

Resistivity-at-the-Bit Measurements Guide

Geostopping 0.2-m TVD Below Top of Reservoir

geoVISION service helps CLJOC with precise well placement and eliminates pilot hole, reducing well costs offshore Vietnam

CHALLENGE

Land well and set liner as soon as bit reaches top of reservoir, without a pilot hole, and reduce the overall well cost.

SOLUTION

Guide well placement with real-time data from geoVISION* imaging-while-drilling service.

RESULTS

- Reduced costs by using LWD data to land well without having to drill a pilot hole.
- Identified the top of target reservoir 15 m deeper than expected and landed the well at 0.2-m TVD inside the reservoir without losing reservoir thickness.



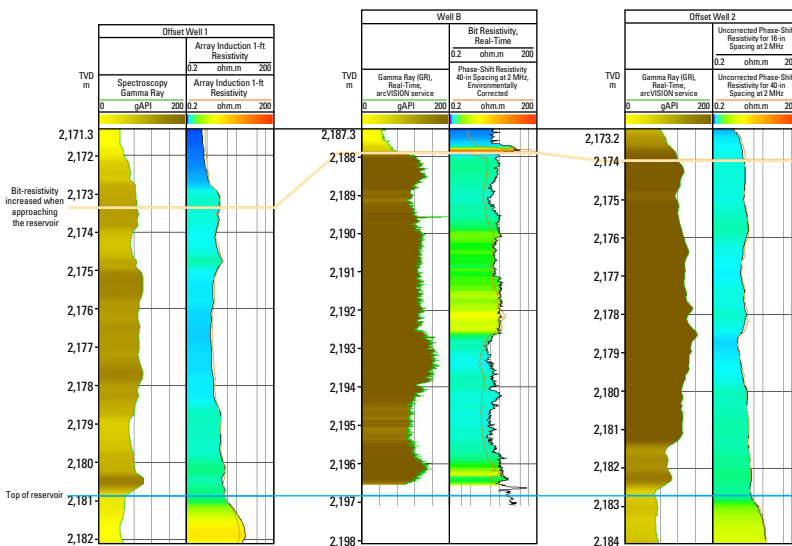
Exploit undeveloped thin sands offshore Vietnam

The Cuu Long Joint Operating Company (CLJOC), having developed much of the Cuu Long basin offshore Vietnam over the year, was looking to access undeveloped, thin-oil reservoirs to counteract production decline in the field. CLJOC decided to take advantage of thin oil-bearing sands that had been identified during past exploration and development drilling. Operations faced large uncertainties in reservoir thickness and lateral continuity, hydrocarbon content was untested, and there was low confidence in the depth conversion of the top of the structures interpreted from previous seismic data.

The plan was to drill two horizontal wells with objectives to reduce the depth uncertainties for landing the producer well, test the hydrocarbon content, and maximize reservoir contact in the thin sands. In addition, CLJOC wanted to land the second well without a pilot hole to reduce costs for the project.

