CASE HISTORY

Tribex™ ERD Additive and Direct Emulsion System (DE) Displace Diesel OBM for Major Global Operator in Permian Basin for Extended Lateral Section (ERD)

Well Summary

Global operator drilling ERD oil wells in the Permian Basin successfully displaces Diesel OBM in lateral section with 50:50 brine diesel ratio (BDR) Direct Emulsion WBM and 3-6 ppb Tribex™ ERD Additive. High torque values were encountered with a WBM that exceeded the rigs torque limitations, Tribex™ ERD Additive was used to minimize reservoir friction factors. This reduction in friction was demonstrated through torque stabilization and reductions in both expected upweights and down weights. The addition of Tribex™ ERD Additive produced a WBM that performed on par with offset wells drilled using conventional DOBM. This resulted in a lower overall well cost to the operator and a reduced environmental foot print generally associated with the use of WBM.

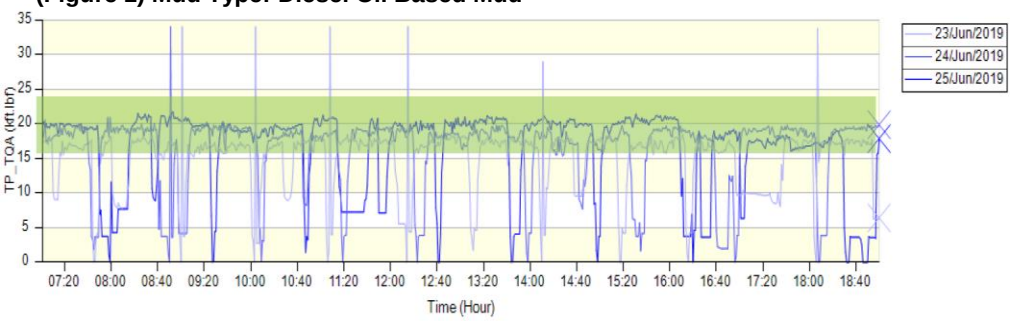
Well Outline

Interval Length: +/- 15,500 ft. or 4724 m
Well MD: +/- 19,500 ft. or 5943 m
Well TVD: +/- 9,000 ft. or 2743 m
Hole Diameter: 8.5 inches

Objective

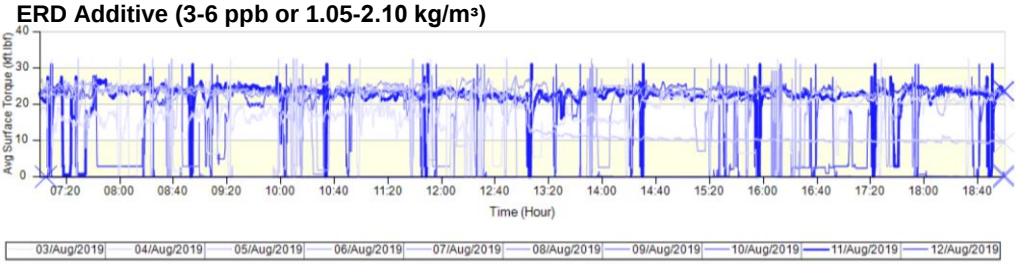
Well interval was successfully drilled to TD using Direct Emulsion WBM and 3-6 ppb or 1.05-2.10 kg/m³ Tribex™ ERD Additive**.** Torque values were maintained at 22-25k ft-lb average as seen in Figure 2. Offset well torque values with Diesel OBM averaged 20-22k ft-lb as seen in Figure 1.

(Figure 1) Mud Type: Diesel Oil Based Mud



Maximum Torque: 32k ft-lb.
Limit Torque: 28k ft-lb.
Observed while drilling: 20-22k ft-lb. average

(Figure 2) Mud Type: 50/50 Direct Emulsion w/ Tribex ERD Additive (3-6 ppb or 1.05-2.10 kg/m³)



Maximum Torque: 32k ft-lb.
Limit Torque: 28k ft-lb.
Observed while drilling: 22-25k ft-lb. average

CHALLENGES

- Displace Diesel OBM w/ DE WBM
- High torque values exceeding limitations of the drilling rig
- High Drag on Trips
- Large torque variation (tortuosity)
- Tool damage/failure rates

