

## Torque Reduced By 28% After Installing WWT NRPs In Build Section

### High Torque While Drilling Ahead

Operator experienced high torque within the first half of drilling a two mile lateral. The increasing trend suggested that torque would be above the torsional limit for 5" DP before TD. WWT provided a complimentary well analysis to identify critical areas where frictional torque was occurring.

### NRP Recommendation

WWT Non-Rotating Protectors (NRPs) were recommended through the build and start of the lateral with the goal of significant torque reduction. NRPs were installed mid-span on the drill pipe to also mitigate parasitic effects of buckling such as erratic torque, increased drag, and vibration. A total of 171 SS3-500 NRPs were installed at a frequency of one per joint. The shaded blue area in the projected vertical section plot represents the NRP placement at TD.

### Immediate 28% Torque Reduction

A pipe trip was made at 18,100ft MD to install NRPs per WWT's recommendation. While POOH, it was discovered that part of the BHA was lost in hole. Therefore, an open hole sidetrack starting at 18,000ft was drilled around the fish. Back-modeling suggests overall friction factors up to 0.45 prior to NRP installation, which indicates possible buckling. Friction factors immediately decreased to 0.25 after installing NRPs, and remained around 0.30 while drilling to TD.

Torque was 30k ft-lbs @ 18,100ft without NRPs installed. Torque immediately dropped approximately 28% to 21.5k ft-lbs after installing NRPs to drill the open hole sidetrack. The operator was able to drill further than initially planned with this BHA.



**Location:** Delaware Basin (New Mexico)  
**Well Type:** 2 Mile Horizontal  
**Objective:** Torque Reduction  
**Solution:** WWT SS3-500 NRPs  
**Results:** Immediate 28% Torque Reduction

