

**TWO ELUSIVE SOURCES OF SUSTAINED CASING PRESSURE ARE  
DIAGNOSED BY FLI DURING WELL DECOMMISSIONING IN AUSTRALIA.**



**Well-SENSE was appointed by a leading integrated energy operator headquartered in Australia, to investigate and diagnose the source of ultra-low sustained casing pressure in a land-based gas well during decommissioning operations.**

## **THE CHALLENGE**

The well had a c. 500 m. cement plug set across the reservoir section to a top depth of 362 m. but a low-level of sustained casing pressure (SCP) was present in the annulus at surface, which reached a maximum of just 20 psi.

After observing the SCP, casing slotting and cement squeeze operations were conducted to address any cement channelling behind casing, however the SCP persisted.

Such low levels of pressure are often due to small and intermittent leaks occurring over time, so are very difficult to diagnose using standard single-point logging equipment. However, the operator needed to identify the source of the SCP to plan correct remediation and properly decommission the well.

An additional challenge was the semi-urban location of the well in New South Wales, requiring consideration of local communities and associated noise and access restrictions.



## THE SOLUTION

Well-SENSE's best in class technology - FiberLine Intervention (FLI) - was selected for this survey due to several valuable advantages:

### VALUE

- **Answer Certainty** - Distributed fibre-optic sensing delivers continuous 3D monitoring of the entire wellbore to track fluid movement over time. FLI's dynamic 3D well mapping can be cross-verified with separate temperature and acoustic profiles.
- **Highly Sensitive** - FLI uses bare fibre which is incredibly sensitive and allows it to detect even the smallest intermittent subsurface movement or anomaly.
- **Independent Operation** - FLI incorporates its own pressure barrier system for offline, rigless, independent deployment.
- **Collaborative Real-Time Service** - Well-SENSE provides an industry-leading data analytic service for precise diagnostics with a rapid turnaround and real-time 'first-look' data sharing and collaboration at the wellsite.
- **Low Risk** - FLI is lightweight, noiseless and compact, allowing it to be mobilised with virtually zero impact on the surroundings. It requires only a low power electric supply and utilises just one engineer on site, thereby reducing risk, site footprint and emissions.
- **Industry Leading** - Well-SENSE has an established track record in successfully identifying low intensity, intermittent leaks behind tubing, casing and cement.

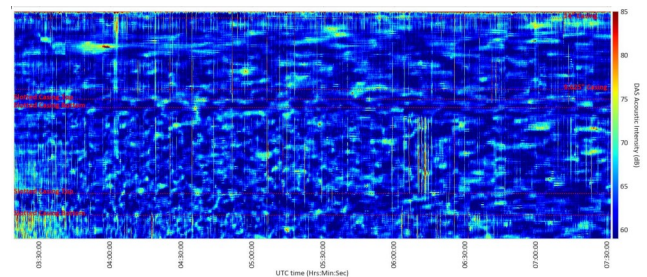
Upon arrival, FLI was gravity deployed in the well, then the production casing and surface casing were pressure vented and a pressure test performed to confirm isolation. Well-SENSE conducted a two-day distributed acoustic and temperature survey, providing the operator with ongoing feedback and real-time data, plus an overnight analysis and summary, ready to be discussed at the morning call. This allowed the operator to monitor the results and make early decisions to determine the length of the survey and balance valuable well insight with operational efficiency.

## RESULTS

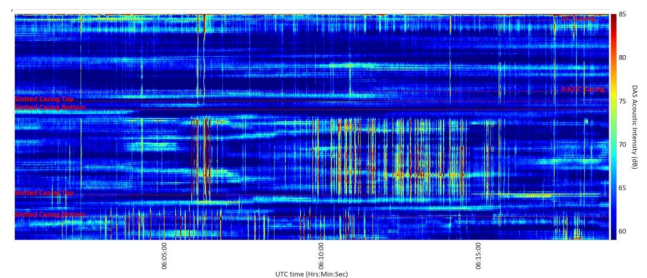
FLI detected no leak activity within or below the existing cement plug, verifying its integrity and successful reservoir isolation.

During the survey, a ten-minute period of intermittent acoustic activity was detected by FLI in two locations above the cement plug. These were logged in the low frequency range of FBE (1-10Hz). Slow strain data during this period provided high resolution location accuracy at a well depth of 210 m. and 356 m. and pinpointed two potential flow paths with wellbore connectivity originating from adjacent shallow geological formations.

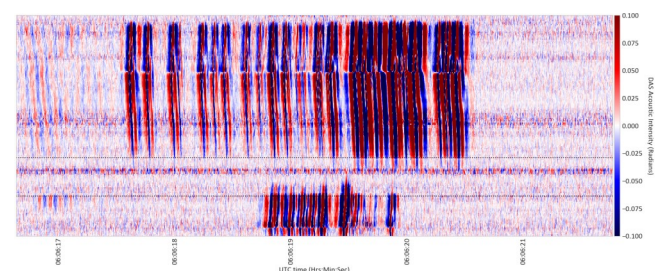
The information enabled the operator to undertake accurately targeted remediation work with further casing slotting and a micro-fine cement squeeze to isolate the cement channels surrounding the flow paths.



Above: Four-hour FLI DAS log.



Above: 20-minute FLI DAS log.



Above: Five-second acoustic strain log where FLI captured intermittent activity in two locations.



Delivered in partnership with R&D Solutions. 