

SILDRIL K Shale Inhibitor Helps Save More Than USD 100,000 per Well in Operating Costs, Canada

Excellent sealing mechanism on borehole wall increases ROP, reduces losses, and provides cost savings on fluid, casing, and cementing while reducing environmental impact

CHALLENGE

Drill the intermediate section using a water-base mud (WBM) system that delivers high-quality inhibition and stability while reducing environmental impact and operational costs.

SOLUTION

Use the SILDRIL K* potassium silicate shale inhibitor to ensure shale stability for proper drilling, casing running, and cementing operations.

RESULTS

Achieved the drill plan for the intermediate hole, confirmed the expected well performance, and saved more than USD 100,000 per well.



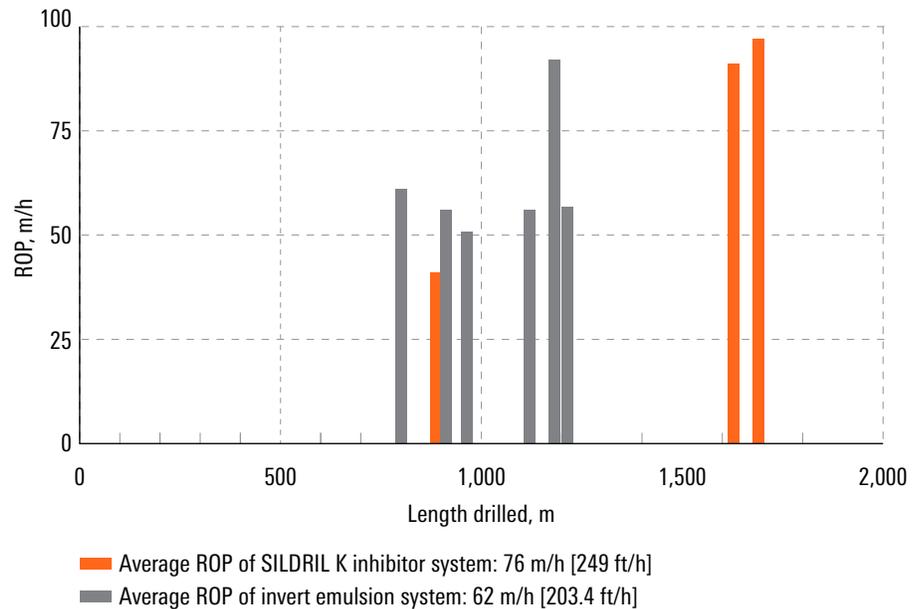
Replace oil-base mud with WBM to drill intermediate section

In the Resthaven field of western Alberta, Canada, an operator needed a cost-effective WBM drilling fluid system with good inhibition and stability characteristics for drilling an 8¾-in intermediate hole. The operator’s traditional practice included drilling the surface hole and setting the surface casing between 500- and 600-m [1,640- and 1,969-ft] MD using WBM to comply with environmental regulations for shallow ground waters, then using oil-base mud (OBM) to drill the intermediate hole to 2,100-m [6,890-ft] MD.

The Belly River Formation in this field has the potential for moderate to high losses and is known to be readily dispersible in WBM systems, resulting in low well performance and well failures. The operator wanted to perform a field trial on three wells to reduce the surface interval length, set the intermediate casing shallower, and drill the intermediate interval with a higher ROP.

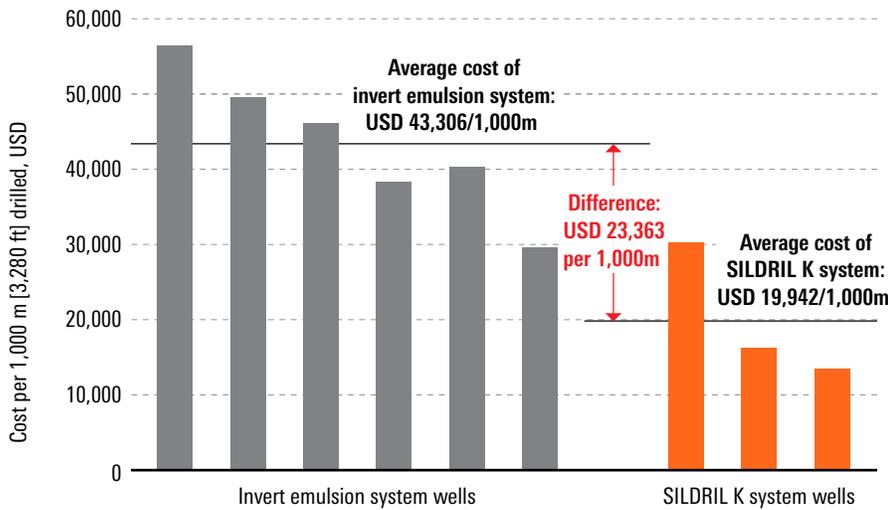
Ensure shale stability with SILDRIL K inhibitor in WBM

To meet the operator’s objectives, M-I SWACO recommended using a WBM with SILDRIL K potassium silicate shale inhibitor to ensure shale stability for proper drilling, casing running, and cementing operations. This combination delivers inhibition performance that is similar to that achieved using oil- or synthetic-base mud and generates a high-quality seal on the borehole wall. As a result, the system enables increased ROP with a reduction in bit trips, reduced fluid loss, and cost savings on overall fluid, casing, and cementing while minimizing environmental impact. A major driver for its use was its nontoxic acceptance; the SILDRIL K shale inhibitor is defined as a dissolved glass system, and the Alberta Energy Regulation permits its use through the open groundwater table.



Average ROP vs. length drilled for invert-emulsion and SILDRIL K inhibitor system.

CASE STUDY: SILDRIL K shale inhibitor helps save more than USD 100,000 per well in operating costs, Canada



Fluid interval cost for invert-emulsion vs. SILDRIL K inhibitor system.

M-I SWACO conducted a series of laboratory tests using cuttings from offset wells to determine the appropriate concentration and ratio for the silicate as well as suitable products for optimal rheology and flocculation in the silicate chemistry. These tests determined that the SILDRIL K inhibitor exhibited shale inhibition comparable to invert-emulsion systems while exhibiting negligible environmental impact. Further, the SILDRIL K inhibitor would cost 40% less compared with conventional invert-emulsion drilling fluid and would reduce costs in terms of associated services and rig time.

Achieve planned goals in all candidate wells

The 8³/₄-in intermediate holes were drilled as planned without any NPT or major operational issues. In two wells, the holes were drilled from 258-m [846-ft] MD to 2,100-m [6,890-ft] MD, and the third well was drilled from 624-m [2,047-ft] MD to 2,074-m [6,804-ft] MD. Casing was successfully run, set, and cemented at 2,100-m [6,890-ft] MD. Although the interval length was 300 m [984 ft] longer compared with offset wells, the operator saved an average USD 31,236 per well in fluid costs compared with the invert-emulsion system.

All three intervals were drilled at an average ROP of 76 m/h [249 ft/h], an 18% increase compared with offset wells drilled with the invert-emulsion system. Additionally, all three intervals were drilled in a single run without the need to trip out to change the bit or BHA. Approximately USD 100,000 overall cost savings resulted per well by setting surface casing at approximately 250-m [820-ft] MD in addition to an average rig-time savings of 2 days per well. All wells were in gauge with fewer losses compared with the invert-emulsion system.

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