



MATURE FIELDS



UNCONVENTIONALS

BaraXcel™ HP NAF System Enables Operator to Drill Wolfcamp Well in Record Time

BAROID FLUID MITIGATES LOSSES, SAVING SIGNIFICANT TIME AND MONEY

PERMIAN BASIN, TEXAS

CHALLENGE

Provide customized oil-based fluid that would provide fast ROPs, while also maintaining low ECD values, in order to mitigate losses

SOLUTION

- » Customized BaraXcel™ HP NAF system and LCM sweep program
- » DFG™ and WellSET® software modeling

RESULTS

- » BaraXcel HP NAF system delivered fast ROPs with low ECDs
- » LCM sweep program minimized seepage
- » Baroid solution enabled operator to drill in record time, saving USD 1,120,000

OVERVIEW

In 2015, an operator in the Permian Basin modified its three-string casing program so that the intermediate casing was then set at approximately 5,600 feet (1,707 meters) true vertical depth (TVD), about 3,000 feet (914 meters) higher than in the past. The new design meant that the Spraberry formation would be exposed with a significant potential for lost circulation.

The operator challenged Baroid to provide a customized oil-based fluid that would provide a fast rate of penetration (ROP) while maintaining low equivalent circulating density (ECD) values that would mitigate the risk of losses. Finding the right solution was essential, as 60 percent of the customer’s future wells in the area would be drilled using the new modified three-string design.

SOLUTION

The operator had used the organophilic clay-free BaraXcel™ high-performance (HP) non-aqueous fluid (NAF) system in its “regular” three-string wells with great success. With careful ECD management and an engineered background lost circulation material (LCM) blend, the Baroid team was confident that the BaraXcel HP NAF system could perform well in both the vertical and horizontal portions of the production interval.

Two key objectives had to be achieved:

Continuous ECD monitoring throughout the production section

A detailed Drilling Fluids Graphics (DFG™) hydraulics report was generated twice a day and sent to the drilling engineer and company man. The drilling parameters used in DFG modeling were matched to those observed in the field as the production section was drilled. The ECD snapshot was updated every 12 hours. As a result, the BaraXcel HP NAF system densities were constantly maintained at the values needed to stay within the low-ECD window.

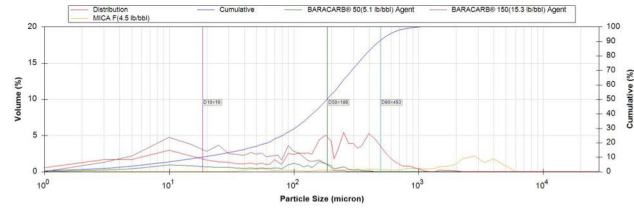
Engineered LCM background solution to mitigate losses in the Spraberry formation

The operator’s drilling team provided histograms of four sections of the Spraberry formation that showed the mean diameter aperture of the micro-fractures. This data was input into Baroid’s WellSET® software to generate an accurate and cost-effective LCM sweep program that significantly reduced seepage losses and allowed the operator to conserve oil-based mud while drilling at a high ROP. The WellSET module output and particle size recommendation are shown in the figure. The LCM recommendation is also suitable for use in the “regular” casing program wells and in water-based mud.

USD 1,120,000
TIME SAVINGS

This was the fastest well ever drilled by this asset team, and the sixth fastest well drilled in the operator's history.

Particle Size Distribution



WellSET® modeling determined the optimal particle size distribution and LCM types to match formation pore throat openings, based on operator-provided data.

RESULTS

This was the fastest well ever drilled by this asset team, and the sixth fastest well drilled in the operator's history. It took 13.67 days to drill from spud to total depth at 16,850 feet (5,136 meters) measured depth (MD) (9,343 feet/2,848 meters TVD). By comparison, operations for wells drilled with the "regular" three-string casing plan and conventional fluids averaged about 30 days.

Using the BaraXcel HP NAF system, the operator's savings in time alone was estimated at USD 1,120,000, based on a daily operational cost of USD 70,000.

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