Case study: United Arab Emirates

PRIME Tractor with integrated telemetry deployed in first tractor-conveyed offshore sour environment

ADNOC Offshore, urgently required a multiphase production logging job for an offshore well. This was to assess the flow contribution from specific reservoir subzones and to determine the gas source due to sudden increase in gas-to-oil ratio (GOR) after only one month of production. The well had a long horizontal drain extending > 8,000 ft with 80° deviation at wireline entry guide (WLEG), which posed an additional challenge for successful deployment. The sour well environment (3.5% H_2S/2% CO_2) dictated the need for H_2S/CO_2 resistant technology to be deployed. E-coil, being historically the primary conveyance method for similar wells was not available at the time, hence leaving the customer with limited options.

Solution

We were asked to provide an alternative tractor conveyance solution, one that would operate successfully in the specified well environment and enable real-time production logging acquisition while tractoring with reduced operational risks. The high performance PowerTrac PRIME Tractor with integrated telemetry was proposed, one that utilizes the latest high bandwidth modem technology and novel method of digitizing passenger telemetry data, enabling simultaneous real-time communication and full control of the tractor and passenger toolstrings. This in turn would significantly increase the efficiency of the operation, reducing the number of passes required to acquire the desired data set.

The efficiency of operation would also reduce the time the tools are exposed to the sour environment, a critical factor in managing sour service operations. Furthermore, the in-well multi-select drive options are also beneficial, providing tractor speed/force optimization in real-time across the entirety of the well trajectory and varying flow rates.

The Tractor was configured using six drive sections (3 x 3), equipped with special sour service seal kits. A thorough system integration test (SIT) was done with the relevant logging toolstring, following which the tools were promptly mobilized to location.

A detailed assessment was carried out to confirm the suitability of the PRIME Tractor technology plus the associated toolstring components and accessories for use within the expected sour environment.

Results

The Multiple Array Production Suite (MAPS) tool was successfully deployed using the H_2S resistant PowerTrac PRIME Tractor to the total depth (TD) of 16,560 ft (5,047 m), tractoring a total distance of 14,646 ft (4,464 m) across two logging passes/choke sizes in high gas-to-oil ratio (GOR).

This enabled assessment of the flow contribution and determination of the gas source downhole, successfully achieving the customer's crucial objective.

This thorough multi-pass/multi-flow PLT operation was completed from rig-up to rig-down in only 37 hours, providing logging-while-tractoring speeds of up to 64 ft/min (19.5 m/min), and delivering quality data acquisition in this sour environment well with 100% efficiency.

Challenges

- Execute a multiphase production logging job in highly deviated well
- Long horizontal drain extending for more than 8,000 ft
- Challenging sour well environment – 3.5% H_2S/2% CO_2

Results

- Logging while tractoring capability increased efficiency and reduced the number of runs required
- More than 14,000 ft of tractoring
- Tractoring speeds of up to 64 ft/min
- Downhole gas source was successfully determined