ALTVISE
INTERNATIOANL

DIGITAL RADIOGRAPHY In Detection of Corrosion Under Insulation (CUI)

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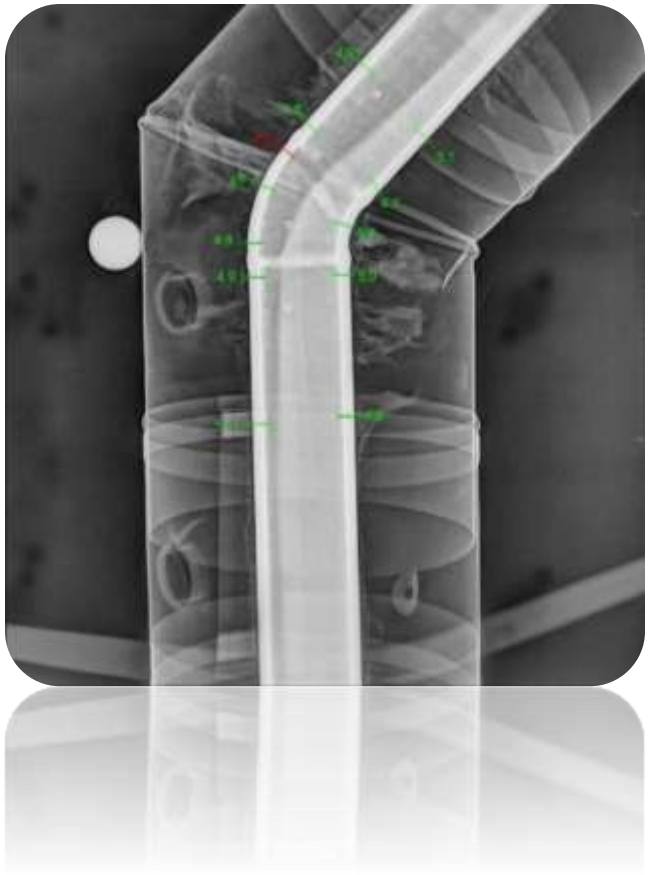
Introduction

- Profile digital radiography for online piping thinning assessment has been in use since 2000's and recently is gaining significantly more acceptance/use.
- Today all major refineries around the world use digital imaging for pipe inspection.



What is CUI

- **Corrosion under insulation** is a severe form of external decay that often occurs on *insulated carbon and stainless steel and low-alloy steel equipment/pipleines* that operates below 175 degrees Fahrenheit or at high temperatures. In most cases, this phenomenon happens in petrochemical, offshore, refining and marine industries.
- If undetected or left untreated, it can cause dangerous complications.