SOLUTION

- 3-6 ppb or 1.05-2.10 kg/m³ Tribex™ ERD Additive

RESULTS

- ERD lateral drilled to TD w/ WBM successfully
- Torque variation (min-max) minimized

MUD TYPE

- 50:50 BDR Direct Emulsion

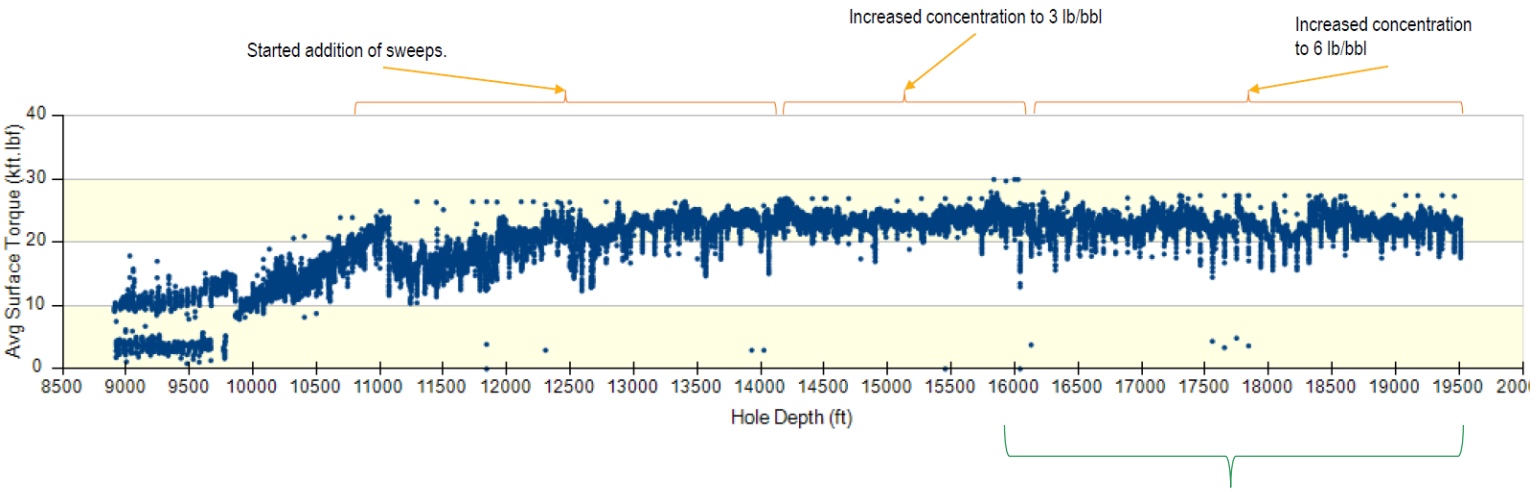
TRIBEX ERD

DrillingSpecialties.com

Drilling Fluids

Tribex™ ERD Additive Continued……

Tribex ERD Additive: Active System-Progressive Concentration
Observation: Torque stable and variations minimized



Tribex™ ERD Additive: 6 ppb or 2.10 kg/m³ +/-16,000 ft – 19,500 ft. Interval TD (Fig. 3)
Observation: Torque values remain stable and tight through the end of the section with progressive concentrations of Tribex ERD Additive. As the Tribofilm is developed, friction factors are minimized contrary to the expected rise in overall torque values typically associated with ERD laterals.

