

Engineered BaraXcel™ Drilling Fluid System Doubles Production

CLAY-FREE NON-AQUEOUS FLUID SYSTEM LOWERS ECD AND SAVES 18 DAYS OF RIG TIME

HAMRA FIELD, ALGERIA

CHALLENGES

- » Provide an effective low-solids fluid to help minimize ECD and prevent lost circulation
- » Improve production in wells with narrow PP/FG margin

SOLUTION

Clay-free BaraXcel diesel-based fluid with low solids content and a low oil/water ratio in order to:

- » Improve ECD control
- » Achieve high return permeability results
- » Reduce diesel consumption

RESULTS

- » Increased estimated production by 250 percent
- » Reduced lost circulation by 67 percent
- » Decreased diesel consumption by 25 percent
- » Drilled section 18 days ahead of plan

OVERVIEW

In Algeria, Sonatrach Petroleum Corporation planned to drill the HA-19 BIS development well in the Hamra field, where severe lost circulation was known to occur in the reservoir section. The presence of microfractures and potential for fracture propagation had caused losses and stuck pipe in offset wells. The pore pressure/fracture gradient (PP/FG) window was very narrow, and tight control of equivalent circulating density (ECD) was needed to minimize or prevent non-productive time (NPT). Further, failed drillstem tests (DSTs) on offset wells indicated that the reservoir had significant formation damage and these wells were unable to produce as expected.

A conventional clay-based oil-based mud (OBM) has been used to drill the offset wells, and managed pressure drilling (MPD) had been applied on some wells as a solution for the narrow PP/FG margin. However, the results were unsatisfactory, and the resulting severe losses were costly for Sonatrach.

SOLUTION

The Baroid team recommended drilling the section with the organophilic clay-free BaraXcel™ diesel-based system. This low-solids fluid would help minimize the ECD and prevent lost circulation. After Sonatrach reviewed the Baroid lab's return permeability test results (92.7 percent on natural core samples), they approved BaraXcel non-aqueous fluid (NAF) for their well plan. The subsequent drilling operation was closely monitored by local, regional and global technical advisors to ensure that the application was successful.

ECONOMIC VALUE CREATED

While drilling with the BaraXcel system, the ECD averaged 1.25 sg (10.4 ppg) as compared to 1.28 sg (10.7 ppg) with the conventional OBM. The downhole loss volume was reduced by 67 percent compared to the average loss on offset wells. Further, because BaraXcel fluid has a lower oil/water ratio, diesel consumption decreased by 25 percent for a savings of 46 m³ (289 bbl).

The DST results showed that the reservoir was in good condition, and the wellbore cleanup times were six times faster than on previous wells. The skin factor was 2.6, and production was estimated to be 250 percent higher than expected.

The section was drilled 18 days ahead of plan. Fewer days and much lower loss volumes saved Sonatrach approximately USD 70,000 overall.

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