EcoScope Service Acquires Real-Time Data to Guide Directional, Well Control in Narrow Mud Windows

Bowleven uses multifunction LWD to evaluate high-temperature wells offshore West Africa

**CHALLENGE**
Acquire high-quality, real-time formation evaluation data for wellbore assurance in a high-temperature reservoir.

**SOLUTION**
Use EcoScope* multifunction LWD service† to deliver high-quality, real-time data for informed decision making and formation evaluation analysis.

**RESULTS**
- Obtained a complete set of real-time information.
- Maintained verticality while drilling.
- Penetrated all targets as planned.
- Reduced overall risks and cost.

**Drill vertical wells with narrow mud windows**
Bowleven, an oil and gas group focusing on Africa, required the acquisition of high-quality data in real time to ensure operational safety while drilling an appraisal well and two exploration wells offshore Cameroon. The appraisal well would include a highly deviated sidetrack. The company needed to minimize drilling risks in narrow mud windows to prevent NPT and well control incidents, particularly in a high-temperature environment of 200 degC to an MD of 4,800 m.

**Ensure directional control with high-quality data**
The EcoScope multifunction LWD service was selected to mitigate drilling risks associated with the wells’ narrow mud windows and evaluate pore pressure used for predicting casing points. EcoScope service provided pulsed-neutron-generator–based neutron porosity, sigma, and spectroscopy data. These measurements reduced risks and costs associated with chemical source handling in the high-temperature, shallow-water environment and minimized rathole requirements with close-to-the-bit measurements. Real-time LWD data were also used to select the wells’ coring points while drilling to TD.

Additionally, APWD* annular pressure while drilling was used to manage equivalent circulating density and bottomhole pressure, enabling informed mud-weight calculations and estimations for handling well control incidents that occurred because of the narrow mud windows.

**Reduced overall risks and cost while increasing safety**
Using EcoScope multifunction LWD service provided comprehensive formation evaluation data to successfully manage the narrow mud windows and penetrate all the targets. The service contributed to an overall reduction of time, drilling risks, and costs. With the sensors located closer to the bit, Bowleven was able to obtain high-quality measurements in real time, minimizing the time spent retrieving critical information.

As a result of the success achieved in these wells, Bowleven plans to use Schlumberger MWD and LWD technologies in future operations.

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†Japan Oil, Gas and Metals National Corporation (JOGMEC), formerly Japan National Oil Corporation (JNOC), and Schlumberger collaborated on a research project to develop LWD technology that reduces the need for traditional chemical sources. Designed around the pulsed neutron generator (PNG), EcoScope service uses technology that resulted from this collaboration. The PNG and the comprehensive suite of measurements in a single collar are key components of the EcoScope service that deliver game-changing LWD technology.

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