

Engineered Completion Brine Significantly Reduces Costs in 48-Well P&A Project

BAROID SOLUTION EXPECTED TO SAVE USD 9.5 MILLION OVER LIFE OF PROJECT

UK NORTH SEA

CHALLENGE

Design the optimal fluid to reduce costs for an extensive P&A project

SOLUTION

Engineered 10.5-lb/gal NaCl saturated salt brine

RESULTS

- » Reduced total time to abandonment from 64 days down to 28 days
- » Saved approximately USD 215,000 per well, and potentially USD 9.5 million over the life of the project

INCOMPATIBLE BRINE SYSTEM INCREASES WELL ABANDONMENT COSTS

After beginning a 48-well plug and abandonment (P&A) project in the North Sea, an operator conducted its own analysis and elected to utilize a viscosified calcium chloride brine (CaCl_2) formulation. The costs on the abandonment for the first well had been high due to downtime caused by fluid contamination and foaming issues. The operator then engaged the Baroid team to assist in engineering a better solution.

**SUPER-SATURATED NaCl BRINE
SAVES UPTO
USD 215K PER WELL**

The CaCl_2 brine chosen for the initial job was often out of specification and required excessive dilution and treatment. It was also incompatible with the cement, resulting in the need for high-volume spacers to provide separation. Thus, the operator wanted to reduce costs by lowering the number and volume of required spacers.

SATURATED SALT BRINE INHIBITS CLAYS, ELIMINATES FOAMING ISSUES

Knowing that an ideal abandonment fluid would have low solids content – and would provide good shale inhibition in the reactive clay sections behind the casing strings, and resist foaming, the Baroid team, utilizing its solution-creation process, conducted extensive lab tests demonstrating that the costly, time-consuming problems previously encountered would be resolved by switching to a 10.5-lb/gal sodium chloride (NaCl) saturated salt system.

The NaCl brine has a low solids concentration and is highly inhibitive when exposed to reactive clays. Without effective inhibition, the clays could swell and damage the casing, as well as compromise the cement plug. During milling operations, these clays could also cause bit balling and stuck pipe.

The 10.5-lb/gal saturated salt system was more resistant to contamination; therefore, it did not foam, making it easier to treat and maintain than the previous fluid. Furthermore, the fluid was designed to ensure that there would not be cement incompatibility issues to help lower the volume and cost of spacers.

Total time to abandon the second well was 58 days, down from 64 days on the first well where CaCl_2 brine was used. The third well was abandoned in only 28 days.

ABANDONMENT TIME DROPS BY 56 PERCENT, SAVING USD 215K PER WELL

The NaCl saturated salt brine was used in the second well to be abandoned. Total time to abandon the well was 58 days, down from 64 days on the first well where CaCl_2 brine was used. The third well was abandoned in only 28 days, demonstrating the improved efficiency of the NaCl brine.

Based on a comparison between the well abandoned with CaCl_2 brine and the subsequent abandonments performed with the NaCl saturated salt brine, the operator will save USD 215,000 on average per well. With 44 wells remaining to be abandoned, the customer could save up to USD 9.5 million over the life of the project.

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