

Case Study

Progressive Cleaning and Ultrasonic Inline Inspection of a Challenging Crude Oil Pipeline

Introduction

Intero was contracted to deliver a turnkey cleaning and ultrasonic inline inspection solution for a 12-inch, 4.98 km onshore stabilized crude oil pipeline constructed in 1990. Decades of operation had resulted in severe internal deposits, preventing conventional inspection.

The project required a carefully engineered approach to restore inspectability while operating under low pressure and without interrupting pipeline operations.

Pipeline Details

- Pipeline diameter: 12-inch
- Total length: 4.98 km/3.09 miles
- Pipeline medium: Stabilized crude oil
- Construction year: 1990
- Maximum pigging pressure: 5–6 barg
- Inspection technology: UT Pipeline Surveyor

The Challenge

Over years of operation, the pipeline had developed extensive internal deposits consisting of scale, sand, wax, and sludge had accumulated over time. Initial cleaning removed more than 10 tonnes of debris, while further analysis confirmed significant diameter restrictions of up to 12%. Additional deposits, estimated at 3,000–5,100 kg, remained within the pipeline. Operational complexity was increased by low and intermittent flow, strict pressure limitations, and a 1.5D back-to-back bend, requiring tools capable of bi-directional operation and safe passage through restricted geometry.

The Solution

We designed a progressive, staged cleaning program to safely remove heavy deposits while minimizing the risk of blockage. The campaign utilized multi-diameter, bi-directional pigs, including descaling pigs, high-density foam pigs with wire brushes, and ploughing pigs to mobilize debris.



Rather than deploying aggressive tools immediately, cleaning intensity was gradually increased as conditions improved. For inspection, a modified multi-diameter ultrasonic inline inspection tool was configured to operate under restricted diameter and low-pressure conditions. All tools were validated in a test loop simulating minimum internal diameter, tight bends, and low pressure, ensuring reliable performance and high-quality data acquisition.

The Result

The cleaning campaign successfully removed approximately 5,000 kg of debris. A subsequent dummy pig run confirmed unobstructed passage, enabling successful ultrasonic inline inspection at stable operating speed and low pressure.

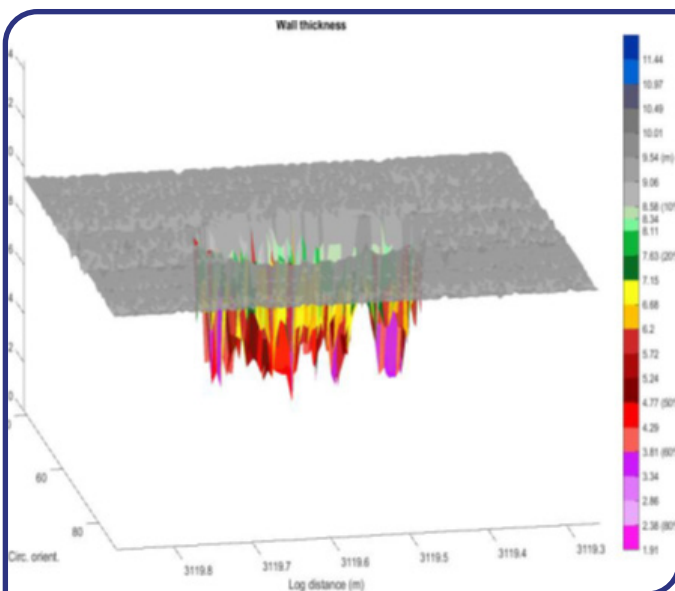
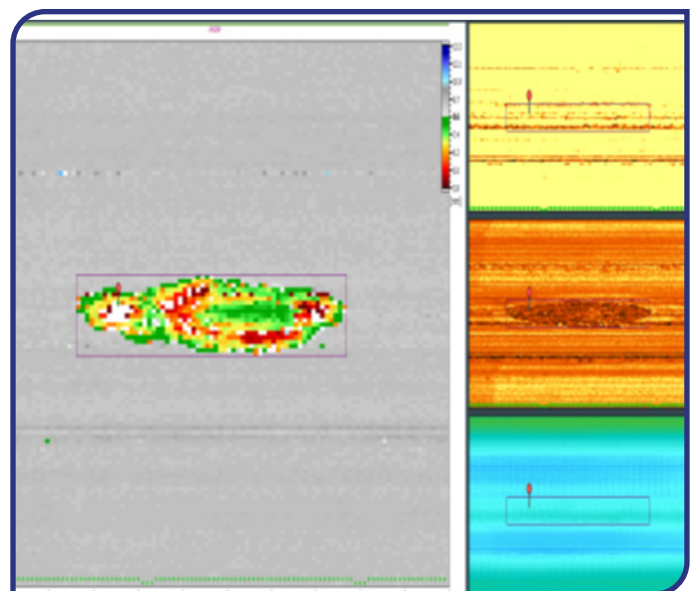
Inspection data met all quality requirements and identified 3,611 anomalies, primarily metal loss features, providing the operator with a detailed and reliable dataset for integrity assessment and future maintenance planning.

This project demonstrates Intero's ability to restore inspectability and deliver high-quality integrity data

under challenging conditions. Through a carefully engineered cleaning strategy and customized inspection solutions, the client gained the certainty required to support informed integrity management decisions.

Advantages

- Safe removal of heavy internal deposits through a controlled progressive cleaning strategy
- Successful ultrasonic inline inspection despite significant diameter restrictions and complex pipeline geometry
- Customized multi-diameter tools capable of navigating tight bends and restricted sections
- Extensive pre-deployment testing to ensure safe and reliable tool performance under low-pressure conditions
- High-quality inspection data enabling accurate integrity assessment and future maintenance planning



Customer feedback

"Successful completion of the inspection, safely and on time. Well done!"