EnerLITE† Direct Emulsion System Delivers Density Control and Salt Inhibition in the Delaware Basin

CHALLENGES

Control density below fracture gradient to minimize losses

Prevent salt washout

Maximize rate of penetration while effectively cleaning the wellbore

SOLUTION

EnerLITE direct emulsion system to inhibit salt with a saturated brine phase

Control density with additions of diesel or saturated brine

RESULTS

- EnerLITE is resilient to adverse well conditions while providing required drilling performance
- Rates of penetration exceeded targets, averaging 400 ft/hr through the salt
- EnerLITE planned for full deployment in the Delaware Basin

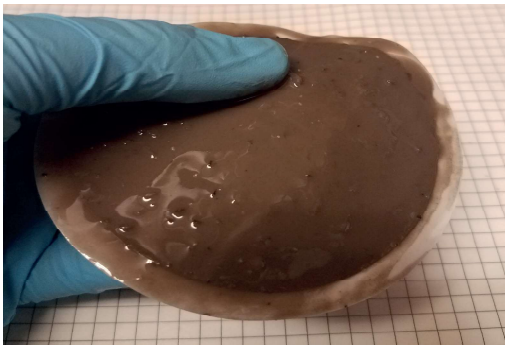
OVERVIEW

Delaware basin wells traditionally required two intermediate casing strings. The first casing string isolates a salt layer and the second string isolates interbedded sands to reach the Bone Springs formation.

The client requested a saturated salt system to prevent washout in the salt layer. At saturation the brine phase required is approximately 10 lbm/gal, which exceeds fracture pressure. AES designed the EnerLITE system with a dispersed diesel phase to provide the desired mud weight range between 9.2 and 9.6 lbm/gal.

Rates of penetration exceeded expectations. The EnerLITE system provided excellent hole cleaning and density management despite significant saltwater flows, among other drilling challenges. Fluid properties including rheology and fluid loss remained stable with simple maintenance treatments.

The direct emulsion system performed with no emulsion instability despite numerous drilling challenges. Cuttings through the salt showed no sign of dissolution (left).



EnerLITE filter-cake remained thin and lubricious

DETAILS

1600 bbl of 9.2 lb/gal EnerLITE was prepared at the rigsite prior to drilling out cement. The system was pre-treated to manage contamination, although the cement was fully set. The salt was drilled without issue.

After drilling through the salt, a saltwater influx was encountered at a rate of 100 bbl/hr, raising the density of the system. Additions of diesel and NORMUL† emulsifier were bled in to control the density at 9.6 lbm/gal and the saltwater flow was incorporated into the active drilling fluid system. Throughout the interval, typical oil:water ratios ranged from 20:80 to 30:70. Influx rates were reduced below 10 bbl/hr with some seepage losses.

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