Santos Maps Top of Reservoir, Determines Optimal Entry Point Offshore Australia

Reservoir mapping-while-drilling service defines reservoir boundaries before entry to maximize pay zone contacts in target sands

CHALLENGE

- Identify top of reservoir to optimize entry point into the target reservoir section.
- Determine fluid contact levels in reservoir before entry and during steering of well.

SOLUTION

Reduce geological uncertainties and mitigate risks during landing operations with a depth of investigation greater than 100 ft [30 m] from the wellbore with the GeoSphere reservoir mapping-while-drilling service.

RESULTS

- Mapped top of reservoir at 20-ft [6-m] TVD from wellpath and oil/water contact (OWC) 43-ft [13-m] TVD below the reservoir’s top.
- Landed and kept well at an optimized standoff and angle.
- Integrated reservoir mapping data into 3D static geological model for future field development plans.

Land and steer well while determining top of reservoir and OWC

Santos wanted to optimize entry and maximize exposure in a target reservoir offshore northwestern Australia. While information from a pilot hole confirmed the presence of the reservoir and identified a dip at the pilot-hole entry point, the location of the reservoir top could not be estimated from the pilot hole or from other offset wells. Facing seismic uncertainty of ±33-ft [±10-m] TVD and a reduced amount of structural control, Santos wanted to map the top of the reservoir and determine fluid contact levels before entry for an optimal landing and maximum reservoir exposure. To do so, it needed to land the well as close as possible to the top of the reservoir before steering the drain trajectory to achieve optimal reservoir exposure at least 33-ft [10-m] TVD from the OWC.

Map reservoir before entry for optimal reservoir contact

In order to reduce the geological uncertainties and optimize the entry angle to the reservoir, Santos selected the GeoSphere reservoir mapping-while-drilling service to map fluid contacts, structural dips, and boundaries before entering the reservoir. With a depth of investigation extending more than 100 ft [30 m] from the wellbore, the service reduces geological uncertainty and enables operators to make more-informed drilling decisions. By integrating the service’s deep, directional electromagnetic measurements with interpreted seismic, operators can update seismic models to refine drilling and field development plans.
CASE STUDY: Santos maximizes pay zone contacts with guided landing, steering

Real-time mapping from GeoSphere service maps the reservoir top and OWC, leading to optimized reservoir entry and drain trajectory position within the target reservoir.

**Acquired data for precise landing, maximum pay zone contacts**

Upon exiting the casing shoe, the GeoSphere service mapped the top of the reservoir 20-ft [6-m] TVD below the well path and OWC 43-ft [13-m] TVD below the reservoir top. Real-time mapping of the reservoir and OWC before entry facilitated an optimized landing at an ideal standoff and angle with respect to the overburden.

The reservoir data was integrated into the operator’s 3D static geological model to update drilling and future field development plans.