

PEMEX Improves Trajectory and Saves 9 Days with Ultrahigh-Temperature RSS

ROP increases by 16% in 8½-in section offshore Mexico, resulting in time savings equivalent to USD 1.35 million

CHALLENGE

Improve trajectory of 8½-in tangent section and increase ROP while drilling to section TD in a shallow-water Gulf of Mexico reservoir with temperatures exceeding 165 degC [329 degF] and pressures greater than 15,000 psi.

SOLUTION

Use the PowerDrive ICE* ultraHT rotary steerable system (RSS) to steer the wellbore to target while withstanding the high temperatures and pressures of the field.

RESULTS

- Steered azimuth from 77° to 57° to reach target of 3D well.
- Increased ROP by 16%, as compared to the previous ROP record in this field.
- Saved 9 days of rig time and USD 1.35 million.



Recover trajectory to drill to target

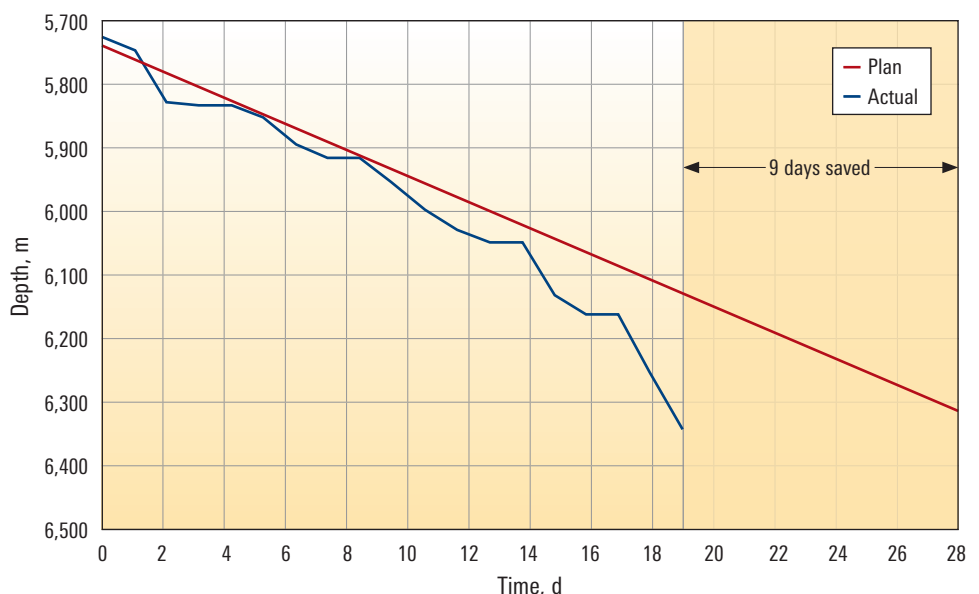
PEMEX was drilling the 8½-in section of a 3D development well in HT formations offshore Mexico and expected to encounter static temperatures exceeding 165 degC [329 degF] and pressures up to 15,000 psi. With no commercially available RSS rated beyond 175 degC [347 degF], PEMEX selected a packed BHA. The possibility of veering off track was known to be a risk with the packed BHA, but PEMEX determined that a temperature-related tool failure was a greater risk.

While drilling, the BHA encountered very abrasive formations and veered off track. Lacking precise directional control and unable to reach the desired target, PEMEX pulled the BHA out of hole. To drill this section to planned TD, PEMEX needed a tool that could recover the tangent section and withstand the formations' elevated temperatures.

Use field-tested PowerDrive ICE ultraHT RSS to correct trajectory of 3D well

During the drilling of the 8½-in section, a field test of the PowerDrive ICE ultraHT RSS concluded, and the tool became available. Schlumberger recommended using the ultraHT RSS to correct the trajectory of the borehole and drill the section to TD.

Rated to 200 degC [392 degF], the PowerDrive ICE RSS is specifically designed to improve reliability in wells with extreme heat. At the time the well was drilled, the operating windows of all commercially available RSSs were limited by the plastic components in their electronic circuit boards. These parts begin to deteriorate, melt, and cause downhole failure at 180 degC [356 degF]. Designed with proprietary ultraHT-rated electronics that are ruggedized for downhole use and a bias unit with metal-to-metal seals, the PowerDrive ICE RSS provides operators with precise directional control in HT and ultraHT environments.

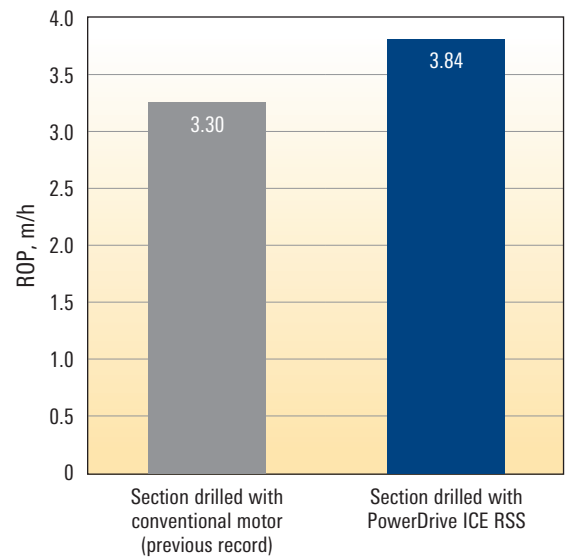


The PowerDrive ICE RSS recovered the tangent section and drilled to section TD 9 days ahead of schedule by increasing ROP by 16%.

Recovered 8½-in section and saved PEMEX 9 days of rig time

PEMEX used the PowerDrive ICE RSS to improve the azimuth of this wellbore from 77° to 57°. This RSS drilled the wellbore from 6,160-m [20,210-ft] MD to section TD at 6,340-m [20,800-ft] MD and encountered temperatures that reached 163 degC [325 degF] while drilling and 173 degC [343 degF] while static. The maximum pressure was 16,000 psi.

The ultraHT RSS performed reliably in these harsh conditions and increased ROP by 16%, saving PEMEX 9 operating days and USD 1.35 million. The RSS achieved an average ROP of 3.84 m/h [12.59 ft/h], setting a record for the field. Previously, the highest average ROP for an 8½-in section in this field was 3.30 m/h [10.82 ft/h], which was drilled using a conventional motor. PEMEX plans to use the PowerDrive ICE RSS in three future HT offshore wells.



The PowerDrive ICE RSS drilled the 8½-in section 16% faster than the previous record, which was set using a conventional motor.