

Case study: Middle East

Baker Hughes cementing solution provided zonal isolation across salt zone, eliminated remediation

A major onshore operator in the Ghantoot Field, in UAE, recently launched a biogenic gas project in an effort to attain gas self-sufficiency by 2030. The project involved drilling wells with prospective shallow gas accumulation and targeting tight gas formation zones to unlock potentially high amounts of biogenic gas. The wells had tight gas reservoirs and would require stimulation to achieve economical production targets.

The operator was experiencing difficulty running a 4 1/2-in. liner due to excessive wellbore circulating pressures. Wellbore stability was a major challenge due to an extensive plastic salt section spanning more than 1,500 ft (457 m) through which the 4 1/2-in. production liner was run, set, and cemented. The new field was made up of interbedded formations consisting of mixed clays, anhydrites, and dolomites, causing ballooning of the wellbore. And, there was very limited formation data available.

Baker Hughes was contacted to collaborate with the operator to analyze real-time logging-while-drilling data to understand and interpret the zonal isolation challenges and recommend a solution that would ultimately aid in fluid compatibility with the salt formation, preventing potential deformation and caving. After three months of meticulous planning, Baker

Hughes recommended a fit-for-purpose solution of semi salt-saturated **Sealbond™ Ultra spacer system** and fiber-loaded, gas-tight **DuraSet™ cement system**.

Baker Hughes chose the Sealbond Ultra spacer system due to its ultralow invasion fluid technology and sealing capability, which creates a film barrier across formation walls via differential pressure, thus minimizing fluid leak-off to formation. The DuraSet system, part of the **Set for Life™ family of cementing systems**, was chosen due to its enhanced mechanical properties of the set cement to ensure optimum zonal isolation for the life of the well. The designed fluid systems were extensively modeled using Baker Hughes **CemMaster™ zonal isolation cementing software**, including the precision displacement module, to ensure effective mud removal and cement placement.

During the planning stage the DuraSet slurry was tested and optimized with an additional latex component. All testing was performed in Baker Hughes' UAE laboratory in accordance with Baker Hughes cementing lab best practices. The resulting design achieved successful compatibility results between the semi-salted spacer/cement and semi-salted spacer/mud.

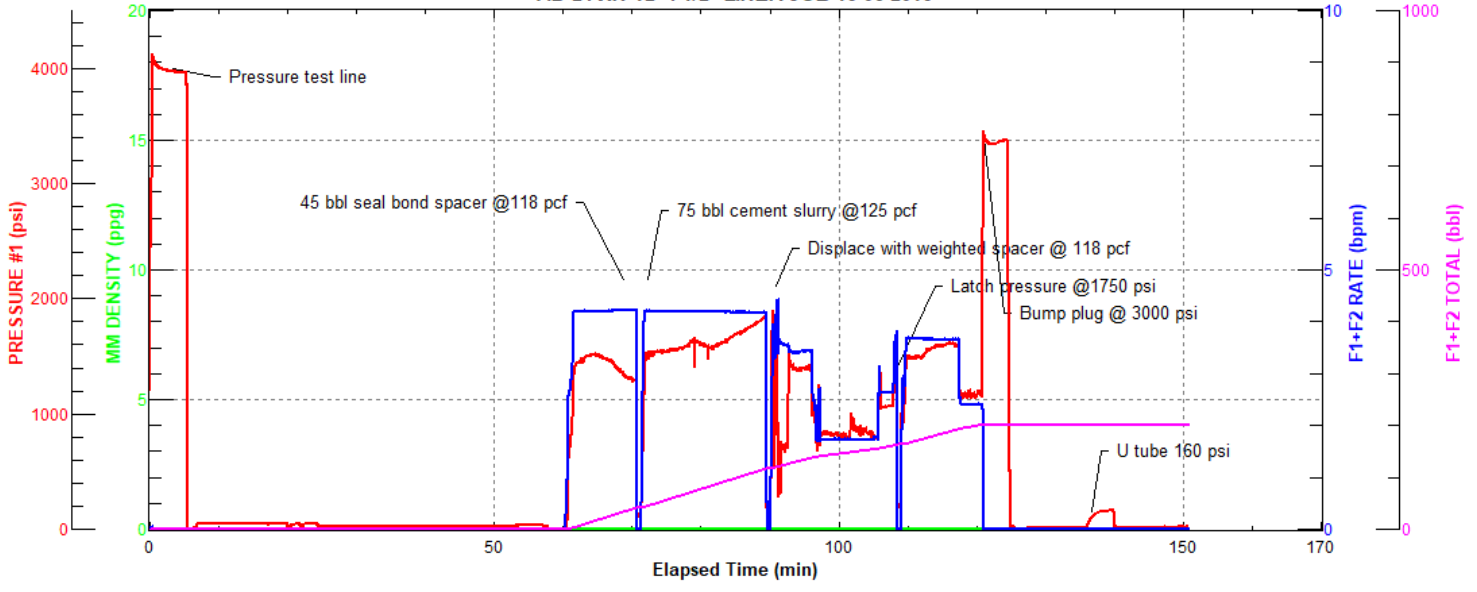
Challenges

- Completion of vertical exploration well across new shallow gas and mobile plastic salt section
- Interbedded formations with varying properties, such as pore and frac pressures, and ballooning of well
- Design of a fit-for-purpose solution for mud removal and zonal isolation

Results

- Successfully pumped semi-salt saturated loss circulation spacer system and fiber-loaded cement system to effectively displace salt-based drilling fluid
- Achieved zonal isolation across exposed biogenic gas reservoirs and salt and interbedded formations
- Experienced zero losses
- Eliminated remediation, saving four days of rig time, and \$400,000 USD

AD 24 XN-12 4 1/2" LINER JOB 19 05 2019



Surface pumping pressure vs. rate showing job executed as per plan.