

Offshore Nigeria, West Africa

FS2 fluid loss isolation barrier valves contribute to successful completion on deepwater project

Halliburton helps optimize operating efficiency and run reliability

CHALLENGE

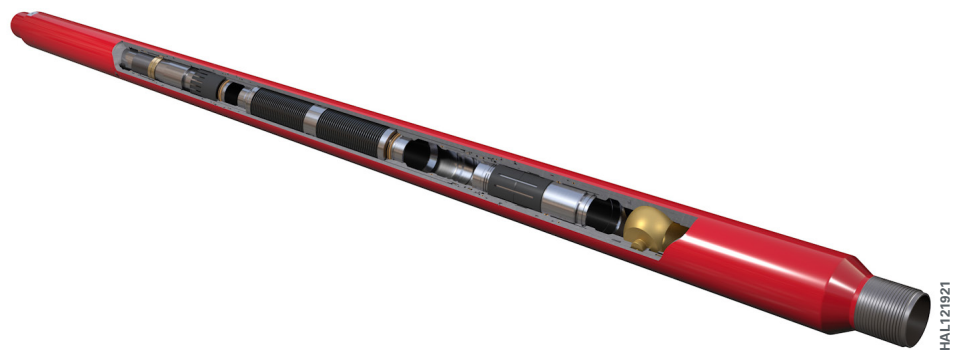
- Deliver upper and lower completions to meet project requirements
- Navigate shallow horizontal wells with long open holes and complex trajectories

SOLUTION

- Prepare detailed design reviews, peer reviews, risk assessments, and CWOP exercises for both upper and lower completions
- Use FS2 isolation barrier valves to isolate reservoirs before running upper completions

RESULT

- Upper completion times reduced by nearly 40 percent, and lower completion times by nearly 60 percent
- Completion operating efficiency and run reliability exceeding 98%
- Operator consistently running upper and lower completions in under eight days



Overview

TOTAL Upstream Nigeria Ltd. planned to install upper and lower completions in a challenging deepwater environment offshore West Africa. Halliburton partnered with TOTAL to deliver optimal completion technology solutions, leveraging previous experience from similar deepwater projects in the region.

Halliburton recommended using the FS2 isolation barrier valve (IBV) to isolate the reservoirs before running the upper completions. With this solution, TOTAL was able to reduce its lower completion times by nearly 60 percent from the start of the project, while also reducing upper completion times by better than 40 percent over this same period. Well construction durations in this location now average 24 days per well, thanks to upper and lower completion efficiencies, along with equipment run reliabilities exceeding 98 percent.

Challenge

Discovered in the early 2000s, the Egina field has water depths exceeding 1,500 m (4,921 ft). TOTAL's development project consisted of both producer wells and water injector wells – shallow horizontal wells with long open holes and complex trajectories. TOTAL required a completion solution to address and overcome the challenges identified in its completion philosophy. As part of the solution, a reservoir isolation device would be required to address TOTAL's dual-barrier requirements before running the upper completions.

Solution

Halliburton collaborated with TOTAL to design a completion solution to address the challenges encountered during this project. Thorough project planning was critical to the success of the operation, beginning with detailed design reviews, peer reviews, risk assessments, and Complete-Well-on-Paper (CWOP) exercises for both the upper and lower completions. Best practices and lessons learned from other TOTAL and Halliburton deepwater operations were incorporated into both the completion designs and the operational procedures.

To isolate the reservoir during the running of each upper completion, Halliburton recommended its ISO 28781-qualified, field-proven FS2 isolation barrier valve (IBV). The FS2 IBV provides a bidirectional, testable barrier for the lower zone by closing the ball valve with a collet shifting tool connected to the end of the service tool string.

The valve is designed to provide enhanced debris tolerance in the event that the well is not adequately conditioned during and after installation. The FS2 IBV has undergone extensive qualification testing, including debris settlement tests in accordance with ISO 28781 Annex G requirements and OBM debris testing witnessed by international oil companies.



Operator consistently running upper and lower completions in under eight days



Completion operating efficiency and run reliability exceeding 98%

Result

The initial 11 wells were successfully drilled and the lower completions were installed. These wells were then temporarily suspended before the installation of the upper completions until the subsea tree arrived.

Once the well was brought back online and the upper completion was installed, FS2 valves on 20 wells, to date, have been cycled opened without issues. Four coiled tubing interventions were performed in the field without any difficulties reported, confirming that the FS2 IBVs were in fully open positions.

The BW10 well was ultimately suspended for 917 days, a record amount of time for a Halliburton IBV to be downhole before its successful remote opening.

Both the upper and lower completions were installed safely and efficiently, ultimately maximizing asset value for TOTAL. To date, 24 completions have been successfully installed, with significant reductions in completion times. Upper completion times have been reduced by approximately 40 percent, while lower completion times have been reduced by approximately 60 percent. Both completion operating efficiency and run reliability exceed 98 percent.

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