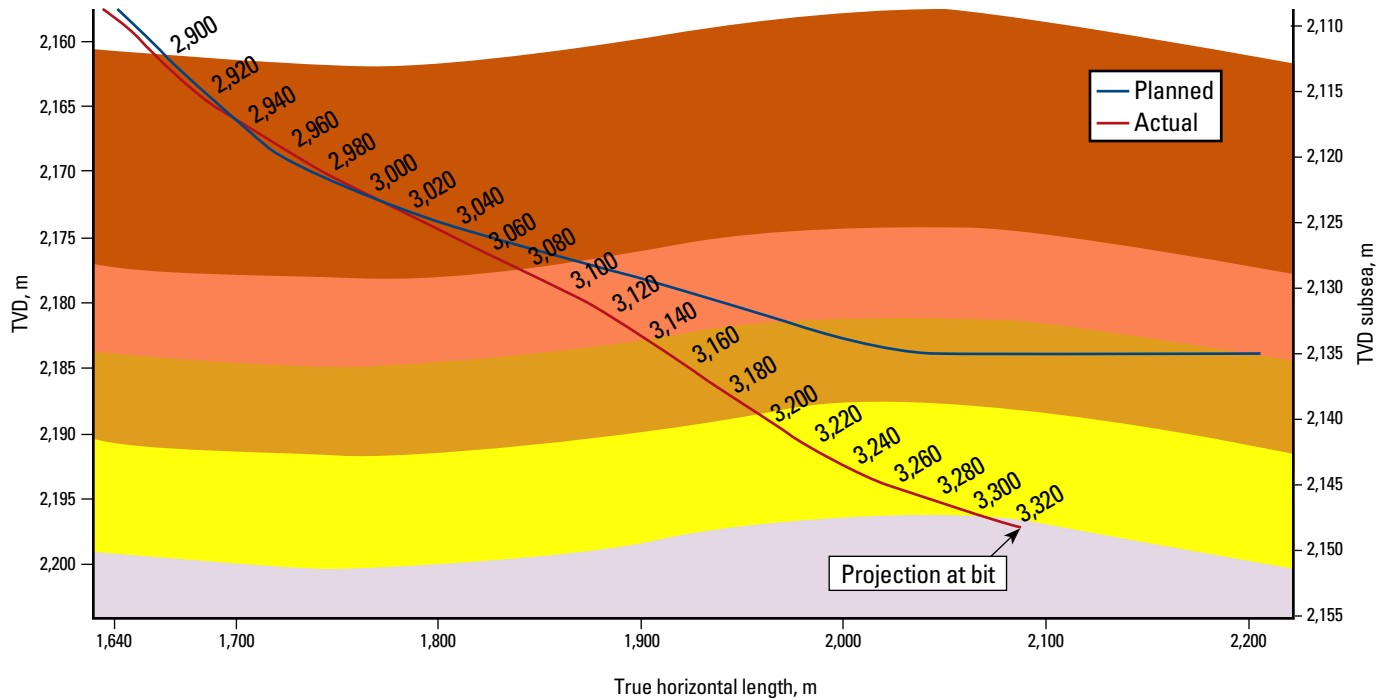
Measure resistivity at the bit for early indication of reservoir top

Schlumberger designed the 8½-in section to land as close as possible below the top of the 2–4 m thick reservoir to prevent loss of sand thickness for the drainage section while also evaluating reservoir quality. To support this objective, the BHA included the geoVISION service for at-bit resistivity measurements to provide the earliest possible indication of an approaching resistivity contrast—in this case, the highly resistive hydrocarbon-bearing sand—and enable precise geostopping.



At-bit resistivity measurements from geoVISION service identified the top of the reservoir 15 m deeper than expectations set by offset data. Bit resistivity increased and gamma ray data indicated sand as the well approached the target.

CASE STUDY: geoVISION service guides precise well placement and eliminates pilot hole offshore Vietnam



Using geoVISION service for early indication of the thin target reservoir helped the team geostop the section 0.2-m TVD within the reservoir, preventing loss of sand thickness for the production hole.

Landed well at 0.2-m TVD below top for minimal penetration

During landing, the trajectory was adjusted according to key depth markers that were 15 m deeper than expected. When the top of the reservoir was not reached as planned, the decision was made to drop the angle to 86.5° inclination to reduce the drilled measured depth interval. The team landed in the reservoir at 15-m TVD deeper than plan, which was confirmed by bit resistivity readings of 30 ohm.m and hydrocarbon show in the bottoms-up circulation. Based on LWD data, landing point was determined to be at 0.2-m TVD below the top of the reservoir, so the liner could be set without inhibiting the production hole.

The well was precisely landed using real-time data from geoVISION service. The landing section was geostopped based on bit resistivity after penetrating 5 m of the thin target sand, and a pilot hole was successfully eliminated, which reduced the overall well cost.

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