

North Sea, Norway

7 5/8-in. Multilateral Junction Enables Increased Reservoir Stimulation Capability in Carbonate Formation

Successful first installation of taml level 5 multilateral completion system designed for branch stimulation

CHALLENGE

- Offline stimulation of a carbonate reservoir through a TAML Level 5 multilateral junction

SOLUTION

- The 7 5/8-in. FlexRite® TAML Level 5 junction system allowing for 5,000 psi acid stimulation through both production legs

RESULTS

- Successful completion and stimulation of the well using the newly developed MLT junction system



Overview

Halliburton has been installing FlexRite® Level 5 multilateral junction systems in the North Sea since 2001, enhancing reservoir exposure and improving well production life. With mature and marginal reservoirs becoming commonplace, well completion designs are becoming more complex. To meet these complex requirements, the 7 5/8-in. FlexRite junction system was developed in 2019 with a smaller host casing size that enables deeper junction placement in wells where contingency drilling liners might be required as well as sufficient pressure ratings for branch stimulation. The initial installation of this system was performed in 2022.

Challenge

Stimulation of a multilateral well during the construction phase is possible but can add additional days to a drilling rig schedule. Offline stimulation can be performed more economically after well completion using a dedicated vessel; however, well operations are limited to wireline (WL) or coiled tubing (CT) operations that limit assembly tripping options. Therefore, the completion design must be robust enough to withstand any planned stimulation activities.

As demonstrated by multilateral stimulation case histories within carbonate formations, hydraulic integrity of a junction is essential for optimal stimulation results. Furthermore, the high probability of subsidence over the course of the production life can result in high mechanical collapse stress on multilateral technology (MLT) assemblies.



Additional complexities concerning the interface between the junction completion and lateral liner interface also required careful planning—the expected load cases during stimulation prevented the use of a Swellpacker® system seal due to induced tensile loading. A more conventional sealbore interface was used; however, this resulted in stricter space-out considerations to ensure hydraulic integrity at the lateral completion interface.

Solution

The 7 5/8-in. FlexRite® system provided a robust platform to achieve the proposed stimulation requirements. The high-strength lateral leg design resulted in superior collapse resistance to formation movement, while the 3.5-in. mainbore mechanical access enables plugging and straddle solutions for WL or CT operations later in the well production life. Because the junction must be placed into the reservoir section, the 7 5/8-in. host casing size will not compromise potential contingency liner sections in the event of well construction or formation issues.

After overcoming various challenges related to lateral construction, the 7 5/8-in. multilateral junction was run and landed on a VersaFlex® liner hanger with no issues. Indications of lateral liner engagement were observed, and the VersaFlex liner hanger set, providing positive indications of junction completion integrity. Once the well was completed and the drilling rig moved offsite, acid was bullheaded into both laterals with subsequent production data from both branches verified through tracer data.

Results

Through collaborative planning with the client and a solid technical concept, Halliburton was able to realize the following successful outcomes:

- First Halliburton 7 5/8-in. window constructed globally
- First deployment of the 7 5/8-in. FlexRite system globally
- First stimulation through FlexRite Level 5 junction globally



7 5/8-in. FlexRite® multilateral system

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