



Completion Fluids/Filter Cake Breaker

Customized delayed-reaction N-FLOW™ 325 breaker system helps ensure effective filter cake removal throughout longest lateral in the Al-Khalij field

Location: Offshore Qatar

Operator's Challenge

A major operator in Qatar wanted to set a whipstock and open a window to drill a lateral through a carbonate formation. The interval length would be 2,867 m. This lateral was considered to be the longest drain in the field. The well would then be displaced to sodium chloride (NaCl) brine in preparation for acidizing the entire open hole with a filter cake breaker. Reservoir data indicated downhole temperatures around 54°C (130°F) with a formation pressure of 0.96-SG (8.1-ppg) equivalent mud weight (EMW).

Halliburton's Solution

The Baroid team recommended using the N-FLOW™ 325 breaker system, a delayed-reaction acid precursor that converts to formic acid downhole with exposure to time and temperature. Unlike hydrochloric acid (HCl), the N-FLOW 325 acid production can be slowed, thereby extending time for completion operations.

Baroid technical personnel performed lab tests to create a formulation that would extend the delay time even further than normal. This was achieved by controlling the viscosity and alkali content of the treatment.

The N-FLOW 325 breaker was delivered to the rig in tote tanks for ease of handling. No special containers, vessels, or pumps were required for the procedure.

The delay time specified by the operator allowed the breaker to be spotted uniformly throughout the entire perforated liner length.

HSE Advantage

Because the acid liberation action is slow, the solution contains little or no free acid when placed across the zone to be treated. This results in safer work conditions at the surface, compared to acidizing with hydrochloric acid.

Economic Value Created

The delayed action of the customized N-FLOW 325 treatment accomplished all of the completion operations in the long lateral. The application of the N-FLOW 325 breaker, the removal of the filter cake, and the stimulation of the formation resulted in significantly increased productivity for this completion technique. In addition, handling the N-FLOW 325 breaker in bulk tote tanks instead of drums made for easier processing and saved rig time estimated at US\$500,000.

CHALLENGE	SOLUTION	RESULT
The operator wanted to effectively stimulate a new record-length carbonate lateral in a mature well.	The N-FLOW™ 325 breaker system was customized to ensure that the conversion would be delayed until the breaker was in place throughout the lateral.	The new formulation provided ample delay time to cover the nearly 3,000-m lateral, and well productivity improved significantly.