Engineered Solution with DFG™ Software Enables Operator to Drill Long Lateral Section

OPERATOR SUCCESSFULLY DRILLS LONGEST LATERAL SECTION WITH MONOBORE WELL DESIGN IN DEEP BASIN
KAKWA FIELD, ALBERTA, CANADA

CHALLENGE
In 2013, an operator was actively drilling horizontal wells in the Kakwa area of the Western Canadian Sedimentary Basin to produce gas from the Montney shale formation, where, historically, the rate of penetration (ROP) is low. The challenge in this case was to maintain optimal ROP while drilling a monobore well with a lateral section longer than 3,000 meters (9,843 feet).

SOLUTION
Halliburton Baroid used its Drilling Fluids Graphics (DFG™) software to run hydraulic simulations that would predict standpipe pressure, equivalent circulating density (ECD), annular velocity, and cutting load at different pump rates to select the optimum bottomhole assembly (BHA) for the application. DFG software is the only hydraulics modeling program that accurately accounts for the effects of drilling fluid compressibility and thermal expansion on fluid density. Variance between ECD predicted by DFG software, as measured by pressure-while-drilling (PWD) tools, and actual ECD is consistently less than 1 percent.

Following lab analyses, the team recommended using ENVIROMUL™ invert emulsion drilling fluid, utilizing a base oil with a low kinematic viscosity, along with the operator’s managed-pressure-drilling (MPD) equipment.

The ENVIROMUL fluid system provided comparatively low specific gravity (0.762 base fluid) and kinematic viscosity (1.4cSt @ 40°C) which led to an increase in ROP of 54 percent compared to conventional drilling with conventional invert fluid.

In addition, Baroid used STICK-LESS 20® beads, TORQUE-LESS® DI-170 additive, and graphite in the ENVIROMUL fluid system to overcome excessive torque and drag in the long lateral.

RESULTS
Baroid’s engineered solution enabled the operator to successfully drill a monobore well design with the longest lateral section in Alberta’s deep basin area, achieving 3,010 meters (9,875 feet) of lateral hole, exceeding the previous longest section by 668 meters (2,192 feet).

In addition to the increased production, the operator saw dramatic cost savings and reduced rig time. By eliminating the need to run intermediate casing, rig time was reduced by two days, accruing a rig savings of USD 750,000. Furthermore, the higher ROP saved 12 days of rig time, worth approximately USD 738,000. The total overall savings was USD 1,488,000 and 14 rig days.

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