

Case History

High Performance Water-Based Fluid

Inhibitive HYDRO-GUARD® System and Engineered Lost Circulation Blend Save 5 Days in Complex Wellbore

Location: Offshore, Kingdom of Saudi Arabia

OPERATOR'S CHALLENGE – Multiple severe loss zones were encountered on offset wells, ranging in depth from 5,100 ft to near total depth at approximately 9,500 ft TVD. Heavy lost circulation material (LCM) treatments and cement plugs were only partially effective in reducing losses. The complex wellbore also presented potential issues with swelling shale, gas / salt water influxes and differential sticking, all of which had been observed on offsets.

Running and cementing casing successfully under these conditions was a concern. Any tight hole sections would restrict the casing movement. The increased pressures caused by running and cementing the casing could induce losses, resulting in a poor cement job.

HALLIBURTON'S SOLUTION – Working closely with the operator, the Baroid team optimized the HYDRO-GUARD® high-performance water-based system to effectively inhibit reactive clays encountered in this area. This system was then treated with an engineered blend of bridging and lost circulation material (LCM) additives to provide protection against severe losses.

The HYDRO-GUARD fluid was implemented beginning at 6,543 ft. The system contained CLAY GRABBER® polymeric flocculant along with a clay encapsulator to minimize shale dispersion and CLAY SYNC II™ shale stabilizer to help strengthen the shale and lubricate the wellbore.

Based on modeling, the Baroid team determined that the active HYDRO-GUARD system should be treated with both STEELSEAL® 100 and 400 sized resilient, angular, dual-carbon based LCM. The tightly packed STEELSEAL particles are designed to compress and expand without being dislodged by changes in differential pressure. The varied particle size allows STEELSEAL LCM to act as a bridging and sealing agent over a wide range of pore and fracture sizes.

ECONOMIC VALUE CREATED – The ability to minimize losses and maintain shale stability allowed the operator to reduce drilling time by five days, for a savings of \$800,000-1,000,000 US dollars. Production casing was run to bottom and cemented safely with no losses. This success was achieved by implementing the Baroid Technical and Black Book processes for design and execution of engineered solutions.