

Guided Wave Monitoring of Buried Pipelines

Case Study 21



Buried Pipelines

Buried pipelines are inherently difficult to assess due to restricted access and the requirement for excavation to expose the pipe. Where degradation is suspected, inspection activities can be costly, disruptive, and limited in scope.

Localised corrosion mechanisms are a particular concern in buried lines. Such mechanisms may remain undetected between inspection intervals, while repeated excavation to verify condition is rarely practical. This creates uncertainty around the true integrity of the asset and the effectiveness of mitigation measures.

Equipment



gPIMS® FCU
- Field Control Unit



gPIMS®
Sensor Ring

gPIMS® Monitoring

A buried operational pipeline in the Middle-East region was known to be at risk of degradation from a localised corrosion mechanism. Ongoing condition assessment was required to confirm that corrosion inhibitor dosing was effective and that previously active degradation had been arrested.

A gPIMS® (*guided wave Permanently Installed Monitoring System*) was deployed on the buried pipeline to provide continuous integrity tracking without repeated excavation. The Sensor Ring was installed during excavation and remained in situ following backfill. A cable extended from the buried sensor to an above-ground interface was connected to an FCU (Field Control Unit), enabling automated data acquisition. Data was recorded every 14 hours over one year.

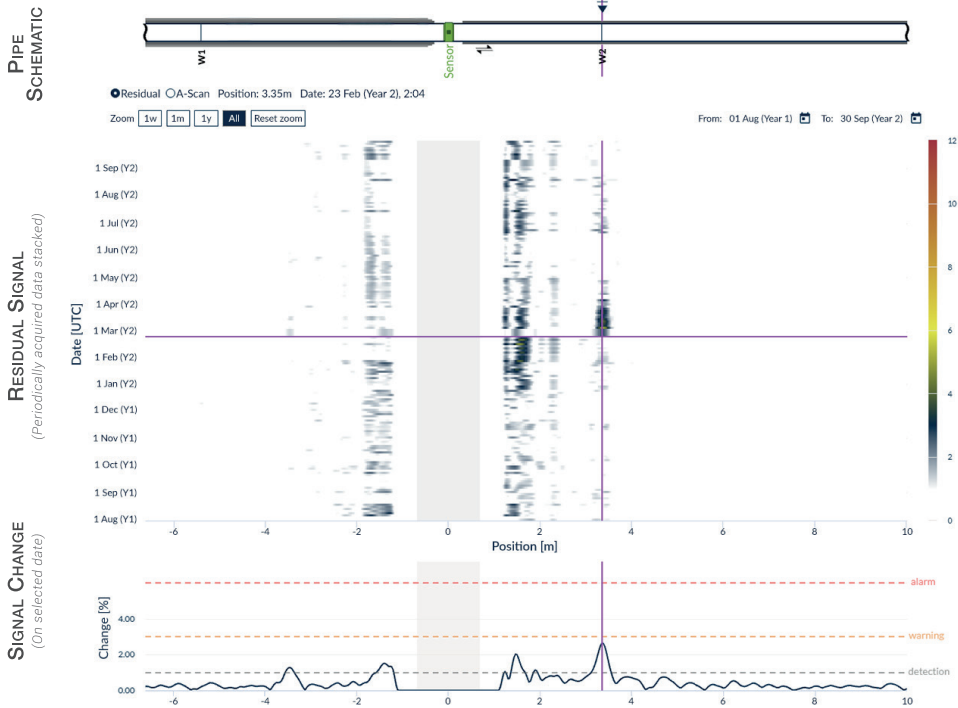
The system provides two complementary data sets: small-area monitoring measures wall thickness directly beneath the sensor at eight circumferential locations to identify general corrosion mechanisms, while large-area monitoring uses guided waves to detect changes away from the sensor and reveal localised corrosion activity along the monitored pipe length.

Buried Pipeline Monitoring

Verification of Corrosion Control

GUL Studio - Large-Area Monitoring

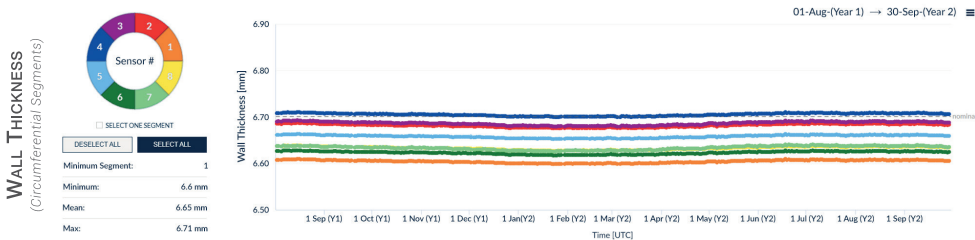
Guided wave data identified a transient feature consistent with sludge accumulation within the pipeline. The indication disappeared approximately six months into the trial, aligning with a documented cleaning activity and confirming the system's sensitivity to process-related changes.



Guided Wave Response. Transient feature resolved following documented pipeline cleaning.

GUL Studio - Small-Area Monitoring

Over the one-year period, no progression of general corrosion was observed. Wall thickness measurements remained stable across all eight circumferential positions, indicating effectiveness of inhibitor dosing.



Stable Wall Thickness. Measurements across all 8 segments remained consistent over one year.

