World’s First Extreme-High-Temperature LWD Triple-Combo Run

QUASAR TRIO® SERVICE HELPS SAVE 26.5 HOURS OF OFFSHORE RIG TIME IN GULF OF THAILAND OPERATIONS

OFFSHORE THAILAND

OVERVIEW

With extreme bottomhole static temperatures approaching 392°F (200°C), some of the wells in the Gulf of Thailand are among the hottest in the world – far beyond the reach of conventional measurement-while-drilling/logging-while-drilling (M/LWD) tools. In an effort to increase the efficiency of its high-temperature (HT) drilling practices, Chevron challenged Sperry Drilling to find a better way to drill and log these wells. With the very first extreme-temperature triple-combo LWD run in the world, Chevron saved 26.5 hours of offshore rig time while retrieving resistivity, neutron porosity, and density data in real time.

Obtaining costly and time-consuming formation and evaluation data in extreme-temperature reservoirs proves to be difficult

At these extreme temperatures, even the industry’s highest-temperature tools require time-consuming, costly temperature mitigation activities and additional runs in order to drill and log to total depth (TD). When static temperatures exceed LWD temperature ratings, the bottomhole assembly (BHA) has to be stopped frequently while tripping in or out and drilling fluid has to be circulated to cool the BHA. It is also common practice to use HT M/LWD tools until they have reached a threshold, before switching over to a dumb-iron BHA to

CHALLENGE

» Reduce rig time while drilling an offshore well with temperatures as high as 392°F (200°C)

SOLUTION

» Use Quasar Trio® service to eliminate temperature mitigation, avoid extra runs, and capture real-time formation evaluation data in extreme-HT wells

RESULTS

» Drilled 387°F (197°C) well to TD while saving more than 26.5 hours of offshore rig time
» Sixty-three hours of operation were above 347°F (175°C)

Chevron deployed the Quasar Trio® service in the world’s first extreme-temperature LWD triple-combo job. The Quasar Trio service captured real-time natural gamma ray, resistivity, density, and neutron porosity data at temperatures up to 387°F (197°C), saving approximately 26.5 hours of offshore rig time and helping to avoid the cost of a wireline triple-combo run.
Sperry Drilling recommends first and only extreme-temperature M/LWD triple-combo service

To overcome these extreme temperatures, Sperry Drilling proposed the Quasar Trio® service – the industry’s first and only triple-combo M/LWD service rated to temperatures of up to 392°F (200°C). Built to withstand high-pressure/high-temperature (HP/HT) environments, the Quasar Trio service enabled real-time and recorded gamma ray, resistivity, density, and porosity measurements, allowing Chevron to drill to total depth (TD), without employing temperature mitigation techniques and trips for dumb-iron assemblies.

Despite temperatures of up to 387°F (197°C), Quasar Trio technology allowed Chevron to drill at maximum drilling parameters without having to reduce the revolutions per minute (RPM) rate and to periodically circulate off bottom to cool the tool. The Quasar Trio service is capable of acquiring a full suite of wireline-quality formation evaluation data, negating the requirement for wireline logging runs. In addition to resistivity, density, and porosity information, this service provided directional surveys to confirm that the well path was within the planned targets.

The first LWD triple-combo service to reach TD in a reservoir with a maximum temperature of 387°F (197°C)

Sperry Drilling made just two runs in the production section – one trip was made to modify the BHA for directional control purposes, while the second BHA reached TD at 16,315 ft (4,973 m). With an average rate of penetration (ROP) of 71.5 ft/h (21.8 m/h), Chevron was able to drill the production hole section with 63 hours above 347°F (175°C) and at a maximum temperature of 387°F (197°C), completing the first extreme-temperature triple-combo LWD job in the Gulf of Thailand – and in the world. In total, the Quasar Trio service helped Chevron save an estimated 26.5 hours of rig time and avoid wireline triple-combo costs when compared with previous drilling practices in extreme temperatures.