



Multilateral Technology Advancements Key to Continued Troll Field Success

After its first installation 25 years ago, multilateral wells have seen technological advancements in the North Sea that lessen environmental impact and increase productivity.

Halliburton's multilateral wells have become essential to field development in the Norwegian Troll field since their first installations in 1997. (Source: Halliburton)

Contributed by Halliburton

Mon, 04/04/2022 - 10:00 AM

Editor's note: This article appears in the E&P newsletter. Subscribe [here](#).

Over the last two decades, sustained technological advances in multilateral technology have extended the production life of fields in the North Sea by addressing new challenges and meeting the demands of increasingly complex subsea applications.

During this history, multilateral technology has played an important role in the commercial success of the Troll field on the Norwegian Continental Shelf. This field presented unique challenges due to the thin oil column, which required an efficient field strategy to maximize reservoir contact and ensure economic recovery. Ultimately, the operator selected multilateral technology, which can deliver a significant increase in reservoir contact compared to

single horizontal wells. After the first Halliburton multilateral installation in 1997 proved successful, multilateral well plans became essential to the field development. 25 years later, continuous improvement has led to further advancements in multilateral technology, enhancing reservoir exposure in less time and with less environmental impact. To date, more than 180 multilateral wells have been completed with more than 285 multilateral junctions installed in the field.

In addition to increased reservoir contact, multilateral technology enables slot recovery. With slots at a premium due to infrastructure, economic, regulatory and/or environmental limitations, optimizing slot use becomes essential to maximize asset value. The adoption of a multilateral strategy in the Troll field has provided the ability to reenter or retrofit producing wells. A well slot nearing



the end of its life can be recycled to access new targets or a well with still viable economics can be retrofitted to add additional production.

In 2020, a well slot was reentered and completed with a FlexRite multilateral system for the third time since 2001. This slot's history exemplifies the continuous improvement implemented since the operator adopted a multilateral field strategy. The well slot was repurposed twice over its 20-year life span using the latest technologies and has delivered more than 110,000 ft of reservoir exposure.

The original dual-lateral well effectively delivered twice the reservoir contact of a single horizontal while eliminating the drilling, casing and cementing of the vertical wellbore section. In 2014, the slot was reentered and completed as a tri-lateral well to produce reserves left behind with the existing subsea infrastructure. This reentry delivered 31,499 ft of reservoir exposure, twice that of the slot's first dual-lateral.

Multilateral advancements enabled the intelligent control of lateral production delivering improved production profiles resulting in delayed water and gas coning and increased overall production. A second tri-lateral reentry in 2020 again doubled the previous reservoir contact to an astonishing 64,564 ft. The ReFlexRite multilateral system positioned a deeper reentry point enabling a much larger section of the main wellbore to be recycled. This new multilateral strategy also eliminated the retrieval and reinstallation of

the production tree, resulting in operational time savings and reduced well control risks.

Continuous improvement delivered significant increases in operational efficiencies. A multilateral well strategy eliminates time intensive operations by recycling a larger portion of the mainbore and utilizing existing subsea infrastructure. Increased efficiencies enable the delivery of increased reservoir contact in less operational days. The reservoir contact delivered per operational day increased from 147 ft/day in 2001 to 253 ft/day during the first reentry in 2014 to 523 ft/day during the second reentry in 2020.

Increased reservoir contact, slot recovery and operational efficiency are at the core of multilateral benefits and helped extend this mature North Sea field many years past its expected oil production life. Starting in 2001, most oil production wells drilled in Troll were multilateral wells. With the introduction and continuous improvement of multilateral technologies over the next two decades, wells were completed with extended lateral lengths and up to four completed laterals with intelligent flow control. Within the last five years, an average of 10 multilateral wells have been installed in Troll yearly, with each well providing an average of over 60,000 ft of reservoir contact. Multilateral benefits come from a mature, proven technology and can be extended to fields where there is a need to create more reservoir contact in less time with less impact on the environment.