

Casing Reconnect System Enables Gas-Tight Casing and Wellhead Repair, Averting Sidetrack Contingency

Metal-to-metal solution helps restore well integrity for gas lift, offshore Qatar

CHALLENGE

Reestablish casing integrity after cutting the casing to replace a leaking casing hanger seal and corroded casing section in a gas-lifted well offshore Qatar.

SOLUTION

Use Casing Reconnect* metal-to-metal, gas-tight casing repair system to connect a new length of casing and casing hanger to the string left in the well after the corroded section and the string above were removed.

RESULTS

Restored and confirmed casing integrity with a 2,500-psi pressure test and avoided the expense of a sidetrack.



Leaky casing hanger created potential requirement for a sidetrack

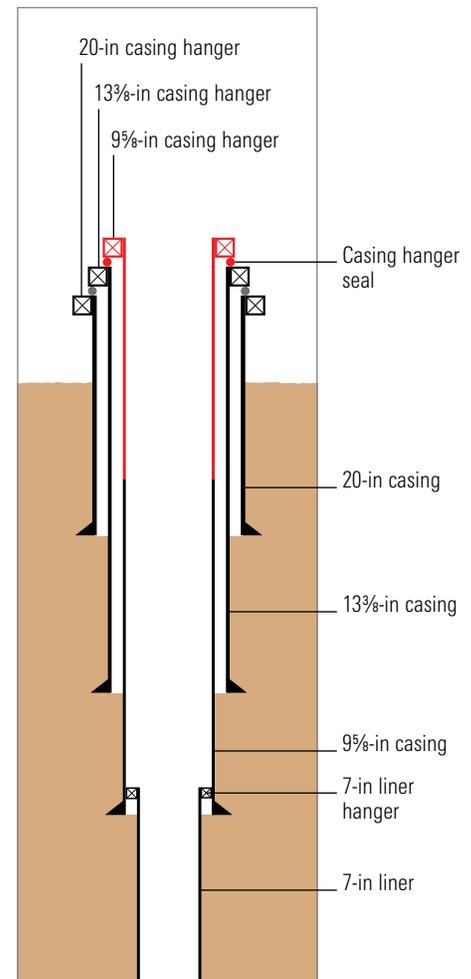
An operator offshore Qatar had been forced to shut in a well featuring a gas lift completion because of high pressure in the 9 $\frac{5}{8}$ -in \times 13 $\frac{3}{8}$ -in annulus. A leak was suspected in the 9 $\frac{5}{8}$ -in casing, somewhere between 3,000 ft and 5,000 ft, but an ultrasonic imager log eliminated that possibility, showing only minor corrosion at about 500 ft.

Subsequent testing identified a leaking seal on the 9 $\frac{5}{8}$ -in casing hanger in the wellhead. With the casing integrity compromised, the conventional solution would be to sidetrack, run a new 9 $\frac{5}{8}$ -in string, and install a new seal—an expense the operator wanted to avoid. Instead, it was recommended to only replace the failed seal. This required cutting the 9 $\frac{5}{8}$ -in casing at a depth above the top of cement and pulling out the cut section together with the casing hanger. Any remedial solution had to be rated gas tight for the planned 2,000-psi [140-bar] injection pressure and robust enough to last for the life of the well.

Casing Reconnect system restored integrity of cut casing

Casing Reconnect metal-to-metal, gas-tight casing repair system is an ISO 14310 V0-rated, full-axial-load-bearing reconnection solution that uses proprietary Metalmorphology* metal-to-metal sealing and anchoring technology. The operator selected the 9 $\frac{5}{8}$ -in repair system because it delivers a connection with

- no moving parts
- metal-to-metal seals
- gas-tight specification
- no reduction in casing ID
- high load capability in both tension and compression
- 5,269-psi [363-bar] internal pressure rating
- 3,803-psi [262-bar] external pressure rating.



The casing hanger seal and casing section that were replaced are shown in red.

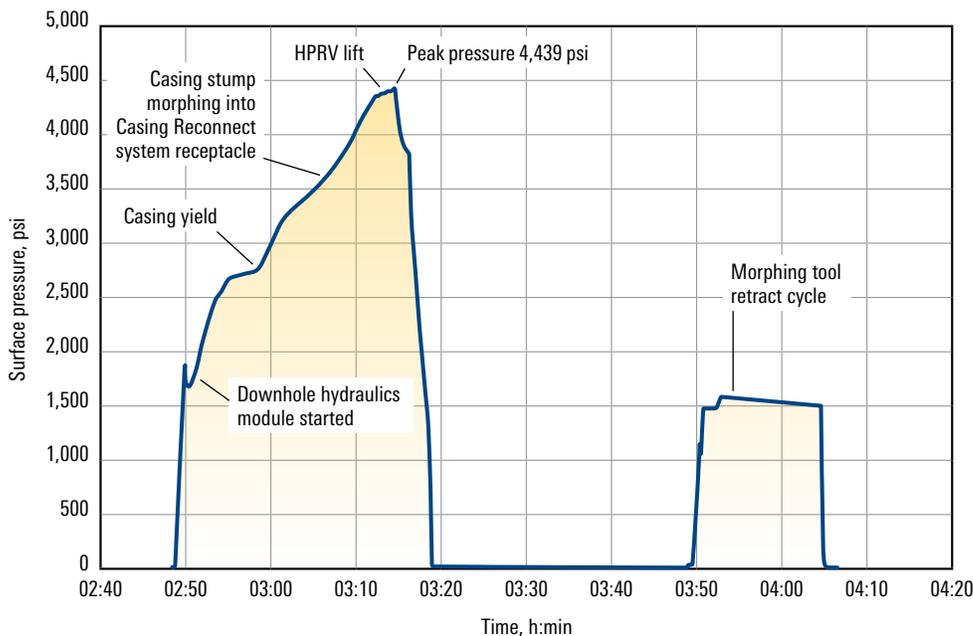
CASE STUDY: Casing Reconnect system restores integrity of cut casing string, offshore Qatar

The casing was cut at 647 ft—below the corrosion depth—and the cut string was pulled out together with the casing hanger. The faulty seal was replaced and subsequently, 13 replacement casing joints were run in with three pup joints for space-out and the Casing Reconnect system receptacle on the bottom. The casing hanger and landing string were made up and the casing hanger was landed in the wellhead; the bottom of the string was at 660 ft, with the pup joints providing 13 ft of casing stump swallow.

The morphing tool and a downhole hydraulics module (DHM) were run in on drillpipe. Once the tool was in position, surface pressure was gradually increased to 4,439 psi [306 bar] and multiplied downhole by the DHM. The casing stump was hydraulically morphed into the receptacle of the Casing Reconnect system to rejoin the two strings with a high-axial-load-bearing, metal-to-metal, gas-tight seal.

Operator achieved well integrity for gas lift completion

A 500-psi low-pressure test was conducted to check casing integrity before pulling the morphing tool out of the well. The entire operation was executed smoothly with zero NPT. Subsequently, the 9 $\frac{5}{8}$ -in casing was pressure tested to 2,500 psi for 30 min, confirming well integrity and eliminating the need to sidetrack.



The surface pressure graph clearly shows the lifting of the downhole high-pressure relief valve (HPRV), predicted to occur at a downhole pressure of 24,500 psi ($\pm 5\%$), indicating a morphing pressure well within the required range.

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