CASE HISTORY

Thru-tubing solution restores continuous production to a liquid-loaded well

The Problem

A major operator in the UK sector of the North Sea came to BJ Services for assistance after several of its gas wells on a large platform stopped producing due to liquid loading. The wells would occasionally flow against a low-pressure separator, but the operator wanted to maintain production into the high-pressure line.

Various methods to restore production were considered: Velocity strings, isolation plugs, plunger lift, compression and jet pumps. Any method would have to maintain full functionality of a surface-controlled subsurface safety valve (SCSSV). In addition, any recompletion in this environment is expensive, raising the economic bar for any technical solution.

The Solution

BJ proposed to provide a clean path for chemical treatment all the way to the perforations by installing InjectSafe™ technology and a new capillary string inside the tubing.

Modeling and analysis of the well’s loading characteristics, using BJ’s proprietary FoamXpert™ software, confirmed that liquid loading was causing the well’s impeded production. Further analysis revealed that injecting foam to the perforations could solve the problem. BJ’s proprietary CIRCA™ software further confirmed that capillary tubing could reach the perforations in this large-diameter, S-shaped well.

After obtaining approvals required to operate the capillary unit in the UK sector of the North Sea, BJ crew members performed the May 2009 installation.

The first step was to swap tubing bonnets on the tree, to allow for a chemical injection port and internal lock profile. Next, another service company made wireline runs to lock out and communicate the existing tubing-retrievable sub-surface safety valve.

The installation continued by snubbing over 16500 ft (5029 m) of ¾-in. capillary tubing into the well and connecting the top of the capillary string to an InjectSafe wireline-retrievable SCSSV. This assembly was then lowered and landed into the original SCSSV, so the previously communicated hydraulics would be able to control new valve. Finally, a short capillary string was snubbed into the safety valve and secured, with a surface hanger landing simultaneously in the bonnet. The entire procedure was performed “live,” with a production tubing pressure of at least 850 psi.

The Benefit

The InjectSafe technology effectively created a safe, sealed flow path from the base of the tree to the perforations, while maintaining full functionality of the tree and SCSSV, and not changing tree height elevations.

The result is that the well is flowing continuously, whereas previously ceased production after 48 hours, only returning to production after enough pressure built up. The project has been a success and additional installations are scheduled.

© 2009 BJ Services. The above features and/or data are supplied solely for informational purposes and BJ Services Company makes no guarantees or warranties, either expressed or implied, with respect to their accuracy or use. All product warranties and guarantees shall be governed by the BJ Services Company standard at the time of sale or delivery of service. Actual product performance or availability depends on the timing and location of the job, the type of job and the particular characteristics of each job. This document is controlled by the reference date. To ensure that this is the current version, please contact your BJ representative.