AES DRILLING FLUIDS

INVERTRA† INVERT EMULSION LUBRICANT IMPROVES RATE OF PENETRATION AND LOWERS MECHANICAL SPECIFIC ENERGY, SAVING WEST TEXAS OPERATOR ESTIMATED $60,000

CHALLENGE

- Alleviate limited drilling efficiency due to elevated torque
- Outperform other uneconomical options such as non rotating protectors

SOLUTION

- Introduce INVERTRA via sweeps to monitor efficacy
- Treat active system to 2% v/v INVERTRA

RESULTS

- Increased ROP while rotating >25%
- Lower MSE exhibiting more energy to the bit
- 16% reduction in torque at total depth versus offset well without NRP

OVERVIEW

An operator in Borden County, Texas struggled with excessive torque while drilling a 3-mile lateral in the Wolfcamp A formation. Prior 3-mile laterals attempted to alleviate torque issues using non-rotating protectors with success but at the expense of productive time and cost. INVERTRA, an invert emulsion lubricant with extreme pressure properties designed to provide maximum energy to the bit, was offered as a solution.

INVERTRA was introduced to the system via 3-5% v/v concentration sweeps to measure lubricant performance. A 25% increase in rate of penetration (ROP) and a 20% reduction in average mechanical specific energy (MSE) was noted upon introduction.(Figure 1) The decision was made to begin adding INVERTRA directly to the system targeting a 2% v/v concentration, with an additional set of concentrated sweep near total depth (TD). Torque at TD was similar to an offset well which used Non Rotating Protectors (NRPs) and 16% lower than a well that did not use NRPs nor lubricant. The well was completed without encountering torque limited drilling and production casing was ran without any issues.

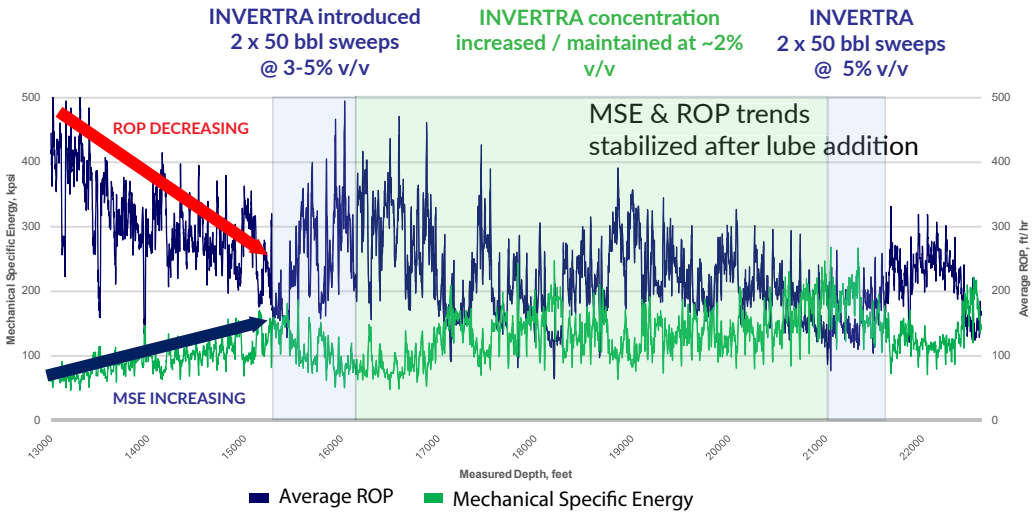

Figure 1

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DETAILS

An operator faced significant rotary torque on multiple 3-mile lateral wells in Borden County, Texas. The production sections of the Wolfcamp A formations were 8-¾ in. diameter with 5 in. drill pipe - using 8.5 lb/gal oil-based mud. At approximately 15,371' MD/6,217' TVD (8,550' into the lateral) a series of 50 bbl 3-5% v/v concentration INVERTRA sweeps were pumped to test the effectiveness of the lubricant.

A notable increase in ROP was observed from 228 ft/hr average to 294 ft/hr average, a 25% increase. MSE reduction was also observed averaging 132 kpsi to 105 kpsi, a reduction of 20% demonstrating more energy was being transferred to the bit. After observing the performance benefits of INVERTRA, the decision was made to increase lubricant concentration in the entire system to ~2% v/v. At approximately 21,100' MD, another set of sweeps were pumped containing 5% v/v INVERTRA. With the performance benefits of INVERTRA the operator was able to drill to TD 22,607'MD without experiencing torque limited drilling. Final on-bottom rotating torque was approximately 32,000 ft-lbs, ~16% lower than an offset well drilled without lubricant nor NRPs. (figure 2)

The BHA was pulled out of the hole and production casing was ran without issues. No adverse changes to the fluid properties were observed. With the success of INVERTRA, the operator saved an approximate $60,000 per well.

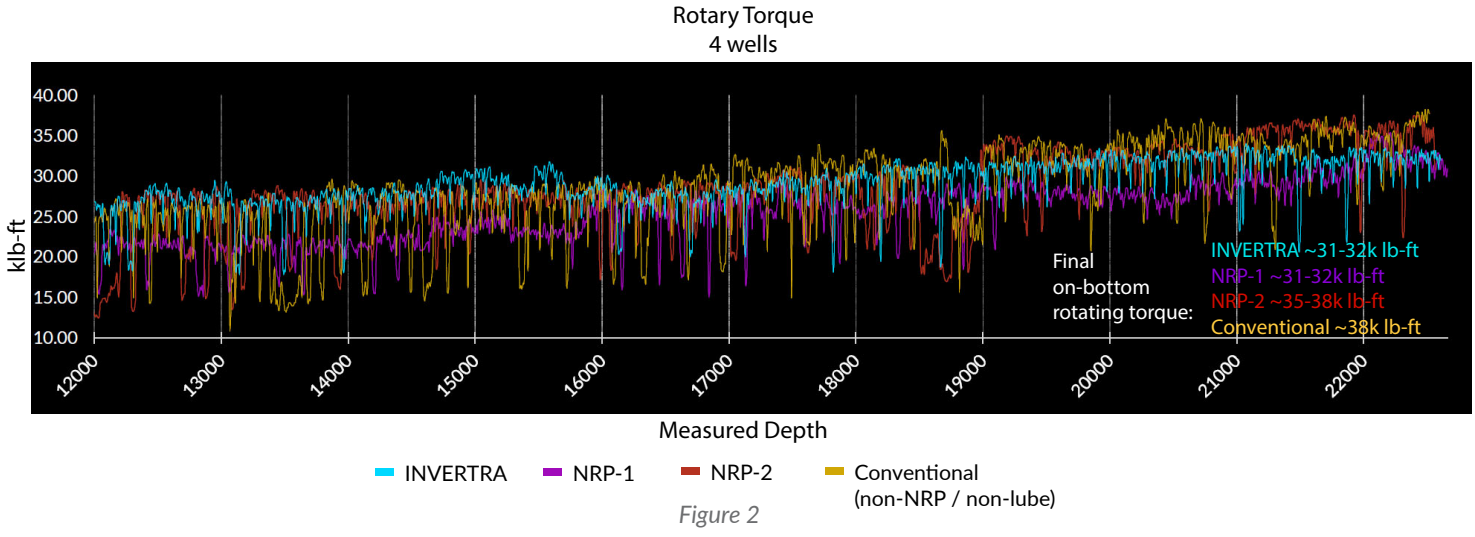

Figure 2

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