



Case Study

Heavy-Wall Natural Gas Pipeline Inspection in Extreme Terrain

Introduction

Intero successfully performed a phased array ultrasonic inspection on a large-diameter natural gas pipeline located in a mountainous region of southern Europe. The project demonstrated how combining advanced ultrasonic inspection technology with specialized nitrogen services can overcome extreme logistical and environmental challenges ensuring safe and precise integrity assessment where traditional methods fail.

Project Scope:

- Cleaning, gauging, full in-line inspection, and nitrogen drying.
- Comprehensive project execution and logistics.

Pipeline Details:

- Diameter: 30"
- Length: 8,200 ft / 2,500 m
- Wall thickness: 1.18-1.9" / 30-50 mm
- Elevation profile: +985 ft/-985ft / +300 m/-300 m
- Bends: 1.5D radius
- Environment: Mountainous, dry, remote area
- Inspection technology: UT Phased Array (Centrix Surveyor)
- Water (batch-pigging), dried with nitrogen.

The Challenge

The project site was one of the most demanding in the operator's network. The combination of heavy wall thickness, steep elevation changes, and lack of water availability made traditional magnetic flux leakage (MFL) inspection impossible.

The terrain restricted equipment access, and the dry, remote location meant that no natural water source was available for UT inspection. Managing large volumes of water safely and ensuring precise tool control up and down steep gradients became critical challenges.



The Solution

Intero engineered and executed a complete integrated inspection solution, combining Inspection Services and Nitrogen Services to ensure technical success and safety.

To overcome the logistical limitations, the team designed a mobile infrastructure on both sides of the mountain:

- 26 temporary tanks (70 m³ each) provided the inspection medium.
- A high-pressure pump (400 m³/h at 36 bar) ensured stable flow.
- 600 meters of hoses connected to a fire reserve basin.

This setup enabled a controlled batch-pigging process, guaranteeing the required water volume and precise pressure management throughout the inspection.

At the core of the operation was the 30" Centrix UT Phased Array tool ("Surveyor"), a high-resolution ultrasonic inspection system designed for large-diameter and heavy-wall pipelines. Its compact rotating sensor head captured full 360° coverage at exceptional accuracy, while a fiber optic umbilical allowed real-time data monitoring during the inspection.

Our nitrogen specialists managed back-pressure and tool movement on the steep incline and later performed pipeline drying with nitrogen, preparing the system for immediate recommissioning.



The Result

The project was executed flawlessly from start to finish. Within three weeks, the entire process, from mobilization to recommissioning was completed on schedule.

The Pipeline Surveyor Centrix delivered high-resolution wall thickness and geometry data, capturing even the smallest features within the heavy-wall sections. Data analysis, performed by the our Data Analysis Center, applied a strict 5% detection threshold, ensuring that all relevant anomalies were identified and reported with precision.

Despite the challenging environment and high system pressures, the operation was conducted with zero safety or environmental incidents. The final integrity report was delivered within weeks, providing the operator with actionable insights that were directly integrated into their Integrity Management System.

The project not only verified the structural health of this critical pipeline but also demonstrated that with the right technology and expertise, previously "uninspectable" lines can now be inspected safely, accurately, and efficiently.

Advantages

- **Turnkey execution:** Complete inspection and nitrogen solution from one provider
- **Safety first:** Controlled nitrogen drying and high-altitude operations with zero incidents
- **Precision data:** Phased array UT performance at unprecedented wall thickness
- **Efficiency:** Full operation within a three-week shutdown window
- **Sustainability:** Environmentally conscious setup minimizing local impact