



NACE JUBAIL TECHNICAL WORKSHOP  
CORROSION UNDER INSULATION (CUI)  
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# YANPET PRACTISE

## ELIMINATE HIDDEN RISK OF CUI

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## WHAT IS CORROSION UNDER INSULATION (CUI) ?

- CUI is an external corrosion that occurs under insulated carbon steel and SS equipment.
- Carbon steel:  $(-12^{\circ}\text{C}) - (175^{\circ}\text{C})$
- Stainless steel:  $(60^{\circ}\text{C}) - (205^{\circ}\text{C})$

CUI is promoted by:

- Water vapors condensation.
- Sweating service
- Temperature cycling.
- Poor condition of coating.
- Poor/broken insulation/cladding.



## CUI GENERAL VIEW

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**BEFORE REMOVE INSULATION**



**AFTER REMOVE INSULATION**



# CUI GENERAL VIEW

BEFORE REMOVE INSULATION



AFTER REMOVE INSULATION



## INSPECTION STRATEGY

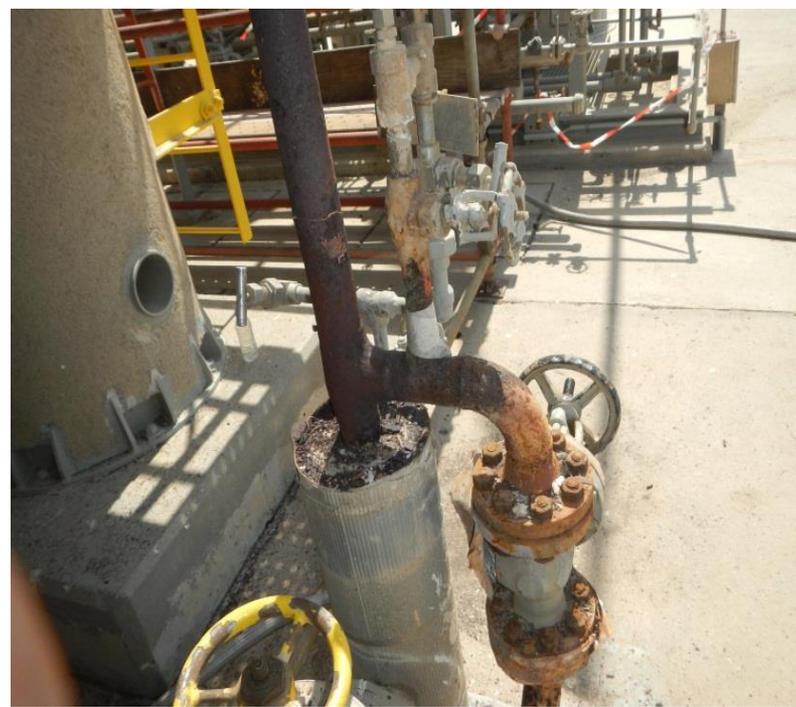
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- Inspection Strategy is RBI based approach
- Priority – 1: Sweating (continuous or cyclic) lines – require 100% insulation stripping and visual inspection and NDT.
- Priority – 2 : Non sweating service Inspect as per API standard (suspected locations)

## CUI: PLANT CASES

### Line H-14015-3"-C322 Leaking Drain Valve & Corroded Pipe (Hydrogen)

Line #	Line Associated Equipment	Damage	Original Thickness mm	Remaining Thickness mm	Risk Level	Risk status
H-14015-3"-C322	D-1451A	localized pitting	5.54	2.5	2	Mitigated Pipe replaced



## CUI: PLANT CASES

### P-13099A-14"-C322 Process (vapour)

Line #	Line Associated Equipment	Damage	Original Thickness mm	Remaining Thickness mm	Risk Level	Risk status
P-13099A-14"-C322 Process (vapour)	P-13064A-18-C322	General corrosion	9.53	5.45	2	Mitigated Pipe replaced



## CUI: PLANT CASES

Line 2P-15166- C323

Line #	Line Associated Equipment	Damage	Original Thickness mm	Remaining I Thickness mm	Risk Level	Risk status
2P-15166- C323	D-1451A	Minor wall lost & bolts severely corroded	8.18	7.8	2	Mitigation is in progress



## YANPET CUI MITIGATION STRATEGY

- I. Inspect on time.
- II. Watch insulation damage.
- III. Restoration of CUI Coatings.
- IV. Apply Thermal Spray Aluminum (TSA) on critical services.
- V. Replace PP Insulation with grid metallic type.



## YANPET PRACTICE WITH PP INSULATION

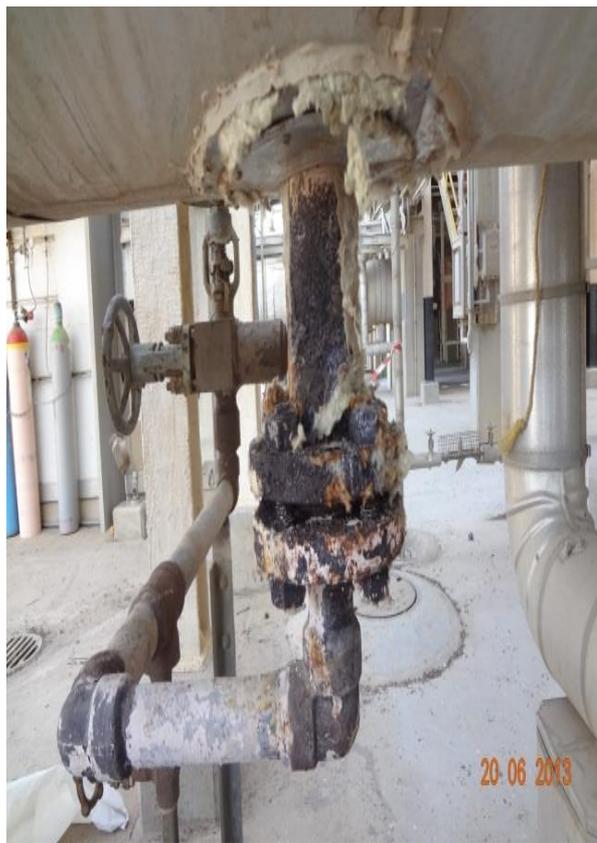
- Removed all PP insulation and replace it by metallic grid type.
- Personnel Protection (PP) insulation (Piping operating above 60 °C to 110 °C).
- Grid type eliminates the hidden Risk & Operator is still protected from hot surface.
- Grid type cost effective, easy to install, reuse and fast future inspection.



## YANPET PRACTICE WITH PP INSULATION



Line covered with old PP insulation



Same line after removing the insulation.



The alternative idea after the installation.

## CORROSION UNDER UNSULATION

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**PLEASE REMEMBER !!!**

**SAFETY FIRST  
&  
CORROSION UNDER INSULATION PROGRAM IS THE SAFE WAY.**

➤ **Always:** AVOID DAMAGES TO THE INSULATION COVER

THANK YOU