

HYDRO-GUARD® Water-Based Drilling Fluid System Stabilizes Problem Salt/Shale Formation

BERKINE BASIN, ALGERIA

CHALLENGES

The 16-inch interval was known for instability issues:

- » Tight hole and hard reaming
- » Pack-offs
- » Stuck pipe

SOLUTION

Saturated-salt HYDRO-GUARD® WBM replaced OBM in a trial well, providing the same drilling performance.

- » HYDRO-GUARD WBM performed as well as an OBM in this difficult interval, and eliminated OBM waste treatment costs.

RESULTS

- » The 16-inch interval was drilled, logged, and cased with zero instability issues.
- » Eliminated OBM waste treatment costs
- » With this success, the operator is now considering other areas where it can replace OBM with the HYDRO-GUARD system.

OVERVIEW

The 16-inch interval is drilled through a sequence of plastic salt and reactive shale, which can cause complications during tripping operations. Offset well reports showed incidents of hard reaming, pack-offs, and stuck pipe – all while drilling with an oil-based mud (OBM). The operator's budget contained funding for introducing new technology. This provided the opportunity for Baroid personnel to implement an inhibitive HYDRO-GUARD® water-based mud (WBM) in the Berkine area.

HYDRO-GUARD WBM CUSTOMIZED FOR SPECIFIC FORMATION CONDITIONS

A careful assessment of Baroid's global experience running saturated-salt HYDRO-GUARD fluid indicated several benefits associated with replacing the OBM system with this high-performance WBM:

- » Achieve OBM drilling performance with an engineered, eco-friendly WBM
- » Eliminate OBM drilling waste management costs in this interval
- » Match specific formation conditions with saturated-salt water-based fluid

Several lab tests were performed to optimize the formulation for the mixed salt/shale sequence. The operator then provided a trial well location, which was designated as a "critical first well" by the Baroid team. A global technical field advisor (GTFA) assisted with the project one week in advance of the spud date. The team prepared and distributed the Design of Service (DOS) well program for review by all participants.

Specific products used for the HYDRO-GUARD system were forecasted and delivered, per established processes. Experienced field engineers were also mobilized for the project.

The trial well confirmed that the high-performance HYDRO-GUARD system performed as well as an OBM in the difficult 16-inch interval. This opened further opportunities to replace OBM with HYDRO-GUARD fluid.



PERFORMANCE ON PAR WITH OBM, WITHOUT THE WASTE MANAGEMENT COSTS

The overall success of the HYDRO-GUARD system trial included several operational achievements:

- » Using HYDRO-GUARD fluid, the 16-inch section was completed in the same number of days as had been required with OBM.
- » The interval was successfully drilled, logged, and cased through formations known for hole instability issues.
- » HYDRO-GUARD WBM provided OBM performance with no impact to drilling parameters.
- » Minimal tight hole occurred while tripping, similar to wells drilled with OBM.
- » The wellbore remained stable after extended static periods.
- » Moderate downhole losses (1 cubic meter/hour) were promptly cured with one lost circulation material (LCM) treatment.

The operator is now considering expanding the use of the HYDRO-GUARD system in Algeria as a replacement for OBM. Increasing the scope and number of wells can result in even greater savings related to thermal treatment of OBM drilling waste and disposal costs, which is estimated at USD 88,000.