Challenges

Provide a single stable fluid optimized for drilling, running liners, and suspending well operations at TD.

Solutions

Use BaraECD® NAF in all drilling intervals to ensure that:
- Rheological properties remain stable
- Low-solids formulation minimizes formation damage
- Swab pressures remain low during trips

Results

- Maximised operational efficiency and ensured safe tripping margins, saving rig time and minimizing risks
- Achieved production at maximum capacity after 28-day well suspension, with no time lost to displacements

BaraECD® NAF Enables Operator to Use One Fluid for All Drilling Intervals

BaraECD® NAF Provides Stability, Versatility in All Intervals

Maximum Capacity Production After Drilling With BaraECD® NAF

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**Operator Seeks Versatile Fluid for Optimized Drilling and Production**

On a deepwater well in the Alve field, Statoil planned to drill a 6-inch horizontal section after setting a 7-inch liner in the 8-1/2-inch interval.

When the 1,450-meter (4,757-foot) lateral was drilled, a 4-1/2-inch pre-drilled liner would be set at the lateral total depth (TD). Then operations would be postponed approximately four weeks before the well was produced and allowed to flow to the separators.

The fluid left in the wellbore during those weeks would have to exhibit both stability and mobility when operations resumed. The bottomhole temperature was estimated at 134°C (273°F). The reservoir had < 1 mD permeability, so minimizing formation damage was a critical factor in fluid selection.

**BaraECD® NAF Provides Stability, Versatility in All Intervals**

Baroid personnel wanted to identify a cost-effective solution that would allow using the drilling fluid as the liner-running and well-suspension fluid. After testing all options, the Baroid team determined that BaraECD® high-performance non-aqueous fluid (NAF) offered good stability and mobility, as well as satisfactory return permeability results (78 percent).

The proposed formulation was tested for 30 days to ensure that it would perform as expected in the well. It remained stable and mobile during the test period, and also exhibited a thin rheology profile ideal for tripping and screen running.

The fluid was qualified according to Statoil’s requirements. As this was the first well for Statoil DWN (Drilling and Well North) using BaraECD NAF, it was defined as a “critical first well.” Additional resources were provided offshore to ensure that the engineered solution was executed as planned.

Hydraulic simulations were performed continuously to ensure that the fluid aligned with the parameters of the operational window. This was especially important when the 6-inch bottomhole assembly (BHA) was pulled out of the hole with a low margin to the pore pressure.

The 1.42-sg (11.8-lb/gal) BaraECD NAF provided a downhole static density of 1.40 sg (11.7 lb/gal). The maximum pore pressure reached 1.35 sg (11.3 lb/gal), providing a very low margin for swabbing when pulling out of the 6-inch horizontal section.
CUSTOMIZED FLUID SAVES RIG TIME, MINIMIZES FORMATION DAMAGE

The pre-drilled liner was run and set in hole with zero losses. When the well was finally put on stream, it produced at the maximum capacity of the test separators with no indication of formation damage.

Tripping out of the hole was faster due to the low swab pressures obtained with the BaraECD NAF, maximizing operational efficiency and ensuring safe tripping margins.

Using the same fluid for drilling the 8-1/2-inch overburden section and the 6-inch reservoir section, and then running the lower completion, saved approximately four hours. There was no need to displace to a dedicated low-solids fluid for liner running and temporary abandonment. Reducing the number of fluid sets and displacements also helped minimize the risk of “waiting on weather” time and related logistics.