

Horizontal Well Drilled and Sampled Through the Shuaiba Limestone Formation with FLC 2000® in Qatar

Middle East

CHALLENGE:

- ▶ Shuaiba Limestone formation
- ▶ Expected induced mud losses and high ECDs

SOLUTION:

- ▶ FLC 2000 was added to the system at 8 lb/bbl in a LSND mud

RESULT:

- ▶ Successful drilled the 8½-in. section with no mud losses or differential sticking
- ▶ Fluid sampling was completed while the BHA was held static across the formation
- ▶ The formation was protected



OVERVIEW

The Shuaiba Limestone Formation can be problematic when drilling horizontally in the Al Shaheen Field in Qatar. In one particular drilling program, the operator planned to drill 1500-ft. horizontally through the Shuaiba Formation. The Shuaiba Limestone had an expected matrix permeability of 10–30 mD and was susceptible to induced mud losses. The challenge for this particular well was to drill the horizontal section with the programmed mud weight of 9.6–9.7 lb/gal and preventing mud losses. At the programmed mud weight, overbalance was expected (0.5–1.0 lb/gal) in static conditions. The expected equivalent circulating density (ECD) values of 10.5 lb/gal and higher meant the overbalance would be 1.5–1.7 lb/gal.

Prior to landing the liner, a sampling run was planned, leaving the bottom-hole assembly (BHA) across the open formation for a considerable period (programmed 36 hours). On completion of drilling the section, the fluid and pressure measurements were taken. This method of sampling meant that the BHA would be held static in overbalance conditions for several hours. The entire process of measurement and sampling lasted 24 hours.

SOLUTION

The fluid designed to drill the section was a low-solids non-dispersed (LSND) mud, with the mud weight of 9.6–9.7 lb/gal. FLC 2000 was added to the LSND mud system to "shield" the formation while drilling. Static conditions were maintained for a prolonged period of time when the BHA performed hole sampling. The addition of FLC 2000 was held at an average 8 lb/bbl in the fluid, and an addition of high concentration pre-mixes (approximately 53 lb/ bbl of FLC 2000) continually bled into the active system to maintain the mud properties and prevent losses and differential sticking.

RESULT

The operator successfully drilled the 8½-in. section without mud losses or differential sticking in the Shuaiba Limestone Formation. Fluid sampling was completed while the BHA was held static across the open hole of the Shuaiba Limestone Formation. The formation did not break down with overbalance of the mud weight or high ECDs. FLC 2000 successfully protected the formation to allow the operator to complete the challenging drilling conditions.