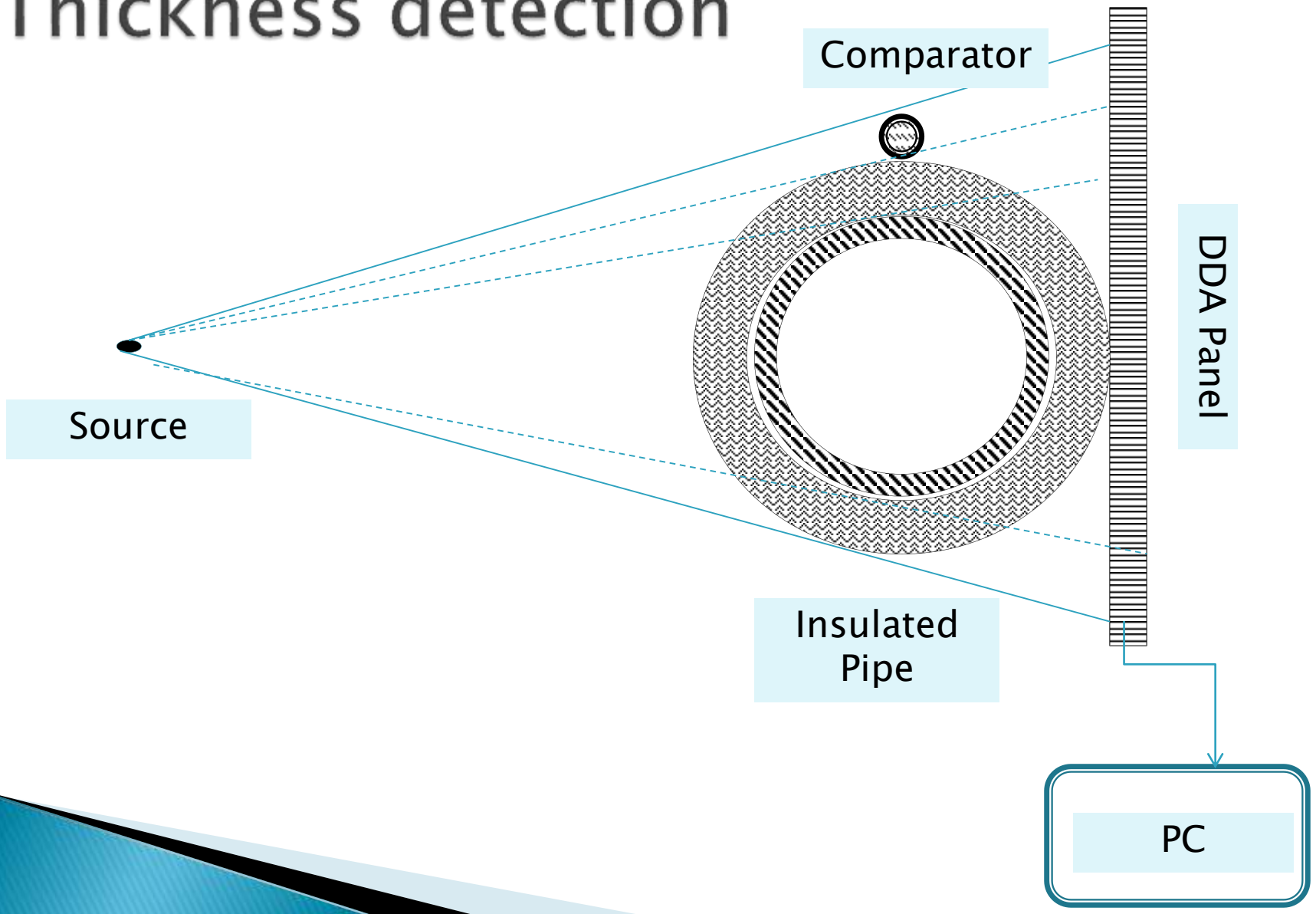
What is CUI Cont..

- Severe or untreated corrosion under insulation may increase the risk of prolonged downtime, equipment failure and leaks. In time, it may require expensive repairs or even entire replacements while also contributing to various environmental and safety concerns.
- Digital radiography can help effectively detect any instances of this issue.

Digital Radiography – What is it?

- Essentially the same as conventional film radiography with the exception that the image is captured via reusable digital media instead of film, at a lower radiation dose by either a Digital Detectors Array (DDA) panel or on a Phosphor Imaging Plate (PIP or IP).
- Industry separates the two mediums by calling DDA – Digital Radiography (DR) and IP – Computed Radiography (CR).

A Typical DRT setup for Corrosion Thickness detection



Advantages of DRT

- Instant results (DDA) – no reshoots
- Fast results (CR) – easy onsite processing
- Software for wall thickness evaluation
- Easily shared (email an image)
- No chemical dark rooms
- Broader area (you get the bigger picture)
- Higher dynamic range
- Higher productivity & automated workflows
- Ability to “hunt” degradation
- Lower Curie strength requirement

Limitations of DRT

- High initial capital costs
- Restricted to smaller size pipes
- Additional training
- Radiation exclusion zones
- Digital, poor data in = poor data out
- DDA lower spatial resolution than film

