

West Texas Operator Utilizes STAR SHIELD® to Eliminate Mud Losses in the Delaware Basin

North America

CHALLENGE:

- ▶ Mud losses in the 3rd Bone Springs/Hoban Formations
- ▶ Hole instability increasing mud weights in mechanically weak formations

SOLUTION:

- ▶ STAR SHIELD added to the OBM system at 6-8 lb/bbl
- ▶ Shale shakers fitted with appropriate screen sizes to maintain concentrations while maintaining LGS content

RESULT:

- ▶ No mud losses or wellbore instability
- ▶ Operator re-used the mud system with STAR SHIELD in the active system on the next pad with the same results



OVERVIEW

An operator drilling in Reeves County, Texas, planned to drill curve section through the mechanically weak 3rd Bone Springs Sand/Hoban formations in the Delaware Basin. Offset well data indicated operators experienced mud losses and hole instability issues while drilling through these problematic formations in the 8 ½-in. production interval. Drilling through mechanically weak formations with narrow pore pressure and fracture gradient windows are often a challenge. Maintaining wellbore stability, while providing sufficient mud weight to prevent hole collapse without inducing mud losses can be difficult to manage.

Hole Section with STAR SHIELD	Mud System	Drilled from MD/TVD (ft)	Drilled to MD/TVD (ft)	Footage (ft)
8 ½"	OBM	10,041'	13,312'	3,271'

SOLUTION

The operator adopted the use of STAR SHIELD throughout the production interval to minimize whole mud losses and provide wellbore stability while drilling the curve and first 2,000-ft. of lateral section. STAR SHIELD was first introduced into the active oil-based mud (OBM) circulating system while drilling out the intermediate casing shoe in the 8 ½-in. production interval. The intermediate casing shoe was drilled out with a 12.0 lb/gal OBM and a successful formation integrity test (FIT) was performed to 13.5 lb/gal equivalent mud weight (EMW). Hourly treatments of STAR SHIELD were added to the active circulating system to maintain appropriate concentrations while drilling the curve section through the fragile 3rd Bone Springs Sand and Hoban formations. Upon reaching the landing point, a trip was made for the lateral assembly with no issues at 11,024-ft. STAR SHIELD concentrations were maintained while drilling the first 2,000-ft. of lateral to a depth of 13,312-ft. measured depth (MD) and 10,436-ft. true vertical depth (TVD).

CASE HISTORY: WEST TEXAS OPERATOR UTILIZES STAR SHIELD® TO ELIMINATE MUD LOSSES IN THE DELAWARE BASIN

Drilling Fluid Performance

Depth MD (ft)	Mud Weight (lb/gal)	Sand Bed Test	STAR SHIELD concentration (lb/bbl)	LGS %	Est. Mud Lost to Formation (bbl)
10,041'- 11,024'	12.0	4.5 – 6.67cm	8	9.2	0
11,024'- 13,312'	12.2	6.67cm	8	9.0	0

SOLIDS CONTROL

The operator utilized three primary shale shakers and a Mud Cube shaker system throughout this hole section. The primary shakers were equipped with API 70 mesh screens and the Mud Cube system was set up to downstream with API 100 mesh screens. Minimal STAR SHIELD depletion was observed at the shakers and Mud Cube system. The product was maintained as a background additive in the active circulating system at 8 lb/bbl with hourly treatments to account for dilution, new hole volume and cuttings attrition. The centrifuge was not utilized during this section and all adjustments proved effective in maintaining STAR SHIELD concentrations while managing low gravity solids (LGS) at 7-9%.

CONCLUSION

The operator drilled through the 3rd Bone Springs Sand/Hoban formation with no mud losses or wellbore instability issues. Additionally, the operator drilled to total depth at 21,167-ft. with zero OBM losses. The 5 ½-in. production casing was ran and cemented to bottom with full returns. STAR SHIELD provided ultra-low fluid invasion protection against the mechanically weak formations compared to OBM without the additive. STAR SHIELD's resistance to shear degradation allowed the operator to re-use the treated mud system on subsequent wells on the pad, reducing the overall consumption. The next well also measured no losses while drilling these formations.