

## **Corrosion Scale And Moisture Assessments – An Improvement To On-Stream Inspections For CUI Management**

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### **ABSTRACT**

Corrosion under insulation refers to localized corrosion under thermal insulations which has resulted in failure incidents in the hydrocarbons industry. The non-destructive examination (NDE) inspections for in-service assets (pipes, equipment) via stripping-off insulations are generally limited to a few feet (or meters) as the removal of insulations from larger sections is limited by the safety issues and required heat conservations in the assets. For these reasons, major CUI inspections are generally performed only during outage conditions, as it permits access and inspections for larger areas. On the other hand, the ambient temperatures (due to the out-of-service conditions) which also results in the moisture buildup on the insulated metals (via condensation), change the chemical composition of the corrosion scale and in turn, the kinetics and mode of the corrosion damage. Therefore, traditional NDEs conducted on out-of-service assets do not mimic the periodical in-service CUI damage. Moreover, there have been many events where insulated assets failed while in service as the metal loss rate from the localized CUI damage exceeded the future corrosion allowance. This study proposes an improved methodology for in-service CUI inspections via accounting for the chemical nature of corrosion products, insulation materials, moisture assessments, etc. to better predict the CUI damage.

**Keywords:** Insulation, Corrosion under insulation, Corrosion management, Optical microscopy, Contact-free insulation, low-point drainage