Advantages of DRT compared with UTG for CUI

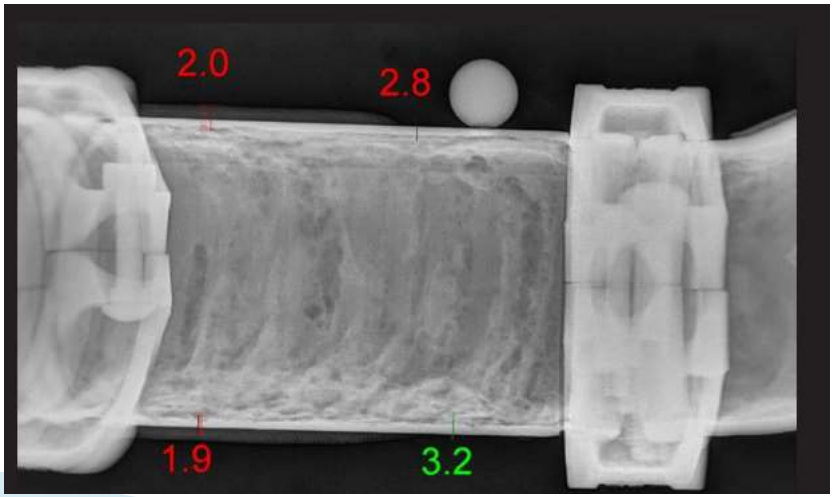
- One of the Prominent Advantage of DRT is there in No need for removal of Insulation of the pipeline to be tested.
- Immediate results give the operator to shoot multiple angles for getting the accurate thickness results
- DRT will provide the thinning of the entire wall profile.
- Dedicated software(RHYTHM Software) to measure the wall thickness accurately.

Insulation – Internal and External pipe degradation

- A key advantage of this technology is that by looking at the image you detect internal (flow/contents) degradation and/or external corrosion (CUI) If you detect CUI at early stages you can then address the issue/s with a repair before costly replacements.

Methods of test – Standards

- **BS EN 16407-1** Non-destructive testing – Radiographic inspection of corrosion and deposits in pipes X- and gamma rays Part 1: Tangential radiographic inspection.
- **BS EN 16407-2** Non-destructive testing — Radiographic inspection of corrosion and deposits in pipes by X- and gamma rays Part 2: Double wall radiographic inspection



Other Applications of DRT in Process Plants Includes

- Detection of Flow Accelerated corrosion
- Detection of Foreign Object
- Fouling in the Pipeline

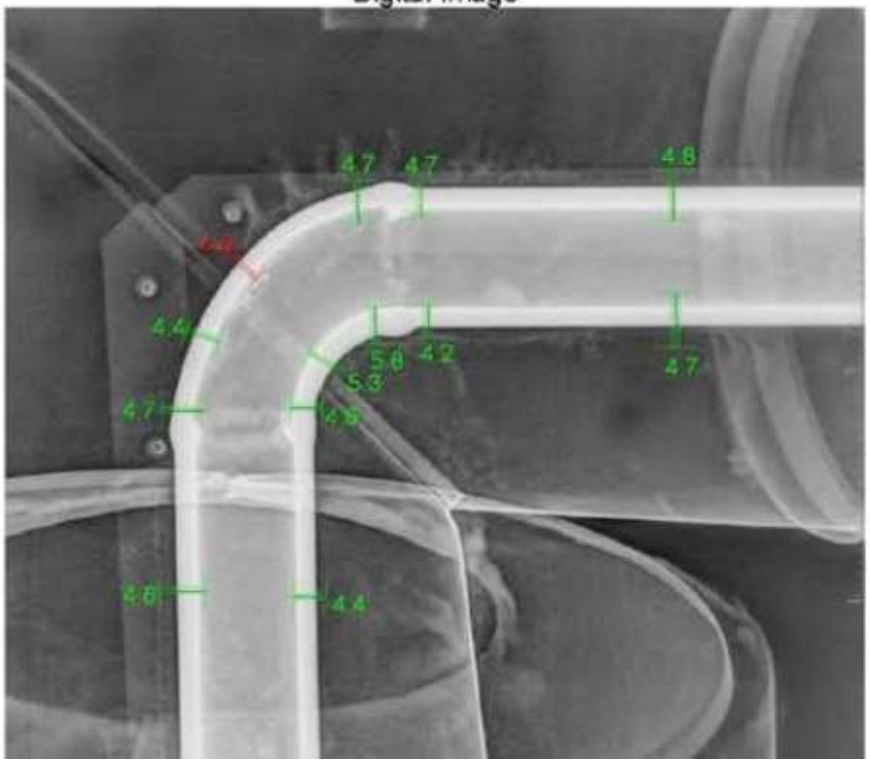
(Blockage in the pipeline due to solidification or Sedimentation of the process chemicals flowing through the pipeline)

