

FLC 2000® Eliminated Instability in the Mannville Coal Formation in Canada

North America

CHALLENGE:

- ▶ Significant amount of water produced in the production of methane
- ▶ Poor gas production rate
- ▶ Highly-cleated coal horizontal section
- ▶ Prevent drilling fluid losses, hole collapse or damage in the production zone

SOLUTION:

- ▶ FLC 2000 was added at 7-8 lb/bbl into a polymer starch water-based fluid

RESULT:

- ▶ Operator drilled to programmed TD in four days
- ▶ Drilling fluid losses were reduced by 96%
- ▶ No wellbore instability issues (no hole collapse or stuck pipe)



OVERVIEW

Wellbore instability creates unwanted drilling issues such as stuck pipe, hole enlargement and lost circulation. In coal bed formations, instability is often caused by the type of drilling fluids used, as well as fluid invasion during drilling and completion operations. Whole fluid invasion can cause cleated formation damage of the coal beyond repair. The Mannville coals in Alberta Canada are notoriously difficult to drill and prevent fluid loss, which often leads to a collapse of the highly-cleated coal.

Methane production from coal can lead to a significant amount of water produced (necessary to desorb the methane from the coal). Measuring potential damage related to drilling fluids is difficult to identify due to the gas production's prolonged time period after drilling is complete.

An offset well using a brine-based drilling fluid (designed to have total dissolved solids of 30,000 mg/l to match the formation water) lost 10,000 barrels of drilling fluid to the coal seams. During a 12-month production period, only 30% of the losses were recovered and at the same time, poor gas production rates were observed. The operator believed the lost circulation event caused the formation damage which led to the drilled coal fines blocking the cleats during production.

The operator set out to drill a 1,350 m (4,430-ft.) horizontal section of the Mannville coal after kick off point at 1,150 m (3,773-ft.) to build angle through the cleated coal seam. The angle would hold to total depth (TD) or 2,560 m (8,400-ft.) and prevent drilling fluid losses, hole collapse or damaging the quality of the production zone for producing methane gas.

SOLUTION

Significant laboratory studies with the operator led to the selection of FLC 2000 after the technology demonstrated ultra-low fluid invasion characteristics with exceptional return permeability results when tested on the coal cores. The addition of FLC 2000 at 7-8 lb/bbl into a polymer, starch water-based fluid prevented damage to the core structure by limiting coal fines from invading the formation. The fluid formulation was applied to one of the horizontal wells drilled in the deep Mannville coals.

RESULT

The operator drilled to the programmed TD of 2,564m (8,400-ft.), after kicking off from vertical at 1,150 m (3,773-ft.) as planned and producing a horizontal section of 1,357m (4,445') in four days. Minimal losses of 57.8m³ (363.5 bbls) compared to the 1592m³ (10,000 bbls) lost in the offset well, a 96% improvement in preventing lost circulation. The operator also reported no wellbore instability issues such as hole collapse or stuck pipe while drilling or running liner to the programmed TD.