

Case Study

Ultrasonic Inline Inspection of Dual Diameter Pipeline (10", 12" Pipeline)

Introduction

Intero was engaged to perform an ultrasonic inline inspection (ILI) on a dual-diameter pipeline system measuring approximately 7,000 feet. This pipeline, constructed from both seamless and ERW pipe sections in 10" and 12" diameters, required a tailored inspection approach. The client, an energy sector operator, specified stringent reporting requirements to meet integrity management and compliance standards. The project's success depended on achieving high data accuracy while minimizing downtime.

Pipeline Details

- Dual diameter pipeline: 10" and 12"
- Length: ~7,000' (~2.13 km)
- Construction: Seamless and ERW pipe sections
- Specific client reporting and compliance requirements

The Intero Integrity scope of work consisted of:

- Feasibility study for dual-diameter ultrasonic inspection
- Applications engineering and in-house testing at Houston facility
- Tool configuration for single-run 10" and 12" diameter traversal
- Field execution of inspection run
- Data analysis and reporting in line with client specifications
- Coordination with client for NDT field verification of results

The Challenge

In 2018, the pipeline was inspected by another service provider. Due to the dual-diameter configuration, this inspection required two separate ILI runs: one for each diameter. While the approach gathered the necessary data, it resulted in extended field execution time, higher operational costs, and increased disruption to operations. The client sought a more efficient solution and improved data quality while reducing execution time and costs.



Challenging Pipe Characteristics

The project posed several technical challenges:

- Transition from 10" to 12" pipe diameter within a single inspection run.
- Seamless and ERW sections introducing material variation.
- Maintaining optimal UT sensor centralized during diameter changes.
- Ensuring passability of the inspection tool through the entire length without intervention.
- Ensuring optimal pigging parameters such as velocity in consideration of the diameter transition.

Feasibility and Engineering

Intero's applications engineering team designed a custom configuration of the Pipeline Surveyor UT tool to navigate both diameters in a single pass. The tool's collapsible architecture allowed it to adapt seamlessly to diameter transitions while keeping sensors in precise alignment for accurate ultrasonic readings.

The engineering phase included detailed review of pipeline construction records, operational parameters, and previous inspection data. This was followed by in-house applications testing at Intero's Houston test loop facility, ensuring passability, verifying sensor centralization, and validating data integrity before deployment.



Inspection

The inspection was executed in a single operational day. The tool traversed both 10" and 12" segments in a single run, completing the pass in 4 hours. Field execution team monitored tool passage, verified operational parameters, and ensured optimal data acquisition.

The data retrieved exceeded the client's accuracy requirements, with exceptional correlation between reported metal loss values and subsequent non-destructive testing (NDT) field verification results.

The Result

- Single-run inspection reduced total field time by more than 75% compared to previous methods.
- Metal loss values validated as highly accurate by client's field verification.
- Inspection run took less than 4 hours to complete.
- Significant cost savings achieved through reduced mobilization and operational disruption.

Advantages

- Early-stage engineering involvement ensured a feasible, efficient project approach.
- In-house applications testing at Intero's Houston facility.
- High collapsibility of the Pipeline Surveyor enabling dual-diameter inspection.
- Reduced client downtime and costs through efficient single-day execution.
- Exceptional accuracy and reliability in reported results.
- Flexible approach to meet unique operational challenges.