional well positioning data for real-time decision making.

Saved two drilling days and lowered emissions

Using these integrated technologies, Vista Oil & Gas drilled a 6 $\frac{1}{8}$ -in production section shoe to shoe in a single run—saving two drilling days from the original plan while reducing CO₂ emissions by 46 metric tons.

The operator drilled a total of 3,568 m with excellent directional control in both the curve and lateral, while the DynaForce motor delivered consistent performance with 180 pumping hours and temperatures reaching 145 degC. The average ROP was 22.8 m/h with some instances of on-bottom ROP of up to 71 m/h, and no damage to the motor or the RSS was reported.



The DynaForce motor and PowerDrive Orbit G2 RSS enabled Vista Oil & Gas to drill shoe to shoe in a single run in an interbedded formation and saved 2 days from original planned well time.

"This was the first shoe-to-shoe run for Vista Oil & Gas. We were pleased with this successful run, which marked a huge milestone in our efforts toward continuous improvement and operational excellence."

Well Construction Manager, Vista Oil & Gas

†Calculations based on Schlumberger transitional methodologies.

*Mark of Schlumberger.
Transition Technologies is a mark of Schlumberger.
Other company, product, and service names are the properties of their respective owners.
Copyright © 2021 Schlumberger. All rights reserved. 21-WCDR-994387