



Lost Circulation Materials

Customized Shale Control Sweeps Prevent Instability in Reservoir, Saves \$80K in Rig Time

Location: Central Colombia

Overview

Most horizontal oil wells in the Castilla field are drilled using a geo-navigational technique that improves hydrocarbon recovery, but also brings wellbore stability challenges. The operator had experienced pack off incidents with both the bottomhole assembly (BHA) and the liner due to exposure to reactive shale. To avoid damaging the reservoir, the proposed treatment had to be applied very precisely.

In the preliminary lab testing, the Halliburton Baroid team achieved a 92% return permeability value after treating the selected BARADRIL-N® drill-in fluid with STEELSEAL® 25 resilient graphitic carbon (RGC) and BARO-TROL® PLUS shale stabilizer. Based on this result, the customer authorized the use of these products in the reservoir formation.

The resilient behavior of STEELSEAL 25 RGC allows tightly packed particles under compression in fractures and pores to expand or contract without being dislodged or collapsed due to changes in differential pressures. Though STEELSEAL 25 RGC is primarily used to address lost circulation, it has proven to be very effective in preserving shale stability. BARO-TROL PLUS shale stabilizer also helps plug micro-fractures and reduce fluid filtrate invasion that can destabilize reactive clays.

CHALLENGES	SOLUTIONS	RESULTS
<ul style="list-style-type: none"> Pack off incidents with both the bottomhole assembly (BHA) and the liner due to exposure to reactive shale 	<ul style="list-style-type: none"> The Baroid team prepared 30-bbl stabilizing sweeps containing 10.0 ppb STEELSEAL 25 resilient graphitic carbon (RGC), 3.0 ppb BAROTROL PLUS shale stabilizer and BARACARB sized ground marble in the following concentrations: 10.0 ppb BARACARB® 25, 10.0 ppb BARACARB 50, and 5.0 ppb of BARACARB 150. BARACARB sized ground marble helps bridge fractures and pore throats and is non-damaging in the reservoir. 	<ul style="list-style-type: none"> There were no shale instability issues while drilling and tripping. The operator was able to reduce the time required to run the 7-in. liner by 24 hrs. compared to offset wells where significant shale instability was encountered. This saved \$80,000 USD in rig and operating costs. Other potential operational risks such as stuck pipe and induced mud losses were minimized due to the excellent wellbore stability achieved with the STEELSEAL 25 RGC and other sweep components.

When drilling commenced in the Upper K1 formation, the Baroid team prepared 30-bbl stabilizing sweeps to be pumped one per stand until the bit reached the Lower K1 formation. The sweeps contained 10.0 ppb STEELSEAL 25 RGC , 3.0 ppb BAROTROL PLUS shale stabilizer and BARACARB sized ground marble in the following concentrations: 10.0 ppb BARACARB® 25, 10.0 ppb BARACARB 50, and 5.0 ppb of BARACARB 150. BARACARB sized ground marble helps bridge fractures and pore throats and is non-damaging in the reservoir.

There were no shale instability issues while drilling and tripping in the upper K1. The operator was able to reduce the time required to run the 7-in. liner by 24 hrs. compared to offset wells where significant shale instability was encountered. This saved \$80,000 USD in rig and operating costs.

Other potential operational risks such as stuck pipe and induced mud losses were minimized due to the excellent wellbore stability achieved with the STEELSEAL RGC and other sweep components.