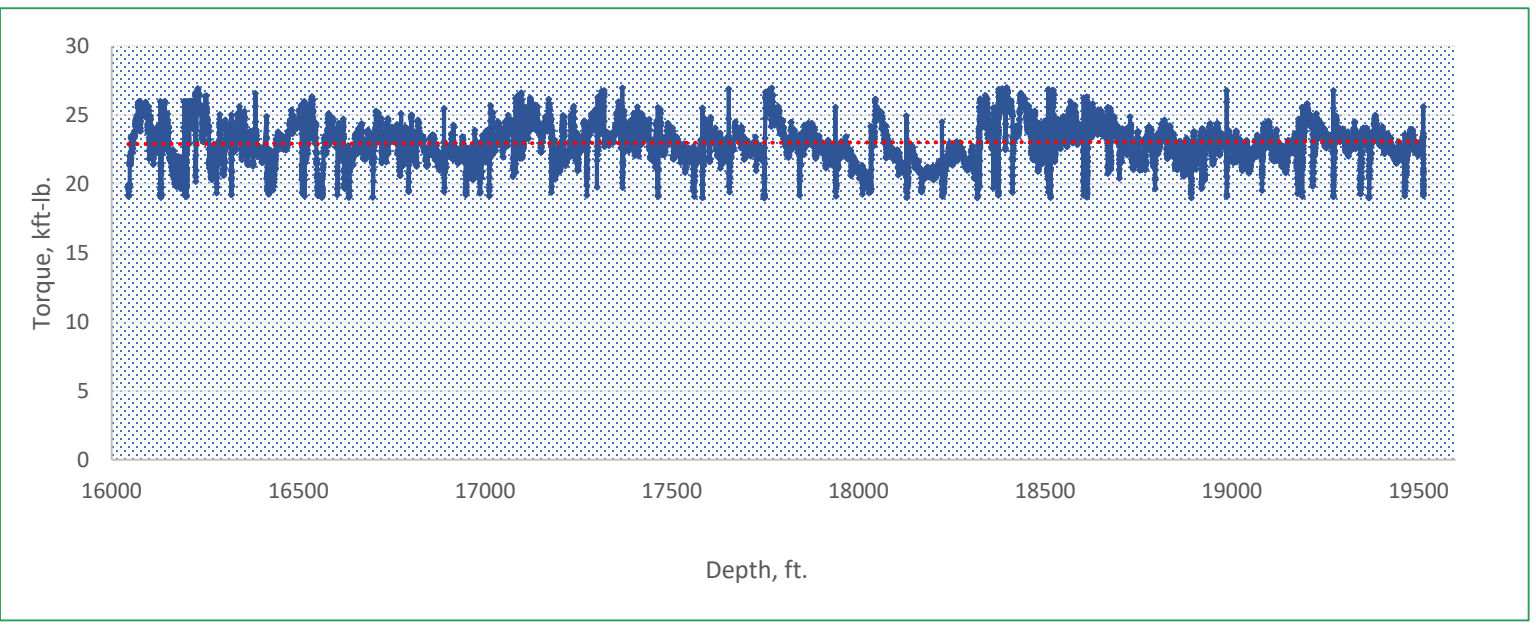
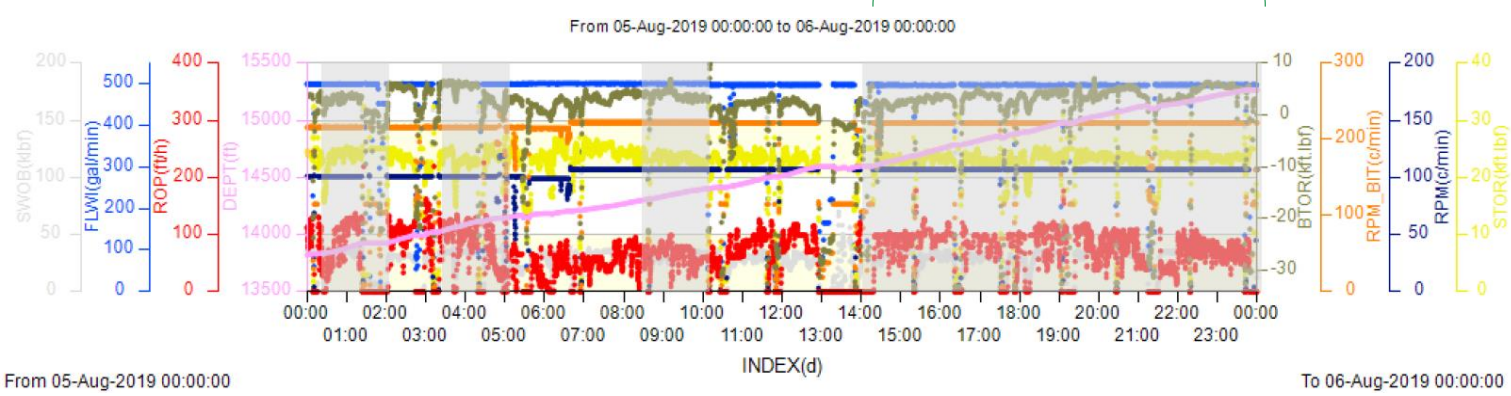


