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GeoSphere Service Enhances Coring Operations With Real-Time Look-Ahead Capability

Operator detects reservoir 19-m TVD ahead of the bit and confirms reservoir thickness for coring operations, offshore Australia

CHALLENGE

Drill an exploratory well with uncertainty about reservoir position and thickness while optimizing coring operations without drilling a pilot hole.

SOLUTION

Use the look-ahead answer product of GeoSphere* reservoir mapping-while-drilling service to confirm reservoir position and thickness for coring operations.

RESULTS

- Detected the reservoir top 19-m [62.33-ft] TVD ahead of the bit.
- Revealed reservoir thickness at 7 m [23 ft] ahead of the bit.
- Confirmed the reservoir thickness at approximately 25-m [82.02-ft] TVD.

Enhance coring operations while avoiding sidetrack despite seismic uncertainties

An operator drilling an appraisal well in a new block offshore Western Australia faced several challenges. The field had a complex stratigraphy because it was on an anticline and was composed of siltstones between discontinuous sand bodies.

The operator needed to confirm the presence and thickness of the reservoir in an unexplored part of the field, which was characterized by a lack of markers above the reservoir and several meters of seismic uncertainties. A conventional approach would have required the customer to confirm reservoir thickness by drilling a pilot hole and then performing a sidetrack for coring operations.

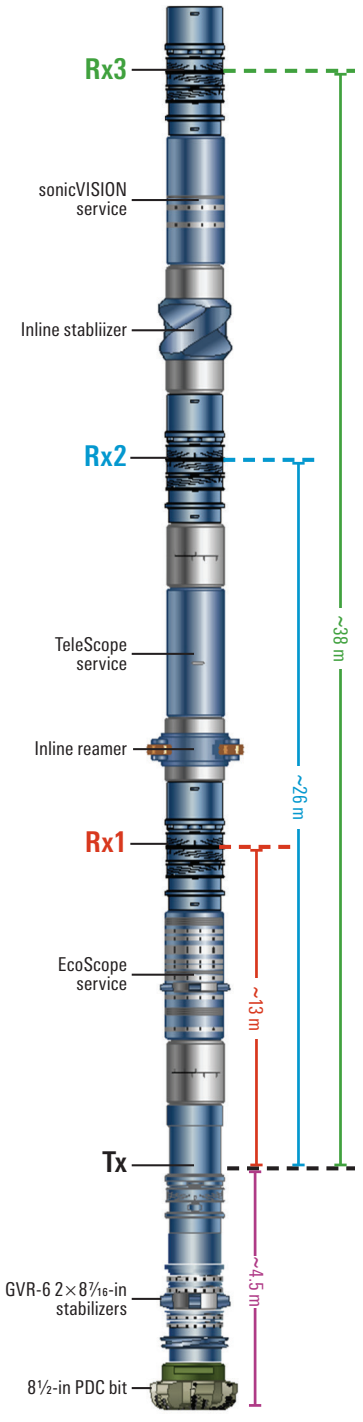
Use look-ahead service to map reservoir ahead of the bit

The operator chose GeoSphere service because of its real-time capabilities for ahead-of-the-bit depth investigation and reservoir mapping while drilling. Using deep directional resistivity measurements, the service maps formation features ahead of the bit, thus resolving seismic uncertainty while mitigating drilling risks. This was crucial for the operator's objective of improving coring operations by confirming thickness and presence of the reservoir section.

