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Logging Tools Tractor Conveyed 10,700 m in 3½-in ERD Completion to Identify Water Inflow

Single slim TuffTRAC iX tractor cuts conveyance time by 80% and easily navigates restrictions, offshore Sakhalin Island

CHALLENGE

Determine water inflow source behind tubing in an ERD well to guide future workovers and aid in new well design.

SOLUTION

Use the four-drive TuffTRAC* iX cased hole services tractor to efficiently navigate in 3½-in completion while conveying Pulsar* multifunction spectroscopy service to acquire production and WFL* water flow logs.

RESULTS

- Successfully achieved target depth of 10,700 m in a single run in 80% less time than conventional tractors to save rig time
- Obtained advanced spectroscopy and WFL logs that unambiguously identified the point of water inflow.

Identify water inflow in a complex, slim extended-reach well

An ERD well in a field offshore Sakhalin Island had developed water inflow behind tubing, most likely because of a leaking packer. However, logging the well would not be simple. The tubing was only 3½ in in diameter and had numerous gas lift mandrels (GLMs) and crossovers in one 50-m interval that would have to be traversed to reach a total depth of 10,700 m for logging a 1,500-m interval.

To develop full understanding of the situation to guide future workovers and plan upcoming wells, the operator needed to run advanced logging services that would provide an unambiguous determination of fluid holdup inside the tubing—in consideration of the presence of gas in the wellbore—and water flow behind the tubing.

Efficiently deploy advanced logging toolstring with TuffTRAC iX tractor

The new 2⅛-in TuffTRAC iX tractor was recommended by Schlumberger to convey the logging tools because its slim diameter can be run in casing as small as 2½-in diameter.

The tractor's drives can be operated independently, enabling a single tractor to negotiate a restriction by closing the drives sequentially as they pass the restriction. This means that only one drive section needs to be closed, which maximizes available power when navigating through restrictions. The electromechanically driven wheels of the TuffTRAC iX tractor already optimize use of the available surface power, achieving more than 45% conversion efficiency from the supplied electrical power. With these low power requirements, even in dry gas wells the tractor never has to be stopped to cool down.

The compact TuffTRAC iX tractor's four drives are operated independently for unprecedented maneuverability and optimized low power consumption.

Traverse 10,700 m in 80% less time to obtain key logs

The slim TuffTRAC iX tractor provided a benefit to the operator even before entering the well. Having to deploy only one tractor resulted in a shorter toolstring that reduced the crane boom height requirement. The shorter toolstring also facilitated conveyance. The TuffTRAC iX tractor with its four-drive configuration easily navigated past the two GLMs and six crossovers in the 50-m interval at about 7,500-m depth without the need to deploy the usual tandem tractors.

Tractoring to the target depth of 10,700 m in a single run was also quick—from the 1,200-m holdup depth, including passing the GLMs and crossovers and performing 30 tension pickups—taking just 25 hours. This is an efficiency gain of 80% over conventional tractor conveyance. The TuffTRAC iX tractor also easily conveyed the logging toolstring with a continuous head tension of more than 600 lbf during the flowing down pass of the production log to ensure safer and more efficient operation.

The high-quality logs returned by Pulsar service over the 1,500-m logging interval included 50 WFL log stations that made it possible to successfully identify the water inflow source.

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