

Inhibitive HYDRO-GUARD® WBM and DFG™ Modeling Software Deliver Trouble-free Drilling, Saving US\$ 360K

OFFSHORE MIDDLE EAST

CHALLENGES

Offset wells experienced multiple downhole issues:

- » High torque
- » Lost circulation
- » Reactive clays
- » Gas and water flows
- » Differential sticking

SOLUTIONS

Strategic drilling with DFG software simulations and optimal fluid selection.

- » Accurate modeling of wellbore conditions and real-time drilling parameters
- » Inhibitive HYDRO-GUARD WBM for shale stability and enhanced lubricity

RESULTS

- » Zero NPT
- » No losses
- » US\$ 360K saved

POTENTIAL HOLE CLEANING CHALLENGES INCREASE RISK OF LOSSES, STUCK PIPE

Based on offset information, the operator anticipated several challenges while drilling a directional well offshore, including high torque, cuttings bed build-up, lost circulation, water and gas flows, differential sticking, and tight hole in swelling clays. Proper drilling fluid selection and the ability to accurately model downhole conditions would be critical to a successful operation.

The 16-inch interval in particular was expected to present hole cleaning challenges. The operator would need to minimize equivalent circulating density (ECD) to avoid losses and differential sticking, yet avoid excessive cuttings loading and cuttings bed build-up on the low side of the wellbore.

INHIBITIVE WBM, HIGH-VIS SWEEPS OPTIMIZE HOLE CLEANING

The Baroid team recommended drilling with the inhibitive HYDRO-GUARD® water-based mud (WBM) system to overcome drilling risks related to reactive clays. The high-performance HYDRO-GUARD system provides maximum shale stabilization, and is proven to help maintain wellbore stability, high rates of penetration, and acceptable rheological properties for effective hole cleaning. The unique polymeric design of the HYDRO-GUARD system also delivers lubricity similar to synthetic based fluids, which would help with potential torque problems.

As part of the well planning stage, the technical group used Baroid's DFG™ hydraulics modeling software to accurately simulate expected wellbore conditions. Based on this extensive analysis – which continued to be implemented while drilling – they designed a sweep program that would ensure good hole cleaning without risking high ECDs. Integrating the DFG modeling results with the performance features of the HYDRO-GUARD system allowed the operator to pump high-viscosity sweeps at prescribed intervals. They developed a “sweep sheet” to track and optimize the sweep schedule, which was used throughout the operation. Optimal results were obtained by pumping a 40-bbl high-vis sweep every half stand drilled, including a helpful decrease in ECD.

To address the risk of lost circulation, Baroid personnel recommended treating the WBM system with sized STEELSEAL® 100 and 400 lost circulation material (LCM). This helped seal porous and fractured formations to aid in preventing stuck pipe in porous and depleted formations, and it imparted lubricity to improve torque values.

Engineered WBM and hi-vis sweeps

SAVE

US\$ 360K

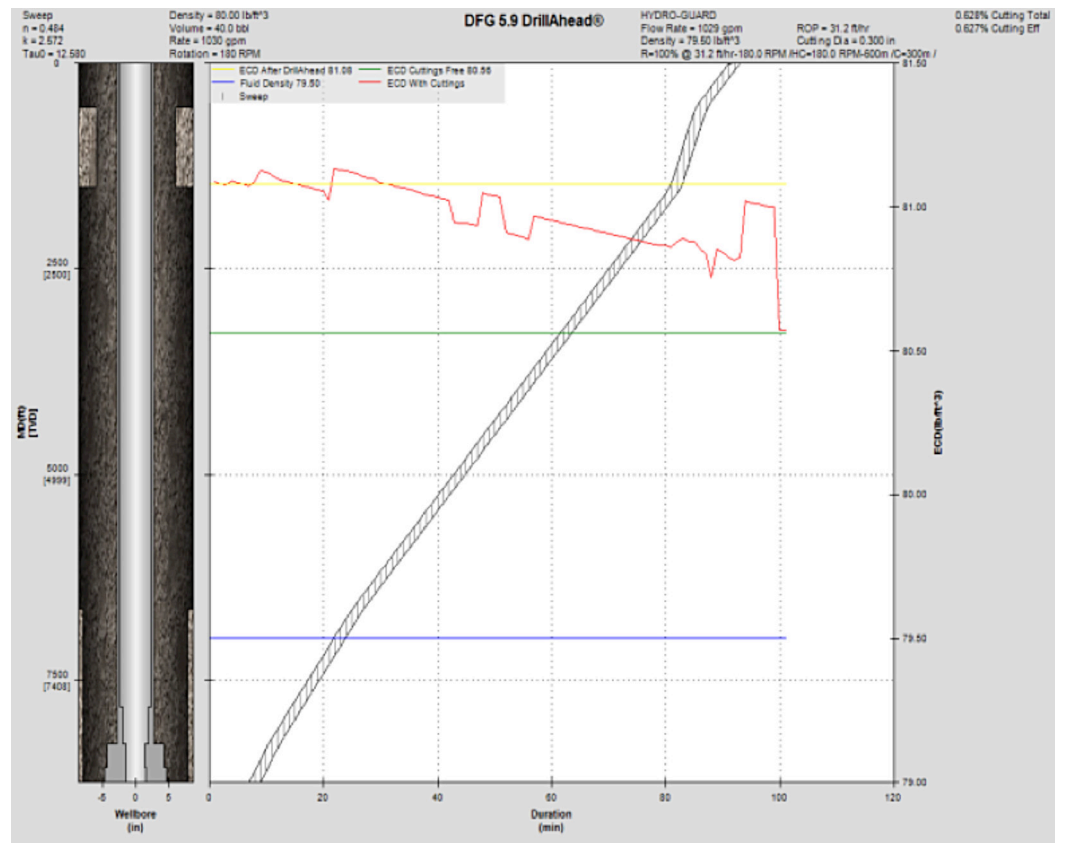
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INTERVAL DRILLED AND CASED WITH ZERO NPT, SAVING 24-48 HOURS

These strategies paid off in a trouble-free operation while drilling, tripping and setting casing. Cuttings loading was maintained at the desired level, and there was no evidence of cuttings build-up on the low side of the hole – confirming effective hole cleaning. No major losses were encountered, no torque and drag was observed, and the wellbore remained stable.

Continuous modeling with DFG software allowed the operator to adjust drilling parameters and fluid properties on-the-fly to optimize performance.

An estimated 24-48 hr were saved on drilling and tripping time, valued at ~ US\$ 360,000. Casing was run and cemented with no issues.



Effect of pumping a 40-bbl high-viscosity sweep prior to making a connection in the 16 " hole section: The hole will be clean after sweep reaches to surface and the ECD will decrease from 81.08pcf to 80.56pcf. 40 barrels every half stands as they've already done to enhance the hole cleaning specially on low side considering drilling through hole inclination of +/- 25 degree.

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