



WWT Non-Rotating Protectors

WWT Non-Rotating Protector Provides
Greater Than 25% Torque Reduction

WWT NRPS REDUCE TORQUE IN CHALLENGING WELL

Executive Summary

- This well had high friction factors at the start of the run. Back models showed that the FF reached over 0.40 CH and 0.45 OH when drilling with WBM.
- Adding lubricants gradually to reach 2.5% lub reduced the FF to around 0.30/0.36, and the lubricant % was held steady at 2.5% to TD.
- **WWT NRPs** entered the hole at 16,950 ft bit depth and started covering the critical area from 17,500ft bit depth. Backmodeled FF dropped to below 0.25/0.30 and showed NRP benefit reaching **20%** from projected torque with FF 0.25/0.30., and around **30%** reduction from projected torque with FF=0.30/0.36. At TD torque reduction benefit could be back modeled at **22%** from FF= 0.30/0.36.

High Torque With WBM

- Added lubricant reduced friction factors to 0.30/0.36.
- NRPs reduced torque further to show 22% reduction at TD
- WWT Non Rotating Protectors performed their optimal benefits within adequate wellbore conditions:

At up to 80% local friction reduction

