

Saltel Expandable Steel Patch Protects Derated ECP Valve, Enabling Multistage Fracturing

Patch successfully meets minimum ID requirements for plug-and-perf operation

CHALLENGE

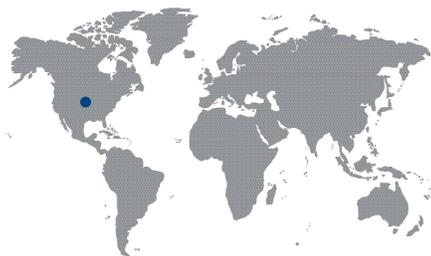
Protect derated external casing packer (ECP) valve from fracturing pressure up to 7,000 psi [48 MPa] without impeding plug passage and subsequent well cleanout.

SOLUTION

Cover the valve with a Saltel expandable steel patch.

RESULTS

- Fractured 13 stages and effectively pumped high volumes of proppant and fluid through the patch.
- Successfully passed all of the perforation guns and plugs through the patch.
- Applied this remedy to other wells on the pad with similar diverter valve issues.



Shield a derated external casing packer valve from fracturing pressure

Set in a plug-and-perf horizontal well, an ECP valve was derated to 6,000 psi [41 MPa] by the manufacturer after being run in a formation that required a fracturing pressure of 6,800 psi [47 MPa].

It was determined that the best solution was to keep the ECP in place but cover the valve with a casing patch to shield it from fracturing pressure. However, a patch would reduce the diameter the plugs had to pass through, and a cleanout operation to remove plugs and start production could prove difficult.

Deploy an expandable steel patch to accommodate minimum ID requirement

The operator had planned to run plugs with an OD of 4.425 in [112.395 mm] for the stimulation operations and switch to 4.3-in [109.22-mm] plugs if needed. However, a conventional 5.5-in, 20-lbm/ft [139.7-mm, 29.76-kg/m] casing patch would not have a sufficient ID to allow even the 4.3-in plugs to pass through the patch.

A caliper log was run to determine the exact ID of the casing and the required ID of the necessary patch. The caliper log indicated that a minimum casing ID of 4.744 in [120.498 mm] would require a patch with a drift diameter of 4.391 in [111.531 mm]. To resolve the issue, a 5.5-in Saltel expandable steel patch was set in 3 hours, the patch fully drifted up to 4.35 in [110.49 mm], and the well was pressure tested to 9,800 psi [68 MPa]. After running a plug with an ID of 4.425 in that, as predicted, could not pass through the patch, the operator decided to run 4.3-in plugs for the stimulation operations.

Successfully fractured 13 stages with no patch retrieval required

All of the perforation guns and plugs passed through the patch without issue. All 13 stages of the well were fractured up to 7,000 psi [48 MPa], with 4.5 million lbm of sand and 67,000 bbl of fluid effectively pumped through the patch.

Retrieving the patch from the hole by fishing or milling was not necessary. All of the plugs were successfully milled with a 4.25-in [107.95-mm] bit, drilling out one plug at a time and applying sweep and short trips to minimize any tagging or dragging issues. This remedy proved to be an ideal solution for this and other wells on the pad with similar diverter valve issues.



The Saltel expandable steel patch enabled the operator to safely and successfully fracture the well despite a derated external casing packer valve.