CASE STUDY

GUIDED ULTRASONICS LTD.

gPIMS® ON BURIED PIPE WITH ROCK SHIELD



MAINTAINING GUIDED WAVE MONITORING COVERAGE AFTER BACKFILLING

2026

CHALLENGE

ASSESSING THE INTEGRITY OF BURIED PIPELINES

- Buried pipelines are critical to midstream infrastructure, transporting hydrocarbons over long distances.
- Integrity is essential for safe operation, particularly in high-consequence areas (HCA), including populated areas, sensitive environments and road, rail or river crossings.
- Internal and external corrosion threaten integrity, with the latter often linked to coating degradation or damage.
- Access for inspection requires excavation, making regular inspection costly and disruptive.
- In the US, guided wave testing for integrity assessment of buried pipes is permitted under PHMSA's pipeline safety regulations (49 CFR Part 192).



Picture - CC BY 2.0 David Wright

©2026 Guided Ultrasonics Limited. All rights reserved.

GUL MONITORING

MONITORING WITH gPIMS®



Above-ground Field Control Units (FCU) collect data from buried sensors.

- A client selected gPIMS® to monitor buried pipelines in high-consequence areas, aiming to reduce repeated excavation as part of their integrity management plan.
- gPIMS® sensors provide improved sensitivity and enable repeat large-area monitoring after backfilling.
- The system operates autonomously:
  - Buried sensors connect to above-ground instruments.
  - Instruments collect data automatically at regular intervals, usually once a day.
  - Solar panels keep batteries charged, allowing the system to operate maintenance free.
  - LTE mobile bidirectional connection enables data retrieval and instrument control to be performed remotely.

©2026 Guided Ultrasonics Limited. All rights reserved.

GUIDED WAVE MONITORING

REDUCING ATTENUATION WITH ROCK SHIELD

- Some energy from the guided wave induced by the sensor in a buried pipe is lost into the surrounding soil.
- Stronger soil adhesion increases attenuation, reducing inspection and monitoring range.
- Rock shield wraps protect buried pipe coatings against mechanical damage, with the added benefit of reducing guided wave attenuation.
- Polymer mesh rock shield was used at this client's installation for ease of fitting around the exposed pipe sections before backfilling.



Illustrative example of rock shield installation.

©2026 Guided Ultrasonics Limited. All rights reserved.

FIELD APPLICATION

INSTALLATION ON A BURIED GAS PIPELINE

This example shows a gPIMS® installation on a buried 16" (DN 400) natural gas pipeline located in a high-consequence area. Pipe sections were constructed in 1969 and 2009, with respective wall thicknesses of 0.312" (7.92 mm) and 0.375" (9.53 mm).

