DEEP WATER

CASE STUDY

Cerebro Force™ In-Bit Sensing and GeoTech® Drill Bit Set New Benchmark for Longest, Fastest Well Drilled in the Area

CAPTURING IN-BIT DATA ACCELERATED THE LEARNING CURVE AND IMPROVED DRILLING DYNAMICS AWARENESS

CARIBBEAN

CHALLENGE

- Gain better insight into a 90% unmapped block and field
- Create a reliable bit design that achieves TD in a single run
- Deploy in-bit sensing technology to a new area

SOLUTION

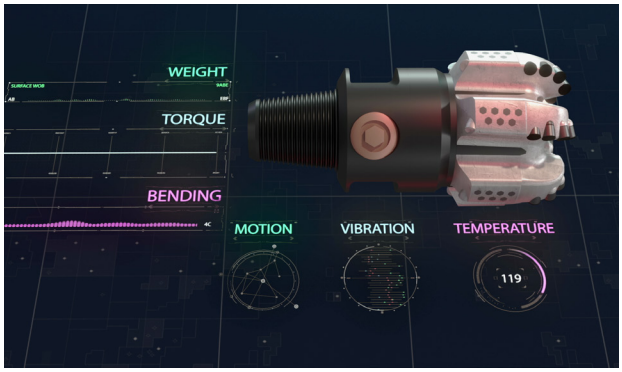
- Utilize DatCI℠ services to create a customized drilling solution
- Design an 8-1/2 in. GT75WMKF GeoTech® bit equipped with Cerebro Force™ in-bit sensing to capture weight, torque, and bending measurements directly from the bit

RESULT

- New benchmark set for longest, fastest well drilled compared to offset wells in the area
- TD reached in a single run
- 8-1/2 in. GT75WMKF GeoTech bit drilled 709 m at 16 m/hour, logging 140 hours of data capture
- Cerebro Force in-bit sensing provided a complete picture of the downhole drilling environment
- Road map created for offset exploratory well to permit more efficient, safer drilling to help mitigate damage to downhole tools and prevent unnecessary trips

OVERVIEW

Providing a customized drill bit and engineered solution, Halliburton Drill Bits and Services helped an operator in the Caribbean level up their drilling performance during a deepwater exploration project. This resulted in setting a new performance benchmark for the area while providing measures to enhance future drilling operations.



CHALLENGE

With only 10% of its block mapped to date, the Operator wanted to gain better insight into the block and field. The challenge was creating a reliable bit design that could achieve TD in a single run. Because previous drilling operations deployed only bits without sensors, no data at the bit had been recorded.

SOLUTION

Halliburton deployed Design at the Customer Interface (DatCI℠) services, which combines application intelligence, local expertise, superior execution, and business development to provide a customized drilling solution for this application. An 8-1/2 in. GT75WMKF GeoTech® bit equipped with Cerebro Force™ in-bit sensing was designed to capture weight, torque, and bending measurements directly from the bit. This information provides the operator with clearer picture of the downhole drilling environment, allowing room for future design improvement to drilling parameters or bit designs.

RESULTS

A new benchmark was set during this deep water exploration operation. The longest and fastest well in the area compared to offset wells was drilled while capturing in-bit data to maximize the learning curve and improve drilling dynamics awareness. The information captured was transmitted into an improved drilling parameter road map and can be used to enhance future well performance.

The 8-1/2 in. GT75WMKF GeoTech bit drilled 709 m total, including 67 m of hard drilling interval (HDI) with rock strengths ranging from 25-45 kpsi in one run to TD. Total ROP of 16 m/hour was achieved while continuously logging 140 hours of high speed in-bit data. Cerebro Force in-bit sensing provided rich insights into the performance of the drill bit and drilling assembly.

Gyroscope based bit speed measurements identified stick and slip vibrations during the drill out operation, which was not previously considered by the directional drilling company. Continuous 1024 Hz high-frequency recording enabled an in-depth post run analysis that identified a 104 Hz high frequency torsional oscillations (HFTO) present in the bottom hole assembly (BHA). These vibrations coincided with limestone stringers that were identified in mud logs and logging while drilling (LWD) data.

Insights from Cerebro Force in-bit sensing provided the operator and directional drilling provider with an improved road map for an offset exploratory well. The road map parameters are designed to effectively mitigate vibration hazards that are expected and will permit more efficient, safer drilling, while helping to lessen damage to downhole tools and unnecessary trips during future drilling operations.

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