

Completion Solutions

Halliburton Shifts to Success in Eastern European Sea

Location: Eastern European Sea

Overview

Since 2008, a major operator has been pursuing a highly specialized solution for stimulating their wells in an Eastern European Sea development project. In completing the final wells of their offshore reentry unconventional campaign, the key challenge they faced was finding a viable solution to selectively stimulate multiple independent zones in openhole horizontal applications that were drilled from existing vertical wellbores. In addition, the operator wanted to be able to selectively open each zone with minimal intervention and 100% success, as well as have the ability to close and/or reopen each zone as desired.

Halliburton needed to find a solution to overcome the internal dimensional tolerance of the wellbore, which can inhibit and cause problems during shifting operations. The stimulation operations were also to take place on production platforms, requiring a stimulation vessel and leaving minimal deck space for other service equipment.



CHALLENGES	SOLUTIONS	RESULTS
<ul style="list-style-type: none"> • Selectively, efficiently, and reliably stimulate and produce from multiple zones 	<ul style="list-style-type: none"> • RapidShift® and RapidStart® Initiator OC sleeves 	<ul style="list-style-type: none"> • 100% of the sleeves shifted with recorded pressure signatures
<ul style="list-style-type: none"> • Selective manipulation with minimal intervention 	<ul style="list-style-type: none"> • High-Expansion shifting tool • RapidBall™ DP self-removing frac ball 	<ul style="list-style-type: none"> • Fully shiftable lower completion design without costly millout
<ul style="list-style-type: none"> • Offshore footprint required for services 	<ul style="list-style-type: none"> • RapidSuite™ system ball drop technology • High-Expansion shifting tool for future intervention 	<ul style="list-style-type: none"> • Minimal footprint • Reduced service intensity • Efficient operations resulting in cost and time savings for the operator

Solution

Ultimately, this was a multi-year, multi-product service line solution, that combined a wellbore full of Halliburton completion and stimulation solutions. The lower completion was comprised of ball-drop RapidShift® sleeves, ZoneGuard® openhole packers for zonal isolation, a RapidStart® Initiator Open Close toe sleeve, a Downhole Shutoff Collar, and a VersaFlex® Breech Lock expandable liner hanger to deploy and hang the string in the newly drilled sidetracked lateral. This was the first implementation of the RapidStart Open Close toe sleeve and High-Expansion shifting tool designed to meet the tight dimensional requirements from the operator, while still allowing selective manipulation of every sleeve/zone without the need for drilling or flowing back. The upper completion also consisted of a Halliburton tubing-retrievable subsurface safety valve (TRSSV), sliding sleeve device (SSD), downhole gauge mandrel with gauge, and a chemical injection nipple.

Each well consisted of a lower zone in the toe, accessed through the RapidStart Initiator OC sleeve and six upper zones accessed through their respective RapidShift sleeve. Each RapidShift sleeve has a uniquely sized baffle installed so that it can be opened by its correspondingly sized RapidBall™ DP ball or the High-Expansion shifting tool. After the sleeves were opened using cost and time-efficient pressure activation and ball-drop technology, the zones were stimulated as designed and the customer was able to flow back their wells as desired with no issues or down time. This was all achieved in a footprint that was a fraction of the size of a typical plug-and-perf or other more intervention intensive solution. The well's design also helped eliminate the need for milling out, saving the operator money, and allowing for quicker time to production. For future intervention, each previously shifted sleeve can be closed or opened using the High-Expansion shifting tool run on coiled tubing to control the flow of production and or water. This feature also makes the well refrac ready, giving the customer the ability to re-stimulate each zone independently.

Result

Halliburton successfully installed over 40 downhole completion tools offshore. All 32 unconventional tools operated with 100% success and with no HSE incidents. This was the first deployment of the RapidStart Initiator OC sleeve in an operator's well and also the first time deploying our ball-drop technology in the area.

To meet the unique dimensional needs of the customer, Halliburton developed a new shifting technology that allows all of the frac sleeves in both wells to be manipulated open or closed using the High-Expansion shifting tool through the smallest restriction in the wellbore. This could have been a much tougher challenge were it not for the dissolvable plastic balls used during the stimulation operations. They allowed the operator to selectively open each desired RapidShift sleeve using cost-efficient ball-drop technology and they didn't have to worry about flowing back or possibly creating a permanent restriction in the well, inhibiting any shifting or pumping operations. Lastly, overall production is as expected for one well and exceeding expectations for the other. The continuous cooperation between Halliburton and the operator was a significant reason the project was able to be completed successfully. The ability to provide a reliable, efficient solution, backed by a solid design and execution set Halliburton apart and raised the bar for completing and stimulating a multistage well offshore in the East European Sea.

