Case Study
i-Stroke™ & i-Shift™

Sleeve operation in well with multiple i-Valve™ sleeves after 7 years of oil production

NOV Completion & Production Solutions

i-Stroke™ & i-Shift™

Background

Our customer wanted to operate i-Valve™ sleeves that had been installed in an oil producer in June, 2009. The sleeves had been operated before, during initial acid breakdown of the formation to initiate production. After 7 years, production rates from the well had declined. The i-Valve sleeves had been installed and were designed and tested to be operated throughout the lifetime of the well. To allow them to be operated during the life of the well, special anti-scale/debris features were incorporated in the sleeve design. The design and qualification were completed in close cooperation with the client, and this was the first sleeve installation in the North Sea.

The operator wanted to re-close all the sleeves in the well, in order to proppant frac the formation between the sleeves. After finishing the multistage proppant fracturing, the objective was to run in hole again to open 3 of the i-Valve sleeves again, as these zones were still producing and would continue to contribute to the production.

Solution

We designed the dual acting i-Stroke™ impact hammer and i-Shift™ shifting tool specifically for operating our sliding sleeve completions in challenging horizontal wells. These tools form an efficient intervention BHA that was planned to be used to operate the sleeves. These tools would be run on coiled tubing and operated by our experienced personnel on the rig.

Result

All sleeves were successfully closed during a single run, and indications of operating the i-Stroke were very clear. A pressure test of the well was done to verify that sleeves had been closed. After closing all the sleeves, perforation between sleeves was conducted to gain access to new areas of the reservoir to proppant frac these zones. After cleanout was completed, we rigged up the bi-directional i-Stroke and i-Shift BHA and RIH to re-open the 3 sleeves that would contribute to production. Operation went as planned, sleeves were opened and the well returned to production at significantly improved rates.

Case Study Snapshot

Date: 2016

Project Area: North Sea

Challenges:

- Run intervention BHA and close all sleeves in a well after 7 years of oil production
- Proppant fracture between the sleeves, cleanout and re-open 3 sleeves to contribute to production
- Highly deviated well, limited coiled tubing forces available at TD

Solution:

- i-Stroke and i-Shift BHA
- Optimized BHA to create high impact in situation with limited set down weight available on coil
- i-Valve, engineered to be operated throughout lifetime of well

Results:

- No issues shifting sleeves during operation
- Re-frac completed as planned and ahead of schedule
- Opening sleeves after re-frac completed as planned
- Job was finished sooner than expected and below budget