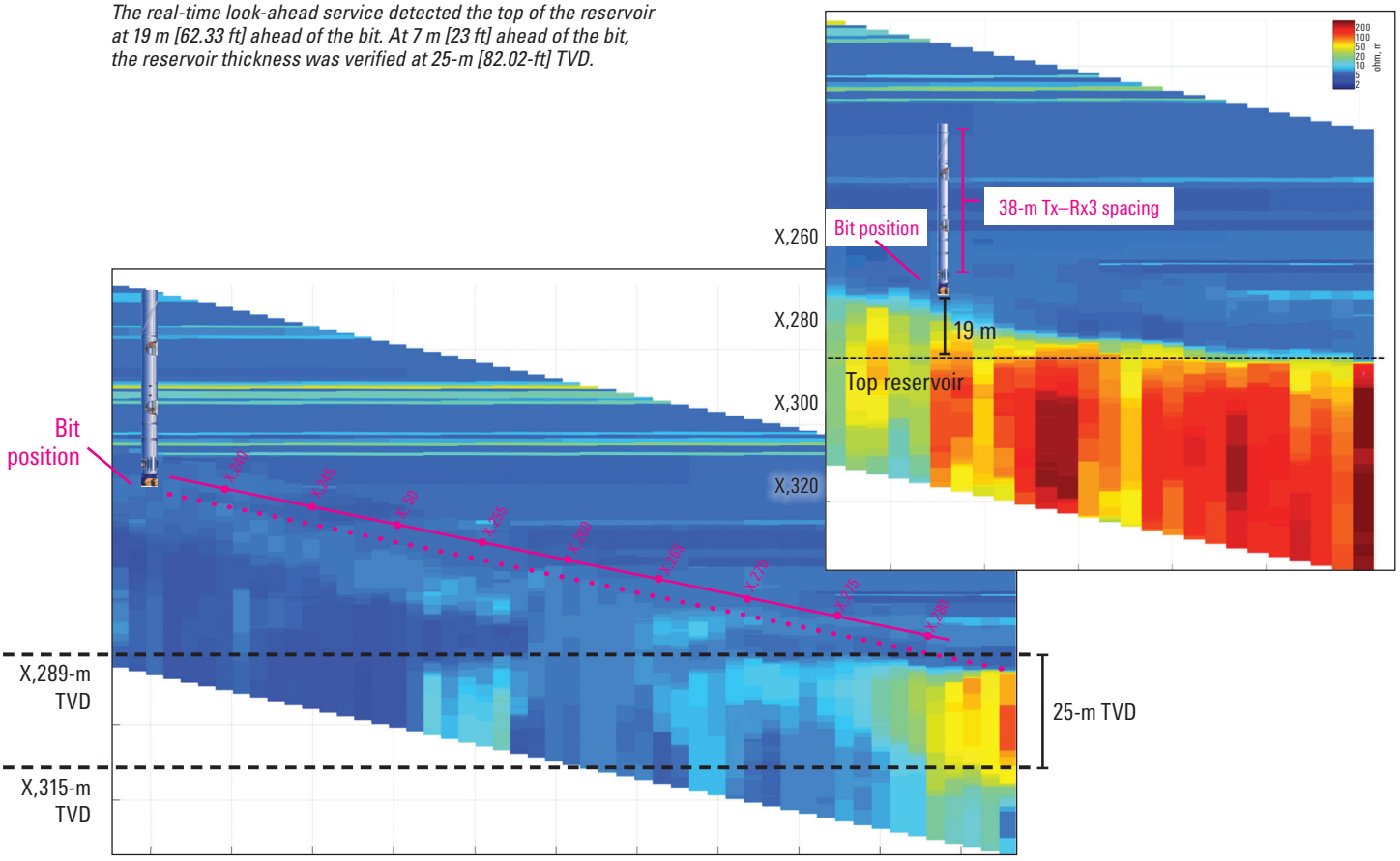
The GeoSphere service uses deep electromagnetic technology with a depth of investigation proportional to spacing on the BHA, and it is dependent on frequency and the formation resistivity environment. The modular design consists of one transmitter and multiple receivers, enabling investigation at multiple depths and frequencies.

Maximized reservoir exposure to improve accuracy in landing the well

A rotary BHA was fitted with proprietary imaging- and logging-while-drilling technologies that incorporated EcoScope* multifunction logging-while-drilling service† and sonicVISION* sonic-while-drilling service as well as GeoSphere reservoir mapping-while drilling service. It revealed the reservoir top at about 19-m [62.33-ft] TVD ahead of the bit, and the 25-m [82.02-ft] reservoir thickness was ascertained at 7-m [23-ft] TVD ahead of the bit. This enabled the operator to avoid drilling a pilot hole and reduced overall drilling costs and associated drilling risks.



The real-time look-ahead service detected the top of the reservoir at 19 m [62.33 ft] ahead of the bit. At 7 m [23 ft] ahead of the bit, the reservoir thickness was verified at 25-m [82.02-ft] TVD.



[1]Japan Oil, Gas and Metals National Corporation, formerly Japan National Oil Corporation, 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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