Case Study:

Epoxy Injection in Gravel-Pack to Shut Off Water Producing Zones and Extend Production Lifetime

Date: Oct 2022
Region: NCS

Key Capabilities

- Rig-less water shut off intervention.
- Ultra-high viscosity epoxy designed for self-bearing properties in horizontal wells.
- Instant measurable results post injection.
- Two competent plugs established, each by a single injection strategy.

Challenge

Operator AkerBP had a subsea gas producer with significant water production suspected to come from the lower producing zones. The water production rate was above expected levels leading to a declining pressure that could potentially result in a risk of not being able to restart the well if the production of water was not reduced.

Some of the screens had water tracers installed due to misplacement of the screens during completion the tally was off and therefore determining the exact location of the water production could be difficult.

The horizontal reservoir section was completed with 5,5" screens and a gravel-packed annulus making it necessary to shut off water both on the inside and outside of the screens.

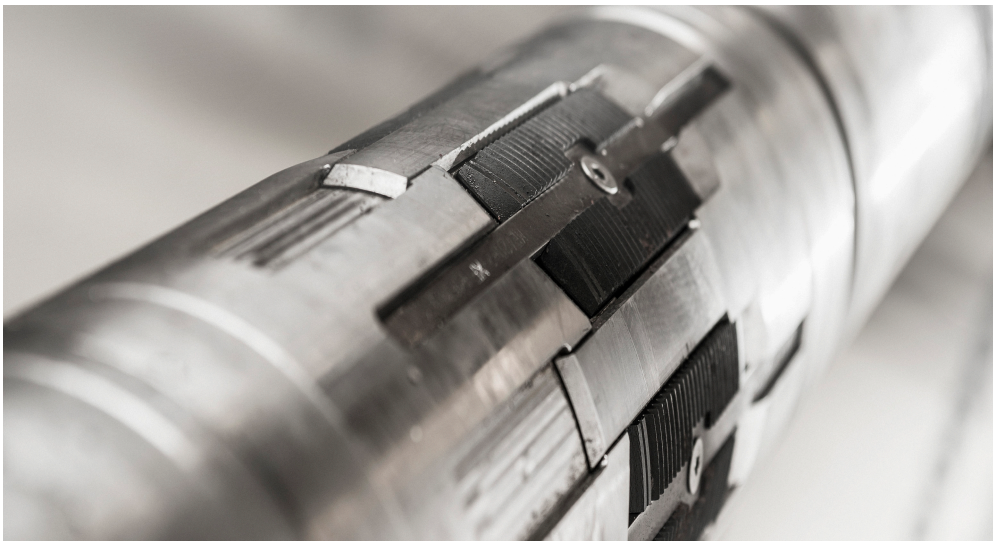
Solution

The solution was to set two individual CannSeal annulus epoxy plugs at two different depths, in conjunction with two Interwell ME plugs installed inside the tubing side to effectively fulfil the objective of completely sealing off the lower zones.

Due to a reported 100% gravel pack in the annulus only one sealant injection per plug depth was deemed necessary. A standard ME retrievable bridge plug (RBP) was planned for setting at the same depth as the lowermost epoxy plug and an ME packer with Intelligent Barrier Valve (IBV) Add-On in the same proximity of the upper epoxy injection.

Prior to the CannSeal water shut-off treatment a third party PLT run with a caliper was performed with the aim of establishing where the liquid level was, origin of water production, potential presence of crossflow, as well as the integrity of the tubing wall for the CannSeal tool injection arms and sealing O-rings. This run showed no obstacles for the CannSeal operation, and it also concluded with the exact target depth for injection of the high viscous epoxy.

The lower injection was performed in a long blank pipe between two screen sections and the upper injection was done in a short 3m blank pipe between two screen sections.



Medium Expansion Retrievable Bridge Plug (ME)

interwell

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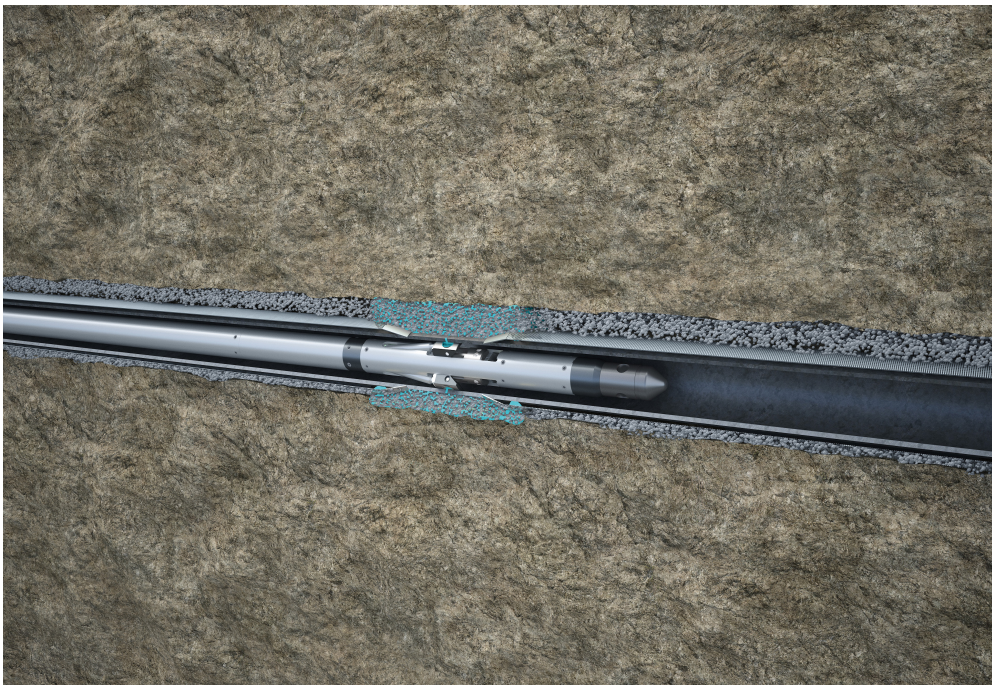
Value Created

Together, the epoxy annulus injections and tubing ME plugs successfully shut off the water produced from the lower zones and drastically enhanced well recovery.

The latest report from AkerBP states that the well is now producing as normal with a 99% reduction of water and the gas production rate at levels seen before the breakthrough.



CannSeal IntegritySeal Epoxy.

interwell