

Case study: Permian Basin

TerrAdapt adaptative drill bit saves 50 hours, \$165,000 USD in challenging interbedded formation application

Our customer in the Permian Basin of West Texas was experiencing erratic drilling performance in the 12 ¼-in. intermediate section through highly interbedded formations composed of sandstone, shale, dolomite and limestone.

Historically, the section required multiple bit trips, at least two drill bits and 65 hours of rig time to reach section total depth because of multiple drilling dysfunctions including stick/slip and vibrations.

Previous runs employing **MultiSense™ HD modules** that monitor high-frequency in-bit dynamics data were analyzed with the **Sabio™ Drilling Insights service**. Using the insight from the analysis, Baker Hughes Drill Bits experts proposed using the **TerrAdapt™ adaptive drill bit** to overcome the challenges of drilling through the formation transitions.

The TerrAdapt drill bit improves drilling performance and reduces nonproductive time by proactively mitigating stick/slip and impact loading. It incorporates self-adjusting depth-of-cut (DOC) control elements to mitigate torsional instability—which can lead to stick/slip—and to absorb sudden impact loads from formation variations. The bit limits DOC when sudden loading is experienced at the bit face, and increases DOC during smooth drilling to maximize ROP.

By managing the high torque in the formation transitions and by increasing ROP, the TerrAdapt bit drilled 6,627 ft (2020 m) to section TD in one run. Our customer saved approximately \$165,000 USD in rig costs.

Challenges

- Drill the 12 ¼-in. interbedded intermediate section to total depth in one run
- Maintain high ROP
- Avoid stick/slip

Results

- Drilled 6,627 ft to section TD in one run
- Improved ROP by 82% compared to competitors' averages
- Saved approximately 50 hours in trip/drill time, equating to \$165,000 USD

