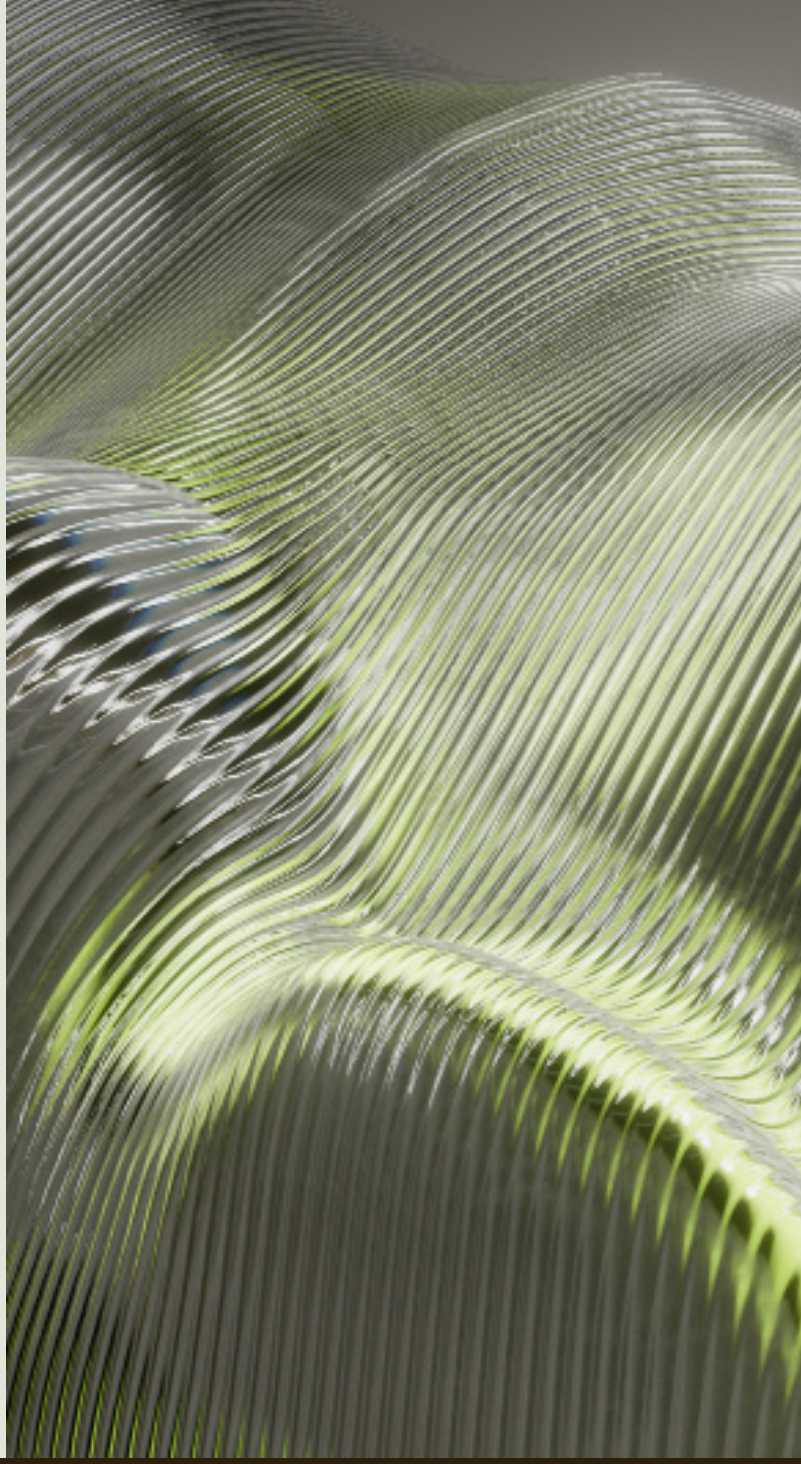
Application modified HEX



Region
Norwegian North Sea

Year
Nov 2011

Case study

Interwell

Challenge

Water production in a well in the Norwegian North Sea caused the lower screen section to become plugged off and the formation perforated by Light Well Intervention (LWI). The well initially produced, but after a few weeks the water cut increased to 100%, resulting in the well being shut-in.

The operator's objective was to close-off water production by isolating the open gravel pack sliding sleeve. However, the operator faced challenges in the well with configuration above the sleeve, the small distance to the packer bore, high restriction in well, non-conventional tubing design for standard plug sizes, and sand in the plug setting area.

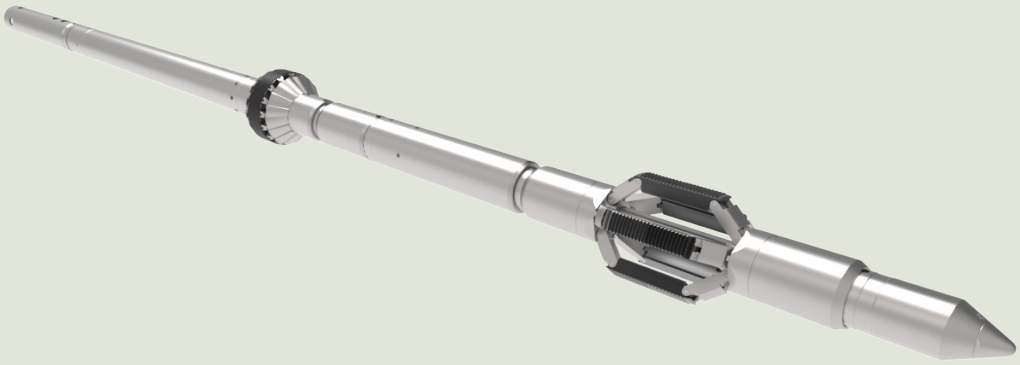
Solution

Interwell suggested running a modified 350-700 HEX plug with special designed slips to be set in 7 5/8" tubing with the sealing element in the SC-1 packer seal bore (6" ID). The expandable adapter kit was modified to be located in 9 5/8" casing while setting the plug. This modification improved the correlation margin from 30-40cm to 2cm to. Due to the fact that the plug anchors and centralises prior to engaging the sealing element, the cross flow did not affect the plug setting.

A separate correlation run was performed prior to the plug run, carried out by running a caliper with extended fingers with a special designed aluminum bullnose attached to the bottom. The correlation was performed by tagging and measuring the distance from the firm tag to the SC-1 packer seal bore. The tagging was performed while flowing the well at a fixed rate – this sequence was repeated three times. In addition, the distance from the SC-1 packer seal bore to the completion mule shoe was measured with CCL and used as a confirmation distance.

Key Capabilities

- → Highest expansion retrievable bridge plug on the market.
- → Adapter kit that ensures the sealing element is centralised when setting the plug.
- → Short tool length.
- → Ideal for workover applications: tubing barrier, packer for injection valve, and fixed choke.
- → Slim design (small OD).
- → Equalise and retrieve with standard GS in a single operation (no prong required).
- → Can be run on slickline, e-line, coiled tubing and pipe .



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HEX

The plug was assembled with the same fixed distance from element to a similar bullnose as the one used in the caliper run (spaced out with stems). Plug was landed on the same tag-point as the caliper run and set on up-weight.

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Value Created

Interwell's modification of the 350-700 HEX plug enabled installation in tubing with different IDs. The slips and anchor modifications were designed within an extremely short timescale, machined and tested in full scale within a few weeks. The Interwell solution allowed the operator to resume production from the upper zone.