

## CASE STUDY

# Increasing Pipeline Uptime with Early Detection of Moisture

### Application Benefits

Distributed and long-range monitoring of insulation moisture levels along a complex horizontal pipeline for a chemical company in the Netherlands.

### Key Benefits

- Prevention of CUI through online monitoring and early detection of moisture
- Prediction of CUI rate at specific locations
- Flexible configuration to cover most complex geometries such as bends, flanges and pipe supports

## Challenge

It is common that when the cladding around critical assets has been compromised, moisture ingresses into the insulation. Wetness is the root cause of Corrosion Under Insulation (CUI) and the very nature of how moisture moves means it is difficult to predict where corrosion will appear.

CUI is the biggest cost associated with asset integrity across the industrial world. Even with human intervention using periodic inspection techniques, it is difficult to accurately locate moisture ingress and resultant corrosion. While preventive techniques and tools can have some use and value, the complex root cause of CUI is affected by multiple factors.

Reliability and asset integrity engineers at a chemical plant in the Netherlands sought an integrated solution for CUI, plus associated quality and safety assurances to address the problem of unplanned shutdowns and ongoing modification and maintenance interventions.



Effects of CUI, a result of water ingress into the insulation.

## Solution

The company favoured a proactive and predictive approach, adopting a totally new mindset towards CUI management. **CorrosionRADAR (CR)** provided timely and accurate decision support, partnering with the organisation in deploying the **CorrosionRADAR® Moisture Monitoring System** at one of its plant.

The CR Moisture Monitoring System works using long flexible sensors embedded between the asset and its insulation. It is based on CR's patented Electro-Magnetic Guided Radar (EMGR) technology enabling continuous monitoring of moisture levels. Data insights about moisture level presence in the insulation and its exact location are wirelessly transmitted for analysis and action. Monitoring moisture levels in insulation is critical for early detection and prevention of CUI. By isolating areas where moisture has ingressed, it is possible to highlight openings or flaws in cladding that can be addressed before corrosion of the asset has commenced.

The key benefits of the CorrosionRADAR Moisture Monitoring System were recorded within the first five months of deployment in insulated pipe and resulted in following outcomes.



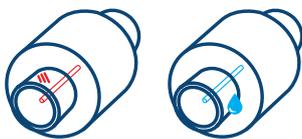
## Results

- 100% system uptime and validation of working in hazardous environments
- Water precisely detected, based on time and location using a blind customer test
- The sensors' capabilities detected the water ingress point in the cladding at 22m from the electronics used as a reference point
- Intermittent wetness was observed at this location – exhibiting a strong correlation to historical rainfall records in the locality
- Further investigation and data analysis concluded that the intermittent wetness was indeed due to ingress of rainfall into the cladding due to a weakness at the pipe support area
- Extra lab tests of the sensor confirmed that the sensor was unaffected by environmental humidity, with no false calls recorded during the test.



**CorrosionRADAR** moisture sensor data analysis and correlation with historical weather data.

### Sensor Types



Corrosion

Moisture

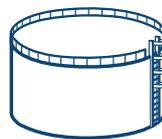
### Asset Types



Column



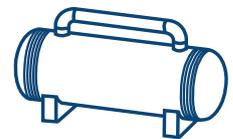
Dryer



Storage Tank



Pipeline



Heat Exchanger

You have been reading about **CorrosionRADAR's Monitoring System** as applied to a pipeline. Above are further examples where predictive corrosion monitoring is effective. To find out more, please visit our [website](#).

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