

Enhancing HPHT Drilling Performance in South Texas with TK-Drakōn Coating and Tundra Max Mud Chiller

Challenge

Extreme Bottomhole Temperatures in Long Laterals

A major operator drilling extended-reach laterals in the South Texas Eagle Ford shale encountered persistent thermal challenges. Bottomhole temperatures routinely reached **385°F (196.1°C)**—conditions that threaten the reliability and performance of downhole tools, electronics, and drilling fluids.

High heat exposure in these wells increased the risk of:

- Premature tool failures
- Inconsistent mud performance
- Excessive nonproductive time (NPT) from unplanned trips to recover or replace heat-damaged equipment

Solution

Integrated Surface and Downhole Temperature Control

To address these challenges, the operator deployed a dual strategy:

1. Surface Cooling

- Utilization of Tundra Max mud chiller to reduce fluid temperature before circulating downhole.

2. Downhole Thermal Barrier

- Deployment of TK™-Drakōn thermally coated drill pipe to reduce heat transfer within the drill string.

This innovative combination of active and passive cooling enabled a significant reduction in downhole thermal exposure.

Case study facts

Location: South Texas Eagle Ford



Results

Dramatic Temperature Reduction and Performance Gains

- Bottomhole temperature dropped from 385°F to an average of 318°F (158.9°C)
- Downhole electronics operated longer and closer to rated design life, including:
 - Batteries
 - MWD/LWD sensors
 - Automated drilling modules
- Tool trips were eliminated, increasing operational continuity
- Improved fluid rheology in high-temperature zones reduced dependency on costly chemical additives
- Lower surface return temperatures enhanced HSE performance, reducing risk of exposure to hot fluid

Conclusion

A Synergistic Thermal Management Solution

The integration of NOV's TK™-Drakōn thermally coated drill pipe with surface-based mud cooling delivered a transformative improvement in drilling performance. By actively managing bottomhole temperatures, the operator avoided costly downtime, preserved high-value tools, and accelerated project delivery—safely and cost-effectively.

TK-Drakōn Thermal Insulated Coating and Tundra Max Mud Chiller

Summary of Efficiency Gains with TK™-Drakōn + Mud Chiller

Measurable Value Delivered

Key Metric	Before	After TK-Drakōn + Mud Chiller
Bottomhole Temperature	~385°F (196.1°C)	~318°F (158.9°C)
Tool Life	Frequent failures	Extended & stabilized
Nonproductive Time (NPT)	High due to trips	Significantly reduced
ROP & Efficiency	Inconsistent	Improved and continuous
Fluid Chemical Usage	Higher (heat breakdown)	Reduced (rheology stabilized)

Temperature at BHA

