

Case study: Nigeria

MICRO-WASH treatment broke up filter cakes, increased 1,000 BOPD

A customer in Nigeria drilled a new openhole well in deep water to 44,865 ft (13,375 m) total depth (TD). The 9⁵/₈-in. casing was run to 43,334 ft (13,210 m), leaving an 8¹/₂-in. openhole section for production. Unfortunately, 10.4 ppg **OMNIFLOW™ filter cake** and other emulsion damage clogged the wellbore, preventing optimal production.

Baker Hughes recommended the deployment of the **MICRO-WASH™ filter cake breaker system**. This solution is a customized, single-step microemulsion-based system designed to remove synthetic-based drill-in fluid (SBDIF) or oil-based drill-in fluid (OBDIF) filter cakes in openhole wellbores. Because of its design, MICRO-WASH can also remediate in-situ emulsions that may have formed. The MICRO-WASH system is one of the most powerful and effective detergents on the market today. It contains a proprietary surfactant blend, organic acid or acid precursor, corrosion inhibitor, and brine that are all pumped into the openhole section and allowed to soak to effectively remove the filter cake along the entire interval of the well.

During the soaking process, the ultra-low interfacial tension properties of the breaker solution allowed it to diffuse into the rock matrix to solubilize the oil in the filter cake, leaving the solids and surfaces in a water-wet state. The calcium carbonate bridging solids are then exposed and subsequently

removed with an organic acid or acid precursor, while the remaining drill solids become dispersed and mobilized. This process results in a wellbore that no longer contains damage, leaving optimized flow paths within the rock matrix and completions screen assembly, further enhancing production or injection for the well.

After extensive laboratory testing by drilling and completion fluids experts, the Baker Hughes team deployed the MICRO-WASH system. MICRO-WASH mixing and pumping exercises were safely executed. A 20-bbl of 10.4 ppg MICRO-WASH pre-flush was pumped via the rig pump as a spacer, followed by 20 bbl of 10.4 lb/gal ppg MICRO-WASH soak and 319 bbl of 10.4 ppg calcium chloride (CaCl₂) filtered brine. The lower completion packer was set and a pressure test conducted. A radio frequency identification (RFID) valve was opened for casing cleaning and pumping of the packer fluid. Within 80 minutes, a drop-in hydrostatic pressure of 1,000 psi (6.8 MPa) and 66 bbl of losses were experienced, indicating that the MICRO-WASH soak performed as expected.

The MICRO-WASH system restored the well to production, adding up to 1,000 BPD. The customer experienced no health, safety and environmental (HSE) issues and contracted no nonproductive time.

Challenges

Overcome declining production in lower reservoir of oil producer well caused by filter cake and emulsion damage

Results

- Destroyed the filter cake
- Removed potential damage caused by invert emulsion
- Increased production by 75% after MICRO-WASH application
- Experienced zero HSE issues