

LNG Case Study – SIL2 implementation

To close your monitoring gap, call +44 20 8236 2550 or visit www.sensornet.co.uk

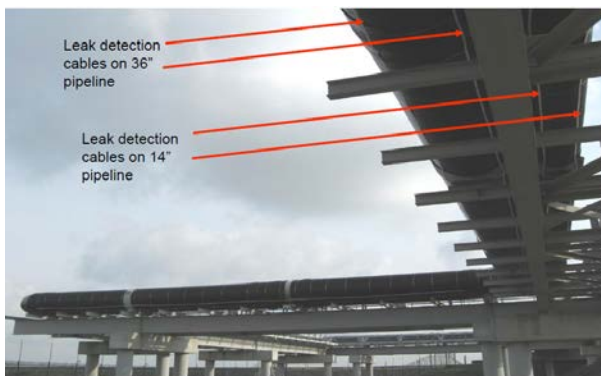
Fibre-optic DTS technology is uniquely suited to a variety of monitoring tasks within an LNG facility such as Leak detection of Loading and unloading pipelines, Leak detection of storage tanks (annulus monitoring), Liquefaction and process areas, Cool-down monitoring, spill channels and impoundment pits and basins being specifically recommended for spillage detection in section 13.4 of EN 1473:2007-06.

The fibre sensor is small diameter and the system responds rapidly to changes in temperature.

Sensornet's LNG monitoring solutions make use of fibre optical sensing probes, which are non-corrosive and intrinsically safe. Suitable for cryogenic conditions, they accurately measure temp over large distances in under a minute.

The Unique SIL-2 (Safety Integrity Level) rating and certification that Sensornet's DTS have achieved gives you the confidence that our solution is going to work as planned, day in and day out, in ultra-high-risk environments.

Isle of Grain LNG Importation Pipeline

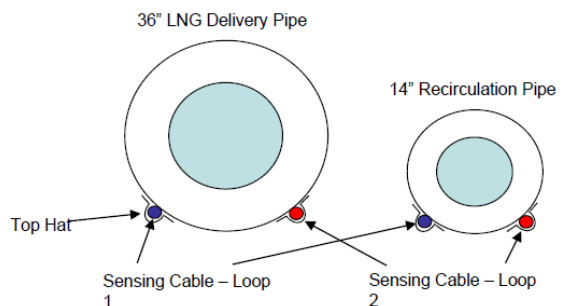


Sensornet leak detection cable installed on LNG Importation and recirculation pipelines at Isle of Grain jetty

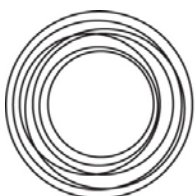


The Isle of Grain LNG importation pipeline has 4.1km of 36" LNG and 14" recirculation pipes installed with 2 fibre optics lines on each pipe to provide full redundancy of the DTS leak detection system

- Independent cable loops
- Independent DTS systems
- 1/8" double wall stainless steel Sensornet DTS cable



SIL 2 RATED Solution

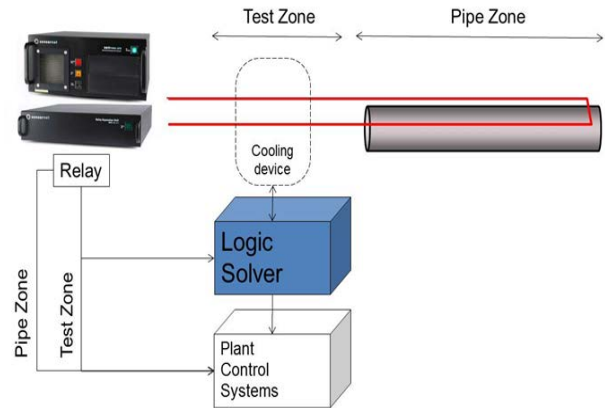


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The SIL-solution offers:-

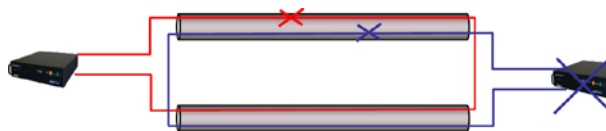
- Sensornet cabinet solution independently tested by Technis
- SIL2 (Safety Integrity Level 2) achieved using PLC voting system
- Automatic trip testing system
- PFD (Probability of Failure on Demand) @ $2 \times 10^{-4} = 99\%$ availability
- This equates to a Risk Reduction Factor (RRF) of 1×10^6 to 1×10^7 . In terms of Probability of Failure per Hour (PFH), this equates to 1×10^{-6} to 1×10^{-7} .
- Fibre break Redundancy



ATTS – Automated Trip Testing System

The patented ATTS provides a pseudo-random automatic system performance check, by virtue of periodically applying an actual cold event to each end of the sensing fibre. Each time the DTS detects a leak in the zones allocated to the ATTS, the DTS will energise a specific relay. Each time the ATTS produces a simulated leak event, it also energises a specific relay. A voting PLC applies the following logic in these events:

- ATTS leak event + DTS leak event in ATTS zone: Simulated leak, no alarm
- No ATTS leak event + DTS leak event: Real leak, raise an alarm
- ATTS leak event + no DTS leak event in ATTS zone: DTS problem, raise an alarm



Fibre break REDUNDANCY

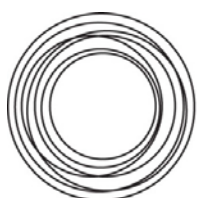
If the red sensing cable is broken the DTS will still test either side of the break.

The blue sensing cable will still monitor the entire pipeline length.

If blue sensing cable breaks the DTS will still test either side of the break

If 1 DTS fails, redundant system still operates

Contact the SIL-2 specialist Sensornet to discuss all your SIL-2 LNG and other DTS requirements.



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