

Case study: Gulf of Mexico, North America

SealBond spacer system restored circulation, saved \$1.7 million USD in GOM

Prior to performing a cementing operation in the Gulf of Mexico, a customer started taking losses while drilling and running 7-in. production casing. The operator had drilled through a salt formation and weak sand, which resulted in pack off, mud losses, and wellbore erosion. After running loss circulation material (LCM) and establishing returns, they determined that 473 bbl of synthetic based mud was lost while drilling through the salt zone, and another 119 bbl was lost while running the casing. After encountering a similar situation on an offset well, the operator had to perform a remediation block squeeze.

In order to find a better, more-efficient solution for this well, the operator reached out to Baker Hughes to ensure isolation of the objective hydrocarbon sand zone and restore lost production. Baker Hughes recommended the **Sealbond™ Ultra spacer system** for this project, which would not only help with mud removal, but also help cure the losses.

Based on its ultra-low invasion fluid technology, the SealBond system's unmatched sealing capability creates a film barrier across formation walls via differential pressure, minimizing fluid leak-off to formation. The SealBond Ultra system also reduces slurry fallback after placement, prevents induced losses, and eliminates the need for costly remedial cement jobs. And, in wells with tight fracture gradient, the SealBond system enables the use of standard slurry designs and densities where highly-extended or special lightweight slurries were previously required—

eliminating the need to compromise thickening times and/or compressive strength. It is equally effective in fragile, unconsolidated, and fractured formations.

The objective in this well was to minimize losses while cementing the target interval and isolating one hydrocarbon zone. Baker Hughes experts obtained samples of the drilling fluid in advance to determine proper rheological hierarchy between the mud and the SealBond spacer system, ensuring maximum displacement efficiency. After verifying compatibility, a spacer design using 18 lbs/bbl of SealBond Ultra concentrate with 7 lbs/bbl KCl was selected based on mud properties and presence of salt in the objective hydrocarbon interval. A total of 60 bbl of SealBond spacer with KCL at 12.5 ppg was used to attain the minimum 1,000 ft of fill while being pumped through the open hole (OH) interval.

At the conclusion of the job, our experts used proprietary Baker Hughes cementing software to determine optimal displacement rates for Equilavent Circulating Densities (ECD) below fracture gradient. Cement bond logs were also run to verify successful top of cement (TOC) and isolation of the desired hydrocarbon sand. Job charts verified full lift pressures and production returns.

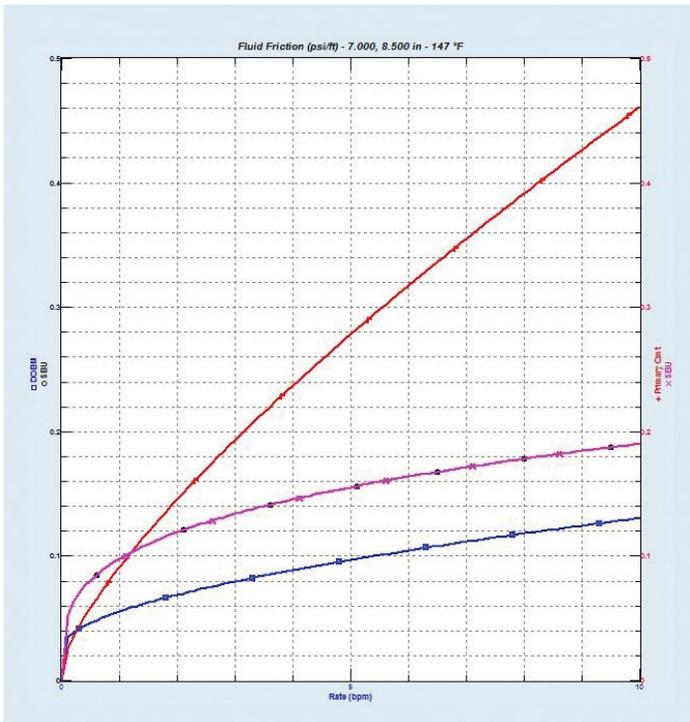
The operator's objective was met which eliminated the need for remedial cementing. This saved the operator approximately three days of rig time, equating to \$1.7 million USD.

Challenges

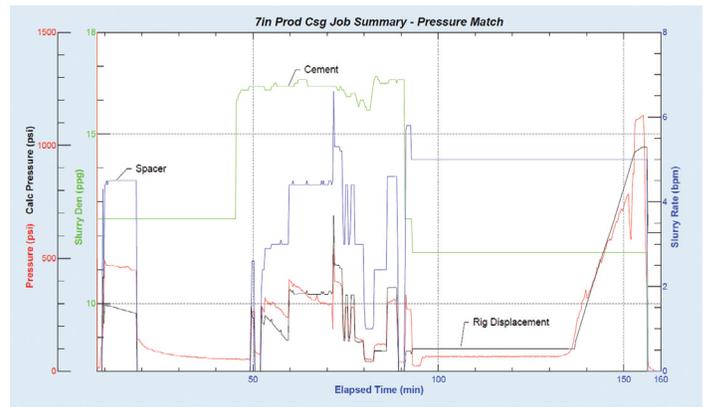
- Constructing a well through salt intervals
- Maintaining well control in a tight pore-pressure/fracture gradient window
- Designing an efficient salt and spacer system while maintaining frictional hierarchy

Results

- Saved approximately \$1.7 million USD and three days of rig time by eliminating the need for remedial cementing
- Achieved desired top of cement, effectively isolating hydrocarbon bearing sands
- Restored circulation after taking loss



Fluid friction chart showing rheological hierarchy between mud, spacer, and cement.



Job summary chart showing close-trending pressure match between calculated pressure and actual pressure.