BAKER HUGHES
a GE company

DELTA-TEQ low-pressure-impact drilling fluid met drilling objectives in challenging deviated well

A development project in the Gulf of Mexico was restricted to a casing program which isolated trouble zones and mitigated any risks associated with a tight drilling window. Recent projects in the area had added additional sections to isolate lost circulation zones and deployed a water-based mud system that would facilitate the treatment of losses in the trouble zones.

The project was limited by the rig's drilling capabilities for large-hole, deep-shelf wells. The 17 ½-in. section had a maximum inclination of 65.96°, and the maximum pump rate of the rig was less than what was required to clean the hole. The inclination of the wellbore and the limited flow naturally promoted cuttings beds to form. The operator was seeking new technology that would allow for alternative wellbore geometries to expand their drilling capabilities.

Baker Hughes, a GE company (BHGE), recommended the **DELTA-TEQ™ low-pressure-impact drilling fluid** to reduce the equivalent circulating density (ECD) and allow a higher maximum flow rate while imparting minimal pressure on the formation. In addition, the fluid would provide better assistance with hole cleaning and suspension capacity required to clean a large deviated borehole at a 66° inclination.

The DELTA-TEQ low-pressure-impact drilling fluid is a non-aqueous, advanced formulation of specialized clay and polymers that creates a non-progressive gel structure, reducing hydraulic impact with a rapid-set/easy-break profile. This profile maintains fluid integrity if operations are paused, mitigates pressure spikes when circulation resumes, and protects the formation from surge pressures when running casing.

In addition, the DELTA-TEQ fluid has the unique ability to manage hydraulic impact by maintaining the right viscosity in the right areas of the well for optimal hole cleaning and penetration rates without putting excess pressure on the formation. Like a "viscosity clutch," it engages viscosity at low shear rates and disengages at high shear rates for true optimization.

The DELTA-TEQ fluid reduced pump pressures, allowing higher flow rates to be achieved. Additional drilling practices, such as weighted sweeps and wiper trips, ensured a clean wellbore prior to a casing run. The

Challenges

- Deviated borehole with complicated inclination
- Limited pumping capacity
- Limited drilling capability for large holes
- Formation of cuttings beds

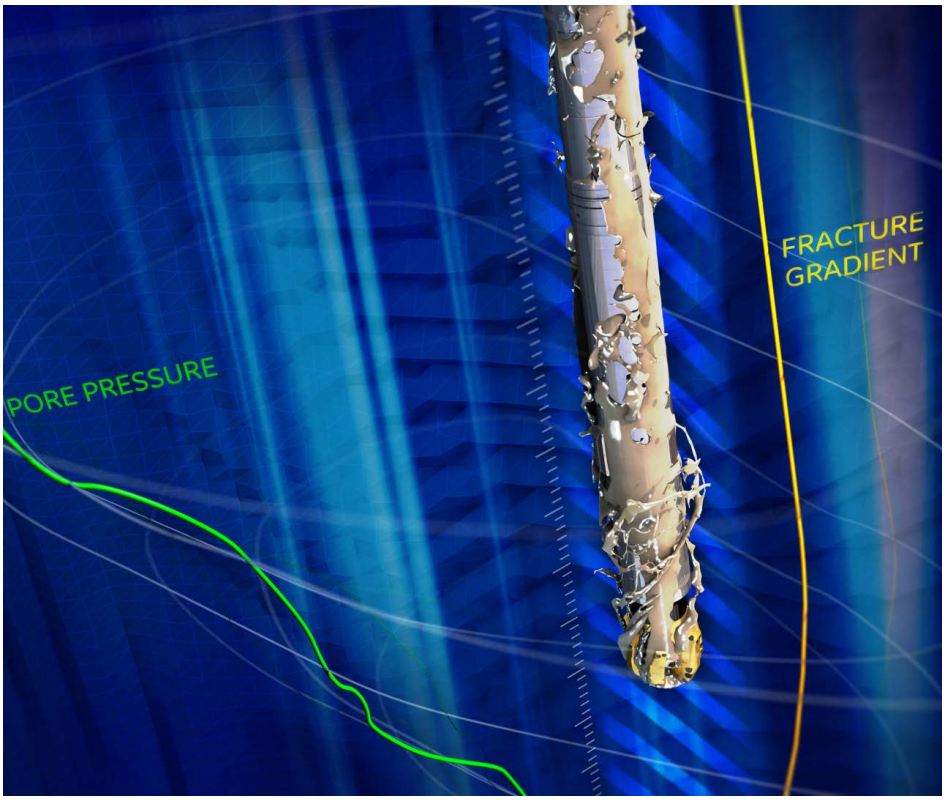
Results

- Maximized flow rates
- Reduced pump pressures
- Achieved high tolerance to drill solids without major impacts on rheology
- Maintained low gravity solids at 11%
- Achieved drilling depth of 18,000 ft (5,486 m)

average difference between ECD and equivalent static density (ESD) was 0.17 ppg, despite having a deficiency of 50% on the minimum flow rate required for hole cleaning. Used in three sections of the well, the DELTA-TEQ fluid was drilled at more than 18,000 ft (5,486 m) and demonstrated a high tolerance to drill solids without major effects on rheology.

The maximum low gravity solids (LGS) concentration reached was 14% by volume and an average of 11% LGS was maintained during the entire well. Although the high amount of solids and low oil-to-water ratio was at 70:30, the DELTA-TEQ low-pressure-impact drilling fluid was able to maintain a constant rheology performance, minimizing the effect on pump pressure at mud densities ranging from 9.7 to 13.3 lb/gal. This well could not have been drilled and the casing program could not have been executed without the DELTA-TEQ low-pressure-impact drilling fluid mitigating the hole cleaning issues and flow rate limitations of the rig.

For more information, visit bhge.com/delta-teq.



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