

Offshore Western Australia Operator Eliminates Differential Sticking with FLC® FINE

Australia

CHALLENGE:

- ▶ Stringent environmental requirements
- ▶ High-angle wells up to 72 degrees
- ▶ Overbalance of ~2,000 psi
- ▶ High Temperature 139°C
- ▶ Potential for differential sticking

SOLUTION:

- ▶ Addition of 6-lb/bbl FLC Fine prior to entering troublesome zones
- ▶ FLC FINE concentration monitored based on SBT results

RESULT:

- ▶ Achieved section TDs without sticking in all 4 wells
- ▶ No mud losses of any kind while drilling with FLC FINE
- ▶ No adverse effect on surface or downhole equipment



OVERVIEW

A major operator planned a drilling campaign of four gas and condensate wells in the Carnarvon Basin, offshore Western Australia where a significant risk of differential sticking was identified in the lower 12¼-in. intermediate sections with high permeability. Further challenges were the high wellbore angle (up to 72 degrees), elevated temperatures (139°C; 282°F), and the potential for seepage losses resulting in differential sticking. The combination of these potential issues put the advanced drilling tools, wellbore, and ultimately the campaign at risk. Furthermore, there was a requirement that all products must meet the highest environmental standards to fulfill the operator's Environmental Agreement.

SOLUTION

Impact Fluid Solutions worked closely with the Operator and one of the local universities for extensive testing and comparison of FLC "Wellbore Shielding" products alongside other potential solutions consisting of commodity blends and specialty products from various mud companies. The FLC range of sized products was found to have the fastest sealing capabilities minimizing both fluid invasion and pressure transmission by forming a strong, robust "shield" over the simulated thief zones. In addition, the seal was achieved with only one product size of FLC rather than a blend of multiple products enabling ease of management at the well site. Finally, the FLC product has a low SG (around 1.5 g/cm³; 12.5 lbm/gal) which does not add significantly to the fluid density or equivalent circulating density (ECD) and does not affect the rheological properties of the drilling fluid. Analysis of the expected geological properties revealed that FLC FINE was the most appropriate size for this project.

RESULT

The recommended concentration of 6 lb/bbl (17 kg/m³) of FLC FINE was added to the 1.50 to 1.60 SG (12.5 to 13.6 lbm/gal) non-aqueous fluid for approximately 200 meters (650 ft) prior to entering the troublesome zone. This was achieved by bleeding over a concentrated pre-mix into the active system while drilling was ongoing. Daily maintenance treatments with FLC FINE were calculated based on Impact Fluid Solutions Sand Bed Invasion Tester (SBT) data on the wellsite and dose curve recommendations. Using API 80-100 shaker screens, the operator was able to minimize loss of FLC FINE over shakers and control low gravity solids (LGS) to an acceptable level of around 5%.

The operator achieved section total depth (TD) in all four wells with no mud losses or sticking events despite recording an overbalance of more than 2,000 psi (13,800 kPa). There were no adverse effects of using FLC FINE on the operation, the function of the downhole tools, or the surface equipment such as the solids control and cuttings dryer. The use of the FLC FINE controlled the differential sticking with zero mud losses and zero NPT downtime for these intervals.