

Increasing Operational and Inspector Safety with Remote, Scalable Ultrasonic Monitoring

In-service, erosion monitoring to maximise well productivity, increase safety and reduce costs.

- Remote well asset integrity monitoring for increased safety and productivity
- Data from ultrasonic monitoring used alongside that from coupons and ER probes to optimise inhibitor injection strategy
- Secure data transmission and collection to centralised server
- Manual Measurement Hub UT monitoring upgraded to automated remote system

Overview

Working with our partners, Axess Corrosion and M2M Data Connect, a previously installed HotSense™ Measurement Hub UT wall thickness monitoring solution was upgraded to a fully automated logging system with secure data transfer from a remote well to centralised cloud storage location.

Globally, there are countless geographically remote wells requiring inspection engineers and technicians to travel extensively by vehicle to make manual ultrasonic thickness measurements for asset integrity and safety. Not only does this involve considerable time, resource, and expense, it also introduces risk to the staff who are travelling on dangerous travel routes and at hazardous sites.

An oil major had previously installed Ionix HotSense™ ultrasonic thickness sensors at a well location connected via the Ionix HotSense™ Measurement Hub

with measurements manually collected by an operator. The system was proven to be reliable and precise and delivered value by detecting and monitoring wall loss attributed to erosion. At this remote site, the oil company wanted to upgrade the data collection to a fully automated solution that could collect measurements at a pre-defined interval and transmit these back to a centralised location. Data security needed to be always maintained and through all stages of transmission from the wellhead to the customer.

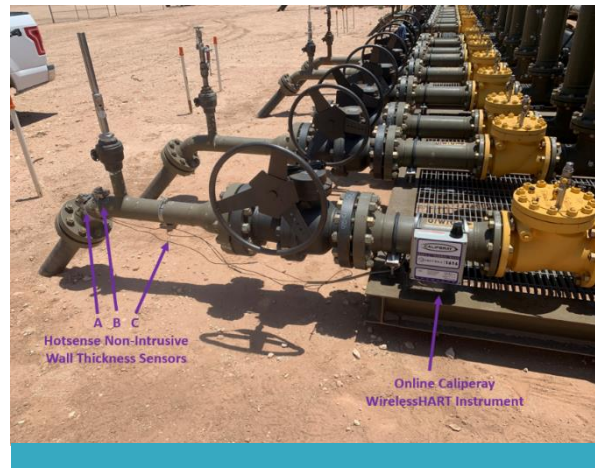


Figure 1: HotSense™ & CALIPERAY installation location

The Challenge

There were several key challenges to overcome to remove the potential limitations of deployment of remote wall thickness monitoring solutions in this case:

- **Fully Automated Measurements** – to maximise the frequency and quality of data collection to detect rapid increase in wall loss as a result of an event.
- **LTE telecommunication** – the remote location required a secure and dependable communication solution, to minimise the need for multiple site visits.
- **System and Data Security** was paramount for the solution considering the potential sensitivity of the safety critical data being collected.
- **Centralised data management** – was critical to allow key client staff and contractors to access and analyse data effectively in real-time.
- **Utilising existing sensors** deployed in the earlier test installation was essential to the cost effectiveness of the solution, validating the modular nature of the system.
- The system delivered had to be an **intrinsically safe solution** with FM Class 1 Div 1 certification required for the entire system.
- The solution had to be **cost-effective** for the application.

The Solution

- A CALIPERAY automated UT monitoring node was installed in place of the previously installed Measurement Hub. The previously installed sensors were directly connected to the CALIPERAY without the need for re-installation, Figure 1.
- An Ionix Field Deployment Kit containing a WirelessHART gateway and secure LTE comms was installed outside of the hazardous location. This provided a local WirelessHART mesh network for the site on to which the CALIPERAY was connected, Figure 2.
- The Field Deployment Kit is designed for deployment in harsh environments and can operate from -55 °C to +70 °C (-67 °F to +158 °F).
- The Field Deployment Kit was powered by a locally installed solar source and battery storage.
- A secure LTE connection on a private VPN and cloud data server was provided by M2M Data Connect.
- The WAMP software was installed on the cloud server for data collection, viewing and reporting.



Figure 2: Field Deployment Kit installation

Execution

- The sensor install location had previously been validated as sites of accelerated wall loss as a result of erosion from sand extraction from the well. As such there was no need to relocate or re-install the sensors.
- The full system solution was successfully deployed during live operation with data immediately available at the data sever.
- The measurements correlated with those previously collected manually with the Measurement Hub ensuring continuity of trending.
- Data from the UT sensors was also compared with that from other sources such as coupon and ER probes to optimise the local inhibitor strategy, Figure 3.
- Live trending and instant access to the data ensures that future events leading to rapid wall loss.
- The solution may be scaled with additional CALIPERAY at the local site or by the addition of Field Deployment Kits at other wells.

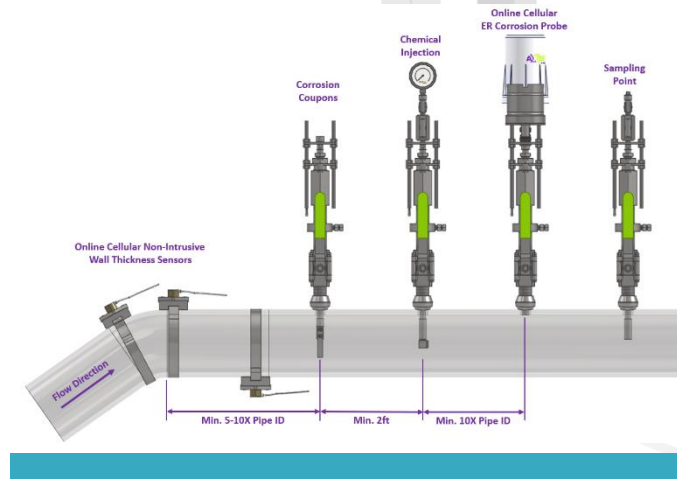


Figure 3: Complete flow line corrosion monitoring solution

Key deliverables and benefits

- A **fully automated** CALIPERAY thickness monitoring system was rapidly delivered by Axess Corrosion with secure LTE backhaul via the Field Deployment Kit and M2M Data Connect solution to a centralised monitoring server.
- The deployment allowed the successful and **economic upgrade** of a Measurement Hub thickness monitoring solution
- **Wall thickness data available on demand 24/7** avoiding deploying lone personnel in remote and hazardous locations.
- This provides a **significant boost** to the **safe operation** of this site (and others like it) whilst also **reducing** the **costs** of labour and inspection.
- Detection of rapid wall loss events using an automated remote monitoring system can **reduce the risk** of loss-of-containment and **focus maintenance** and corrosion inhibition activities.
- Increased precision of the wall monitoring system enables **safer** and **more efficient operation** of the well.

Contact Details:

Dr William Vickers

Product Director, Ionix Advanced Technologies

+44 (0)794 630 5740

will.vickers@ionix.at

<https://www.ionix.at>