Enhancing HPHT Drilling Performance in South Texas with TK-Drakon 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.

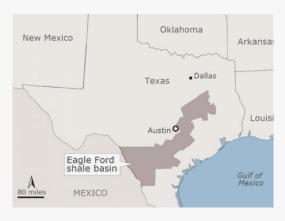
2. Downhole Thermal Barrier

- Deployment of TK™-Drakon 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-Drakon 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

