New multilateral window exit technology expected to save USD 90 million in field development costs

Innovative solution saves approximately 16 hours of rig time per first five wells

CHALLENGE

- Reduce multilateral installation time compared to previous multilateral campaign
- Eliminate steel milling debris to avoid costly and timeconsuming operation
- Reduce construction costs through increased laterals per well

SOLUTION

- Deploy simplified installation process, which features the FlexRite[®] multilateral system with an innovative all aluminum window joint, to reduce well construction time
- Aluminum window milling, that eliminates need to pull BOPs and facilitates easy debris management
- Advance field development from dual-lateral to trilateral well plan

RESULT

- Installed the FlexRite[®] system, with an all-aluminum window joint, in three dual-lateral and two trilateral wells
- All-aluminum windows simplified installation process, which saved operator an additional 16 hours per well
- Reduced rig time by 90 days which saved an approximately USD 90 million

Overview

An operator of a deepwater field off the northwest shelf of western Australia required a minimal subsea infrastructure with tight lateral spacing in an environmentally sensitive area. For this operator's second multilateral well development campaign with Halliburton, 17 laterals were planned from seven wells targeting a sandstone reservoir. To manage production, these laterals were to be completed with sand screens and inflow control devices. Halliburton recommended a simplified installation process, using the FlexRite® isolated tieback multilateral system with an innovative allaluminum window joint, to reduce well construction time. The well architecture was also advanced from a dual-lateral to a trilateral plan. As a result, the operator reduced rig time by approximately 90 days for this field development, which reduced overall costs by an estimated USD 90 million, compared to a single lateral development scenario.

Challenge

To reduce deepwater development costs for a new field, an operator off the northwest shelf of western Australia challenged Halliburton to reduce the project's well construction time compared to the previous multilateral campaign. Elimination of steel milling debris was also a concern, as this debris requires pulling BOPs after milling the window, which is a costly and time-consuming operation in an offshore environment. Additionally, the operator required a minimal subsea infrastructure footprint with tight lateral spacing to achieve optimal operations in an environmentally sensitive area.



CASE STUDY

During previous operations, to ensure that the window exit was high side, the pre-milled window joint required orientation downhole. Therefore, the casing string required rotation to the desired orientation once on bottom, before cement operations. Typically, window orientation would be pulsed to surface via a measurement-while-drilling (MWD) tool run on an inner string inside the casing. Streamlining these steps would increase efficiency of the operation and further reduce costs.

Solution

To improve installation time for this project, Halliburton developed an all-aluminum window joint for use with the FlexRite[®] multilateral system, which provides high-strength, hydraulically isolated TAML Level 5 junctions with sand control. This system also maximizes cross-sectional flow area and load carrying capability and allows intervention and lateral re-entry.

The innovative new joint no longer incorporates a pre-milled steel window, which allows it to be milled out of high side without being oriented. Additionally, milling of the aluminum window would produce only aluminum cuttings and no steel swarf, which eliminates the need to pull blowout preventers (BOPs) and facilitates easy debris management. The window joint can be made up to the 9 5/8-in. casing string, run in hole, and cemented as per normal casing operations. MWD on an inner string and casing rotation are no longer required, which significantly reduces in equipment requirements and multilateral installation time.

In addition, the FlexRite system was instrumental advancing the operator's well architecture from dual-lateral to trilateral because the system is fully stackable, which allows for well designs with two or more laterals, and reduces the project's environmental impact and incremental lateral construction costs.

Result

In this environmentally sensitive application, the FlexRite multilateral system and all-aluminum window joint technology reduced the rig time recorded in previous installations and enables advanced drainage architecture to be constructed with minimal subsurface infrastructure.



Reduced overall rig time by approximately 90 days which saved an estimated USD 90 million

The FlexRite system was successfully installed in three duallateral and two trilateral wells (the first trilateral wells for Halliburton in Australia), all TAML Level 5. For these initial five wells, the new, simplified installation process of the all-aluminum window saved the operator an additional 16 hours per well (saving a total of approximately USD 3.3 million on these five wells) compared to previous installation times.

In addition, the operator's well architecture was advanced from the dual-lateral wells of the previous campaign to trilateral wells for the new campaign, which will further reduce development costs of the new field. The reduced rig time for these first five wells in this multilateral field development indicates that the FlexRite system will enable the operator to achieve an estimated reduction of 90 days in rig time for this field development (for an estimated overall cost savings of USD 90 million) compared to a single-lateral development scenario.

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