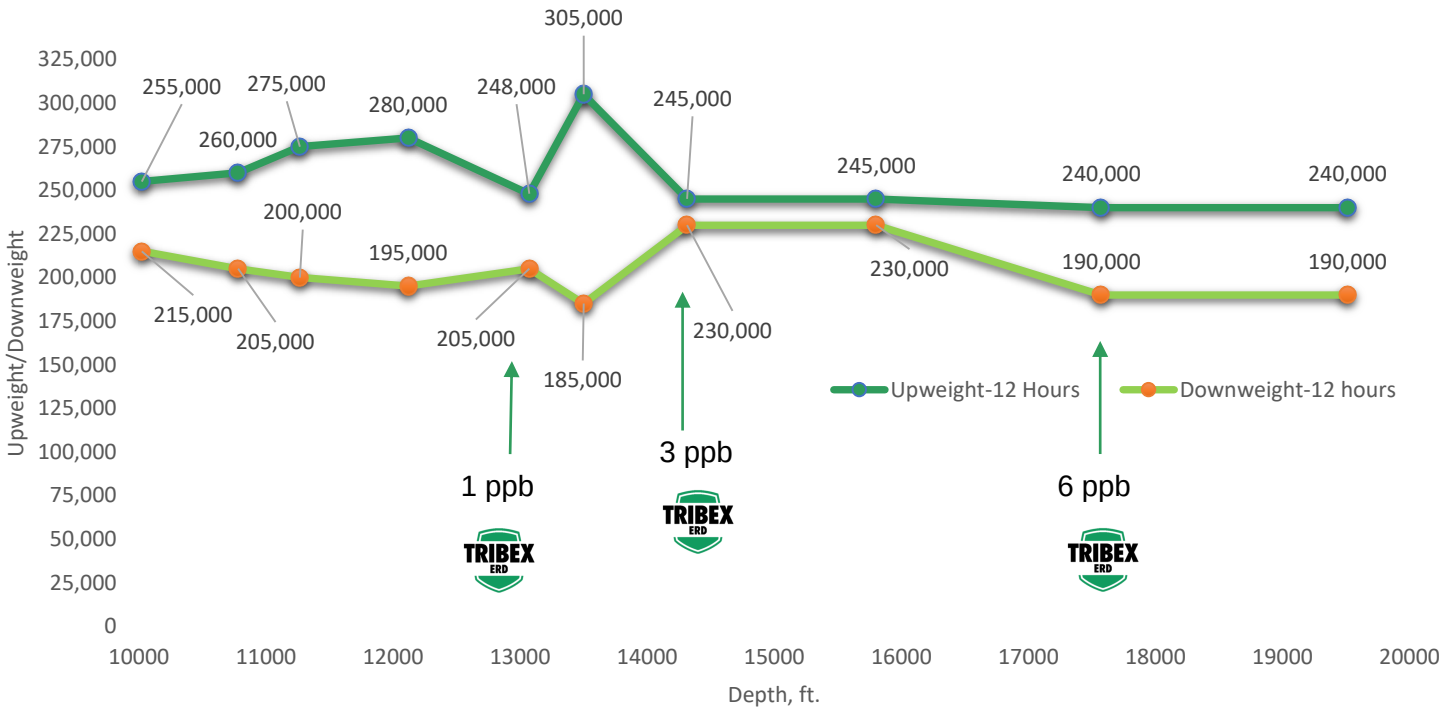
Fig. 3- Torque analysis: 6 ppb. Tribex ERD Additive f/ +/- 16,000 ft. to +/- 19,500 ft.

Tribex™ ERD Additive Continued……

3 ppb or 1.05 kg/m³ Tribex™ ERD Additive Added
Observation: Torque decrease and stable (Yellow)



Upweight and Downweight: Upweight and Downweight measurements decreased as the section was drilled. Through increased concentrations of Tribex™ ERD Additive, these indirect measurements of sliding friction show the contributions of Tribex™ ERD Additive to reducing both static and dynamic friction forces.



DRILLING SPECIALTIES COMPANY™

Drilling Specialties Company's products are designed to help service companies deliver superior fluid performance, and assist operators by decreasing their critical exploration and development costs around the world. The fact is, the more technologically demanding the drilling or well production conditions, the more we can contribute to operational success.

Check us out on:



DRILLING SPECIALTIES COMPANY | 3606 Research Forest Drive | The Woodlands, TX 77381 | (800) 423-3985