Shell Maximizes Potential Recovery in North Sea with Optimized Landing

Service detects reservoir 45-ft TVD below well path while bit is 328-ft MD from intersecting reservoir, enabling smooth steering and ideal landing

**CHALLENGE**
- Land a horizontal well as close as possible to top of reservoir to limit risk of mud loss.
- Ensure smooth wellbore and avoid exits into the overburden shale.

**SOLUTION**
Use GeoSphere* reservoir mapping-while-drilling service for long-range detection of reservoir boundaries and optimal landing of the well.

**RESULTS**
- Landed well and placed casing shoe at 88º inclination within 3-ft [1-m] TVD of the top reservoir to line up the reservoir section and reduce the risk of mud loss.
- Detected reservoir top with drill bit 328-ft [100-m] MD away from intersection, leaving considerable room for steering the trajectory.
- Defined oil/water contact (OWC) to determine oil column greater than 33-ft [10-m], confirming well’s production potential.

**Land well in sweet spot, ensure integrity of wellbore**
Shell wanted to mitigate risk while landing a well in the Draugen field of the North Sea. The target reservoir has exceptional porosity and permeability, and Shell aimed to raise the field recovery rate to more than 70%. However, the depth of the reservoir was uncertain due to several seismic realizations, different interpretations, and time-to-depth conversions. Shell needed an optimal landing of the well and a smooth wellbore throughout the reservoir section. This would maximize production in this attic oil scenario and decrease the chance of early water breakthrough. Another challenge was to avoid exits into the overburden shale, which would result in lost reservoir exposure and increase the risk of sidetracking.

**Extend depth of investigation with reservoir mapping-while-drilling service**
To meet its tight requirements and high recovery targets, Shell created a strategy to land its North Sea well using the GeoSphere reservoir mapping-while-drilling service, complemented by geoVISION* imaging-while-drilling and adnVISION* azimuthal density neutron services. The GeoSphere service provides real-time radial measurements extending the operator’s depth of investigation to more than 100 ft [30 m] from the wellbore, giving them ample time to guide smoother wellbores for maximum contact from the beginning of the reservoir section.

**Accurately detect reservoir boundaries to precisely land well**
The GeoSphere service detected the reservoir 45-ft [15-m] TVD below the well path. At that time the drill bit was still 328-ft [100-m] MD from entering the reservoir, allowing for smooth steering/optimal landing, which would minimize mud loss. Before the bit reached the reservoir, OWC imaging—with an estimated ±6 ft [±2 m] of uncertainty—confirmed the presence of an oil column thickness greater than 33 ft [10 m], which confirmed the well’s production potential.

Due to the successful landing, Shell continued using the GeoSphere system while drilling the reservoir section of this well and plans to use this system for landing future wells in the Draugen field.

*Mark of Schlumberger
Other company, product, and service names are the properties of their respective owners.
Copyright © 2014 Schlumberger. All rights reserved. 14-DR-0096