



## DRILSMOOTH Proves Effective in Mitigating Lost Circulation in Iraq

### FOCUS ON TECHNOLOGY

DRILSMOOTH is a mixed metal oxide (MMO) rheology modifier and secondary shale stabilizer designed to provide excellent shear-thinning, carrying capacity, and suspending ability in DRILSMOOTH System. It has particular application in drilling through unconsolidated formations, lost circulation zones, high-angle and horizontal wells and also for casing milling operations.

The exceptional shear-thinning characteristics of the DRILSMOOTH system reduce fluids losses into the highly-fractured and permeable formations

#### Context

Managing drilling fluids circulation losses is critically important. Not only can these events interfere with drilling operations, but they can present additional risks, logistical challenges, and costs for operators. For highly-fractured and permeable formations, these risks are ever-present. An effective approach to minimize circulation losses is required. Use of a Mixed Metal Oxide (MMO) system, such as DRILSMOOTH, has been successfully used to control losses in highly-fractured and permeable formations.

#### Challenge

In Iraq, carbonate is dominated by very low matrix porosity rock with highly-fractured and karst-related vugular porosity. In some areas, these fractures and vugs are the main producing zones. Therefore, the permanent plugging of the fracture/vugular porosity is not an acceptable solution for fluids circulation losses. Drilling locations are often remote, posing logistical issues for supplying large volumes of drill water from water wells while drilling blind. It is, therefore, important to minimize the risk of circulation losses before they occur.

The operator had previously drilled two wells in which they lost approximately 400,000 bbls of drilling fluid while drilling through fractured carbonates. The fractures were found to be so wide, vugular, and elongated that any amount and number of concentrated LCM pills could not cure the losses. This resulted in excessive cost, time, and resources expended to drill the two wells.

### Solution

The IDEC team developed and implemented a loss control strategy, using an unconventional highly shear-thinning fluid as the fluid of choice; the intention being to use the highly thixotropic nature of the fluid to control the rate of loss in the first instance. As losses became more severe, cross-linking polymer pills were pumped to seal the loss zones and restore circulation.

The DRILSMOOTH system was chosen because of its well-documented cuttings-carrying capacity and its ability to control losses in permeable and porous formations. These features, combined with the low wall shear rates to reduce erosion of the mechanically weak formations, were considered necessary to reduce the risk of destabilizing the sands and causing the overlying limestone bands to collapse into the wellbore.

### Results

By using the DRILSMOOTH system, the operator reduced their drilling fluid loss values by 50% and reduced drilling days by 72% when compared to the similar two wells that had experienced losses. Overall, drilling fluids cost was also reduced by 41%.

WELL	SH-07 (KCl-Polymer)	SH-10 (KCl-Polymer)	SH-11 (MMO)
Drilled depth (m)	1,945	2,255	<b>2,350</b>
Drilling days	369	90	<b>65</b>
Volume mud lost sub-surface (bbl)	249,332	148,051	<b>98,940</b>
Drilling fluid and engineers cost (\$)	\$3,725,254	\$2,077,784	<b>\$1,700,650</b>

### Conclusion

DRILSMOOTH has been designed to minimize mud losses and stabilize unconsolidated formations and has been used successfully in wells in the northern region of Iraq, where massive mud losses are caused due to highly-fractured karstified carbonates.

### Your Unique Well

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## We Deliver, No Excuses