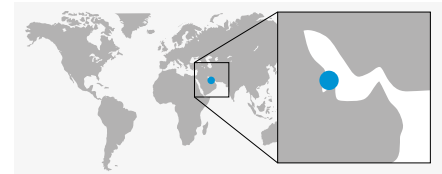


Case study: LeakPoint®/A30

Diagnostic programme locates extremely low-rate casing leak, enabling effective remediation

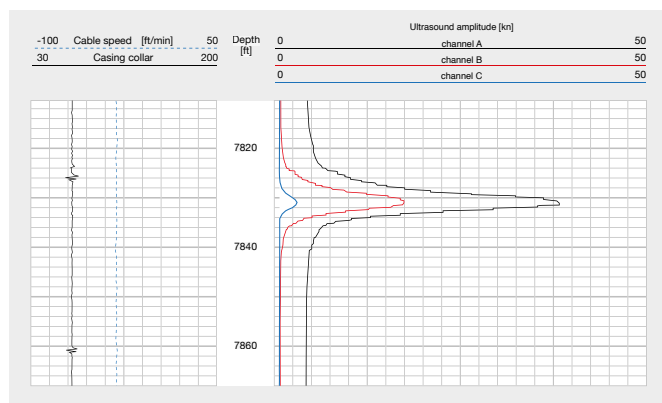


Region: Middle East, Qatar
Customer: Qatar Petroleum
Field: Dukhan
Well type: Onshore gas producer
Reference: IPTC 11583-PP

Challenge

A deep, onshore gas well had, since 1999, a history of sustained pressure in the A-annulus and intermittent pressure in the B-annulus. In 2006, the pressure increased to 2,500 psi exceeding acceptable limits and prompting an investigation by the operator's well integrity management team. Investigation had started with an annular pressure survey and the data collected indicated a down hole gas leak rate into the A-annulus of less than 0.02 L/min.

This is a particularly low-rate leak to detect, made even more challenging by its intermittent nature and suspected location beyond the primary tubular.



The leak depth is clearly identified on the field log. The symmetrical shape of the log response is an indication of a leak beyond the tubing. Correlating this response with surface observations and other well information enabled the analyst to locate the failed barriers — a DV stage cementing tool in the 7-in. casing and poor cement in the B-annulus.

Case benefits

- Fast, reliable diagnosis of casing micro-leak
- Reduced non-productive well downtime
- Exposed compromised cementing strategy
- Effective remediation targeted confidently restoring productivity and extending profitable life of well

Key capabilities

- Locates barrier leaks downhole rapidly, accurately, clearly and completely
- Two LeakPoint options, /A10 and /A30 according to complexity of failure
- Tiered pricing linked to complexity minimises cost of diagnosis
- Evaluates sealing performance of well barriers and complements other integrity management procedures
- Enables confident decisions and better-targeted remediation
- Independent validation of remediation treatment or P&A
- Mitigates integrity risk

Case study: LeakPoint®/A30

Solution

Surface investigations indicated the likelihood of a leak or leaks beyond the primary barrier, and the possibility of an annular flowpath. A LeakPoint/A30 programme was selected initially to locate all barrier leaks as a first step in understanding the integrity dynamics of the well.

The LeakPoint/A30 logging platform was deployed downhole on an electric wireline in surface readout mode to enable real-time monitoring. Tubing pressure was maintained at 3,800 psi and before commencing, the A-annulus was bled to 0 psi.

The build up of A-annulus pressure was carefully monitored while logging at 30 ft/min. It was crucial to maintain sufficient differential pressure across the leak to keep it fully active throughout the survey.

At 7,830 ft a clear leak signature appeared on the log and this was subsequently confirmed with station logging across the zone. The location of the leak correlated exactly with a stage cementing Diverter Valve [DV] tool in the 7-in. casing. The well history showed the DV had previously failed a pressure test and further investigations at surface confirmed that the leak was not in the tubing.

Results

The LeakPoint programme accurately located a micro-leak at the DV tool. The LeakPoint analyst concluded that gas was leaking through the DV tool after channeling through a flowpath in the cement below the DV.

The well was scheduled for a workover. A cement evaluation log confirmed poor cement below the DV tool, validating the diagnosis. A secondary cement job was performed and a new completion deployed. This resolved the integrity failure and the annulus pressure problem, restoring the well to normal production.

The **Point**® system
A proactive and systematic approach
to integrity management.

Check**Point**®/A10 ●
Check**Point**®/A50 ●●●
Check**Point**®/A70 ●●●●

SURFACE **INVESTIGATE**
DOWNHOLE **LOCATE**

Leak**Point**®/A10 ●
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