Sensor installation



Exposed pipe



Rock shield fitted



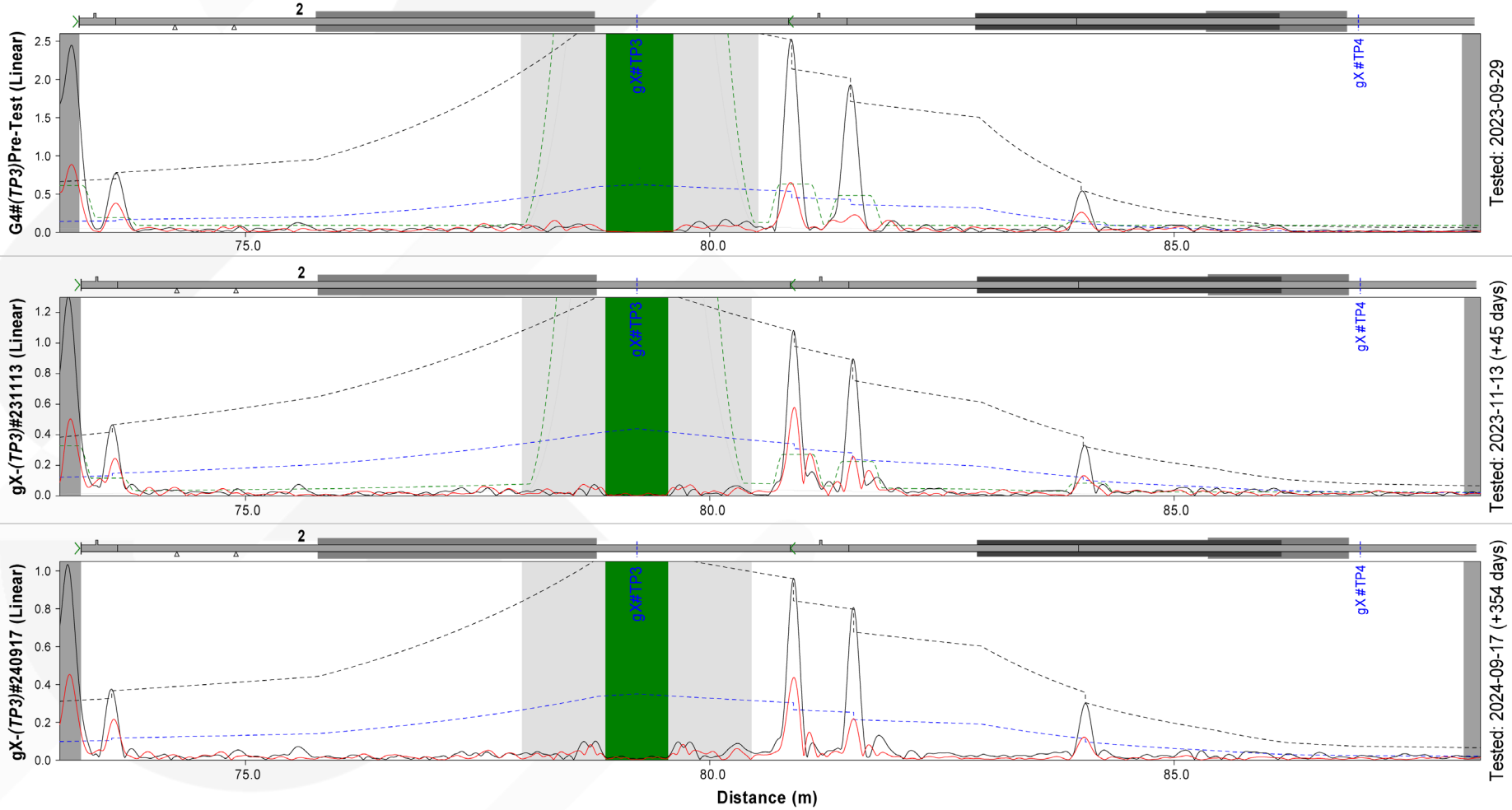
©2026 Guided Ultrasonics Limited. All rights reserved.

MONITORING RESULTS

MONITORING COVERAGE MAINTAINED

Coverage was maintained after backfill, with attenuation unchanged from the initial inspection.

- **Day 0**
  Pre-backfill inspection
- **Day 45**
  Post-backfill monitoring
- **Day 354**
  Post-backfill monitoring



©2026 Guided Ultrasonics Limited. All rights reserved.

ASSET INTEGRITY

GREATER COVERAGE, FEWER EXCAVATIONS



Monitoring arrangement example.

- Monitoring with gPIMS® supports ongoing integrity management and helps demonstrate compliance with applicable regulatory requirements.
- Autonomous data collection enables repeat large-area monitoring without re-exposing the pipe, reducing excavation cost, risk, and disruption.
- Rock shield fitted before backfilling reduces ground related attenuation, helping retain the monitoring coverage available when the pipe was exposed.
- Easy to fit and low cost, rock shield is compatible with the corrosion-protection coating.

©2026 Guided Ultrasonics Limited. All rights reserved.



Technology you can trust.

www.guided-ultrasonics.com