



# IMPROVING SAFETY AND ASSET INTEGRITY WITH CONTINUOUS CORROSION MONITORING

Refineries operating high-temperature process units face persistent corrosion risks, particularly when processing variable crude slates. To address these challenges and support extended turnaround strategies, a mid-size European refinery partnered with Sensor Networks, Inc. (an Eddyfi Technologies company) to deploy continuous, wireless corrosion monitoring at critical high-temperature locations.

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## THE CHALLENGE

Variable crude feeds and extended turnaround intervals caused unpredictable high-temperature corrosion that could advance undetected between infrequent manual inspections.

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## THE SOLUTION

Installed microPIMS Intrinsically Safe UHT wireless ultrasonic sensors with a LoRaWAN network to continuously, non-intrusively monitor wall thickness and temperature up to 500°C and stream data to webPIMS.

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## THE BENEFITS

Early detection and accurate corrosion-rate tracking reduced unplanned shutdown risk and inspection costs, improved safety and confidence in asset integrity, and provided a scalable, low-maintenance monitoring platform.

## The Challenge

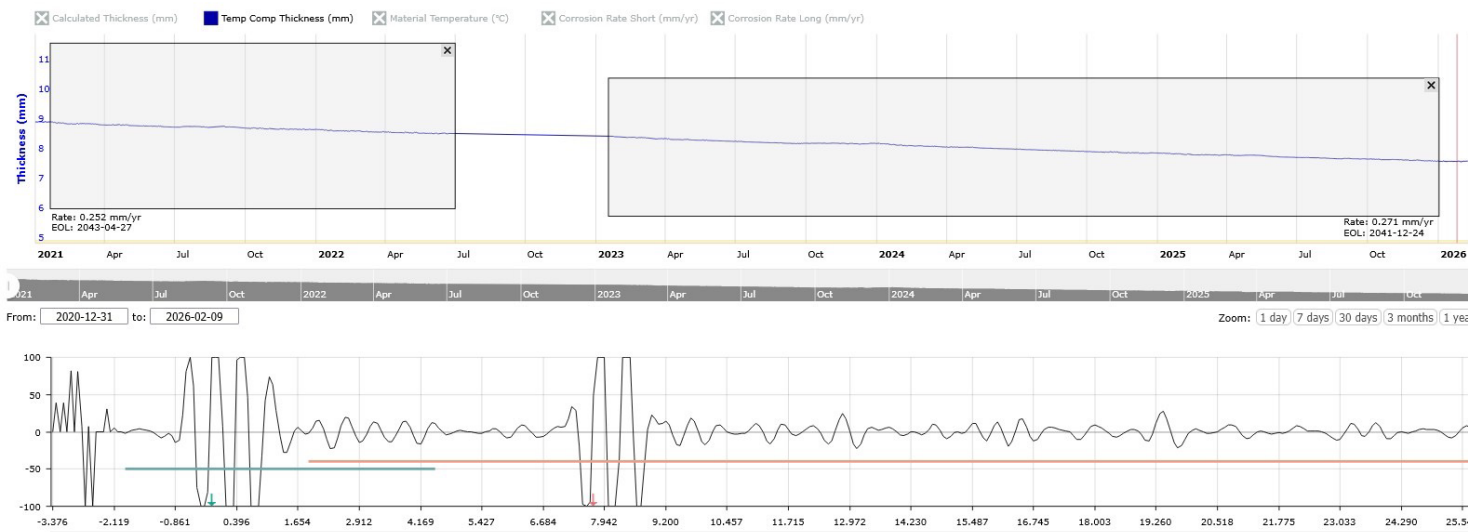
Frequent changes in crude feedstock resulted in highly variable corrosion mechanisms and rates, particularly in piping circuits operating at elevated temperatures. Recent extensions to planned turnaround intervals increased the risk that localized corrosion could progress undetected between inspections.

Traditional inspection approaches relied on periodic manual ultrasonic testing (UT), which required scaffolding and insulation removal, providing infrequent snapshots of asset condition. The refinery needed a safer and more efficient method to continuously monitor high-temperature corrosion without disrupting operations.

## The Solution

The refinery selected microPIMS® Intrinsically Safe (Zone 0) Ultra-High-Temperature wireless ultrasonic corrosion monitoring system to deliver continuous, non-intrusive wall-thickness measurements at temperatures up to 500°C (932°F).

microPIMS UHT sensors were installed quickly (typically under 15 minutes per location) without process penetration or shutdown. The battery-powered sensors automatically collected thickness and surface-temperature data, which is transmitted via a secure LoRaWAN star network to the webPIMS™ data management platform (cloud or on-premise)



## The Benefits

High-resolution measurements enabled early identification of corrosion trends and accurate corrosion-rate calculations, allowing corrosion engineers to correlate metal loss with feedstock changes, temperature excursions, and operational changes.

By implementing the microPIMS Ultra-High-Temperature (UHT) wireless corrosion monitoring system, the refinery significantly reduced the risk of unplanned shutdowns while improving confidence and safety in asset integrity between turnarounds. Continuous, high-resolution wall-thickness measurements enabled early detection of corrosion activity, accurate corrosion-rate calculations, and correlation of metal loss with feedstock changes, temperature excursions, and operational conditions. This reduced inspection costs and supported more informed, data-driven maintenance decisions.

## Why LoRaWAN?

LoRaWAN-based wireless architecture supports refinery-wide corrosion monitoring. Compared with traditional mesh-based WirelessHART networks, LoRaWAN offers longer range (~1.6 km/1 mile), simpler infrastructure, and more predictable battery life (~10 years). Its star topology eliminates repeaters, reduces network complexity, and enables a single gateway to support more than 1,000 sensors, making it ideally suited for scalable, long-term, cost-effective corrosion monitoring programs.

## Why Sensor Networks/Eddyfi?

Sensor Networks delivers advanced, field-proven asset integrity solutions trusted by operators in the world's most demanding industrial environments. microPIMS is part of Eddyfi's broader inspection and monitoring ecosystem, enabling seamless integration with corrosion engineering, NDT, and asset integrity workflows. With deep application expertise, global support capabilities, and a vendor-agnostic data architecture, Sensor Networks helps customers move beyond periodic inspections toward continuous, risk-based integrity management, protecting assets, improving safety, and reducing total cost of ownership.

