



# Sag Resistant, Economical Fluid Solution for Narrow Margin, Depleted Permeable Zone, High Angle Wellbore

US GULF OF MEXICO

## CHALLENGES

- » Narrow operating window
- » High inclination
- » Depleted permeable zone with serious mud losses

## SOLUTION

Baroid proposed the BaraECD® system:

- » Low ECD
- » Mitigate risk of fluid losses
- » Maximize hole cleaning & ROP

## RESULTS

- » Successful delivery of the well
- » Excellent ECD management in this narrow margin application
- » Sag resistance under extreme wellbore conditions

## CHALLENGE

This offshore application presented challenges that included a narrow operating window, high inclination and a depleted permeable zone with serious mud losses. The well required drilling to 57 degrees inclination to Total Depth (TD) the interval at 17,000 ft True Vertical Depth (TVD) in the depleted sand formation. It required to be drilled with 12.5 lb/gal surface mud weight, with a 5,483 psi differential between mud weight and the depleted sands.

In 2013, Halliburton was challenged to deliver a drilling fluid solution that would provide Equivalent Circulating Density (ECD) control in the narrow operating margin, facilitating drilling a quality wellbore to enable 9.679 in liner to be run and expanded to 11.093 in.

## SOLUTION

Upon review of the challenge, Halliburton's Baroid team recommended a program of BaraECD® High-Performance Non-Aqueous Fluid System for low ECD Applications, with the background WellSET®/PPA Lost Circulation Material (LCM) treatment service. Because some 60% of the high angle hole would be drilled in sliding mode with no rotation, Baroid also employed DFG™ Real Time (RT) to monitor the hole cleaning in real time. An economical alternative to other industry recognized solutions, BaraECD fluid system provided the necessary low ECD and sag resistance in this high angle well to seal off depleted KO, K1 Sands, where there was a differential 5,483 psi between surface mud weight and depleted sands.

The particle size distribution of the LCM treatment recommended by WellSET service, combined with BaraECD fluid system, successfully bridged the formation pore throats thus forming a hydraulic seal and a thin semi-permeable filter cake. There were no mud losses while drilling through this interval, compared to the loss of several hundred barrels by another drilling fluid vendor while drilling this interval in an offset.

## RESULT

Baroid's solution provided excellent ECD management in this narrow margin application, as well as sag resistance under extreme wellbore conditions, enabling the 9.679 in liner to be expanded successfully to 11.093 in with no problems.

The well was delivered under authority for expenditure (AFE) cost for this interval, with zero Non-Productive Time (NPT) attributed to drilling fluid and an estimated savings of \$1.5 million. In addition, the customer reported a good cement job based on pressure, with no need to squeeze the liner top, which saved some 30 hours of rig time plus the cost of another cement job.

**\$1.5  
MILLION  
SAVINGS**

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