Newly Installed TUNDRA™ Mud Cooler Saves North Sea Operator 30-hour Trip

Challenges

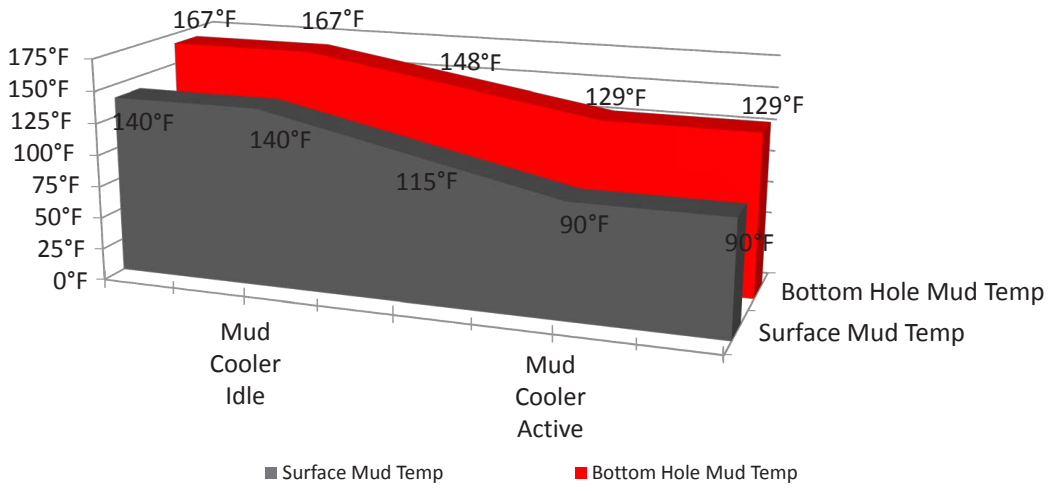
- MWD signal lost in intermediate interval
- Drilling fluid temperature deemed too high for tool design
- Mud needed to be cooled sufficiently to regain signal and avoid 30-hr round trip

Well Information

- Operator: Centrica Energy Upstream
- Location: UK Central North Sea
- Well Type: Exploration
- Depth when MWD lost signal: 12,405 ft (3,780 m)
- Bottomhole temperature (BHT): 167°F (75°C)
- Flowline temperature: 140°F (60°C)
- Mud type/density: Oil-base/12.5 lb/gal (1.5 sg)

Solution & Results

- WSS FluidControl employed a newly commissioned version of its well established TUNDRA Mud Cooler system to reduce the drilling fluid temperature.
- The temperature was lowered in 1.5 bottoms up.
- The MWD signal was restored, saving Centrica an estimated 30-hr round trip.



During drilling of its latest exploration well in the UK Central North Sea, Centrica Energy Upstream lost the MWD signal in the intermediate 8 ½-in interval. Centrica quickly determined that the 167°F bottom hole temperature (140°F flow line temperature), while moderate, probably triggered the failure of the MWD signal. Unless the active 12.5 lb/gal oil-base drilling fluid could be sufficiently cooled, Centrica estimated a 30-hour round trip would be required to pull the drill string out of hole, swap out the faulty MWD assembly and run back to bottom to resume drilling.

Upon examining their options, the drilling superintendent, mud engineer and directional driller jointly decided to prematurely kick in the newly commissioned TUNDRA Mud Cooler. Installed originally for activation in the lower 6-in section, the mud cooler is an expanded version of a unit that has been used successfully in high-temperature environments in West Africa, the Middle East, Southeast Asia, the Far East and elsewhere. All mud coolers are engineered to meet project-specific requirements. To address the need for a larger effective surface area, the high performance unit installed on the North Sea jackup was expanded with a maximum 246-plate heat exchanger package as opposed to conventional units typically outfitted with 204 to 206 plates. The modified unit was also designed with inlet and outlet pressure and temperature monitoring capabilities.

Once the mud cooler was activated in the 8 ½-in. section, only 1.5 full circulations were required to sufficiently cool the drilling fluid and regain the MWD signal. In that brief period, the surface mud temperature dropped 35°F (20°C), from 140°F down to 105°F, then stabilized at 90°F (32°C), while the bottomhole temperature (BHT) was lowered 38°F (21°C), from a high of 167°F to 129°F. Negligible changes to the density and viscosity of the drilling fluid were observed throughout the cooling operation and remained in the optimum range. Centrica credited the performance of the mud cooler with saving an estimated 30 hrs of non- productive time (NPT).

To learn more about how the TUNDRA Mud Cooler can help you achieve similar results, contact your nearest WSS FluidControl representative.

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