CLEAN-LUBE Lubricant Decreases Torque by 30% in Extended-Reach Offshore Well

Lubricity enhancement with FLOTHRU RDF system ensures proper drilling, completions in sensitive environmental area offshore California, USA

**CHALLENGE**
Overcome concerns about lubricity limitations of water-base reservoir drill-in fluids (RDFs) while drilling extended-reach lateral in sensitive area offshore California.

**SOLUTION**
Deploy CLEAN-LUBE* brine lubricant and FLOTHRU* organophilic water-base reservoir drill-in fluid system.

**RESULTS**
- Decreased torque by 30% without significantly affecting RDF rheology.
- Enabled drilling to TD and subsequent completions that would not have been possible without the lubricant.

Concerns about limited lubricity typical of water-base RDFs
Because of environmental considerations, a customer requested a water-base RDF for a planned extended-reach well offshore California. The customer was concerned about water-base fluids’ generally limited lubricity characteristics, which also frequently require a lubricant to reduce torque and drag. Though many lubricants are commercially available, few allow operators to avoid the “cheesing” and “greasing” potential that can cause formation damage. Additionally, many lubricants pose the risk of dramatically reducing fluid viscosity, forcing operators to use additional products to regain drilling properties.

Adding CLEAN-LUBE lubricant to further enhance FLOTHRU system
M-I SWACO designed and optimized a FLOTHRU water-base RDF system to enhance flowback and eliminate the need for a chemical cleanup treatment. During the engineering design process for the offshore well, CLEAN-LUBE lubricant was included in the test matrix. In stress tests, the lubricant continually demonstrated minimal cheesing and greasing tendencies and had little effect on fluid rheology. The FLOTHRU system was tested with 3% CLEAN-LUBE lubricant by volume, the maximum recommended concentration that would have no effect on the active filtercake components.

Enhanced lubricity for ensured drilling, completion of long lateral
The 8½-in hole was drilled with 9.0-lbm/galUS [1,078.4-kg/m³] FLOTHRU system fluid. At 19,655-ft [5,991-m] MD, rotary torque exceeded limitations, and CLEAN-LUBE lubricant was bled into the active system until the concentration reached 3% by volume. After the addition of the lubricant, torque readings dropped from 40,000 ft.lbf [54,232.7 N.m] to 28,000 ft.lbf [3,7962.9 N.m] — a reduction of 30% — with no significant change in fluid rheology. The well was drilled to TD and the 5½-in liner run in hole without issue. Without the lubricity provided by the CLEAN-LUBE lubricant, it would not have been possible to finish drilling or complete the well.