

HYDRAGLYDE DRILLING FLUID SYSTEM IMPROVES ROP 16% REDUCING TORQUE IN CHALLENGING WOLFCAMP SHALE

High-performance water-based drilling fluid system performs like an oil-based system and establishes higher standards of drilling parameters for future wells, West Texas.

CHALLENGE

Overcome limitations in drilling torque and improve penetration rates while drilling the interbedded wolfcamp Formation using a water-base mud (WBM).

SOLUTION

Use HydraGlyde* high-performance water-base drilling fluid system to reduce torque and achieve ROP comparable to those delivered using an oil-base mud (OBM)

RESULTS

- Drilled 8 1/2 -in production interval in 3.5 days and increased ROP 16% compared with previous inhibitive WBM applications.
- Reduced torque by 18% compared with offset wells drilled using inhibitive WBM
- Set higher drilling fluids standards for future wells.



LIMITATIONS ON DRILLING TORQUE AND PENETRATION RATES IN INTERBEDDED FORMATION

The Wolfcamp Formation in the Midland Basin of West Texas contains interbedded shale and limestone that can limit drilling torque and penetration rates. The curve build section through the Spraberry Formation also presented a challenge because it required higher shale inhibition compared with the lateral.

An operator in the region needed to minimize drilling torque in a 15,285-ft-[4,659-m-] MD well while drilling the curve and 6,235-ft [1,900-m] lateral throughout the 8 1/2-in production interval. In previous wells, an inhibitive WBM was employed, but the WBM system's torque limits impaired the rig's overall ability to drill as fast as was possible using an OBM

PERFORMANCE COMPARABLE TO AN OIL-BASE SYSTEM

M-I SWACO recommended the HydraGlyde high-performance water-base drilling fluid system to reduce torque, drag, shale swelling, and dispersion while delivering exceptional inhibition. The HydraGlyde system delivers drillability comparable to an OBM while maintaining the characteristics of a WBM. The system also delivers a high-quality filtercake and a low-tortuosity wellbore that minimizes the risks of differential sticking.

The HydraGlyde system included approximately 1.5 lbm/bbl [5.71 g/L] of HydraCap* encapsulating additive to minimize clay dispersion and to enhance wellbore integrity, 1%-2% of HydraHib* shale inhibitor to provide an amine-base additive for wellbore stability, and 2%-3% of HydraSpeed* ROP enhancing primary lubricant to deliver exceptional lubricity.

	HYDRAGLYDE SYSTEM WELL	OFFSET WELL 1
Start depth, ft	9,050	9,222
End depth, ft	15,285	14,687
Interval length, ft	6,235	5,465
Total interval drilling days †	3.5	3.6
Average ROP, ft/h	95	76
ROP difference, %	+16	-
Max. torque, ft.lbf	21,500	26,000
Torque difference, %	-18	-

† Considers only drilling days excludes time taken for tripping and other rig activity

The HydraGlyde system achieved an ROP increase of 16% due to 18% less torque compared with the inhibitive WBM used in offset wells.

CASE STUDY: HYDRAGLYDE SYSTEM REDUCES TORQUE, BOOSTS ROP BY 16% IN CHALLENGING WOLFCAMP SHALE, WEST TEXAS

The M-I SWACO team used VIRTUAL HYDRAULICS* drilling fluid simulation software, which evaluates and designs critical drilling hydraulics under simulated downhole conditions by monitoring and predicting equivalent circulating density, equivalent static density, temperature, hole cleaning, and tripping profiles. This well monitoring tool helps customers avoid most hydraulics related NPT scenarios. It complements drilling fluid performance by achieving a quality wellbore under optimal operating conditions while reducing rig time and lowering costs.

PERFORMANCE COMPARABLE TO AN OIL-BASE SYSTEM

The 8 1/2-in production interval was drilled in 3.5 days, making it one of the operator's fastest-drilled wells in the area. Drilling torque was up to 5,000 ft.lbf less than the torque required in offset wells. The entire section was drilled to TD with one bit and exhibited a smooth wellbore that was successfully cased and cemented. The customer is using these improved drilling parameters to establish higher drilling fluid standards for future wells in the area.