- Debris Stuck in the pipeline
- Corrosion Under Pipe supports

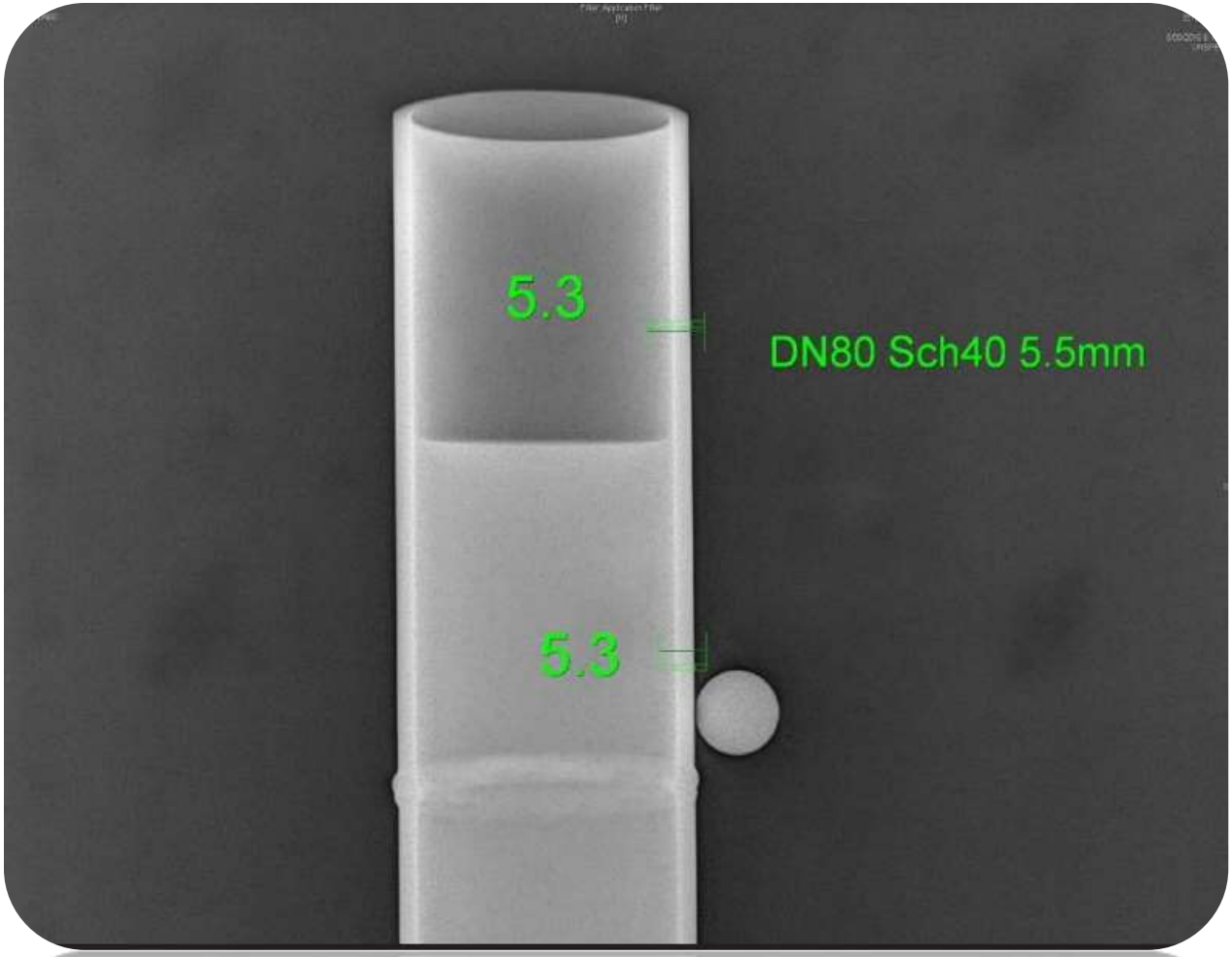
Insulated Pipe Thickness check

Test Arrangement

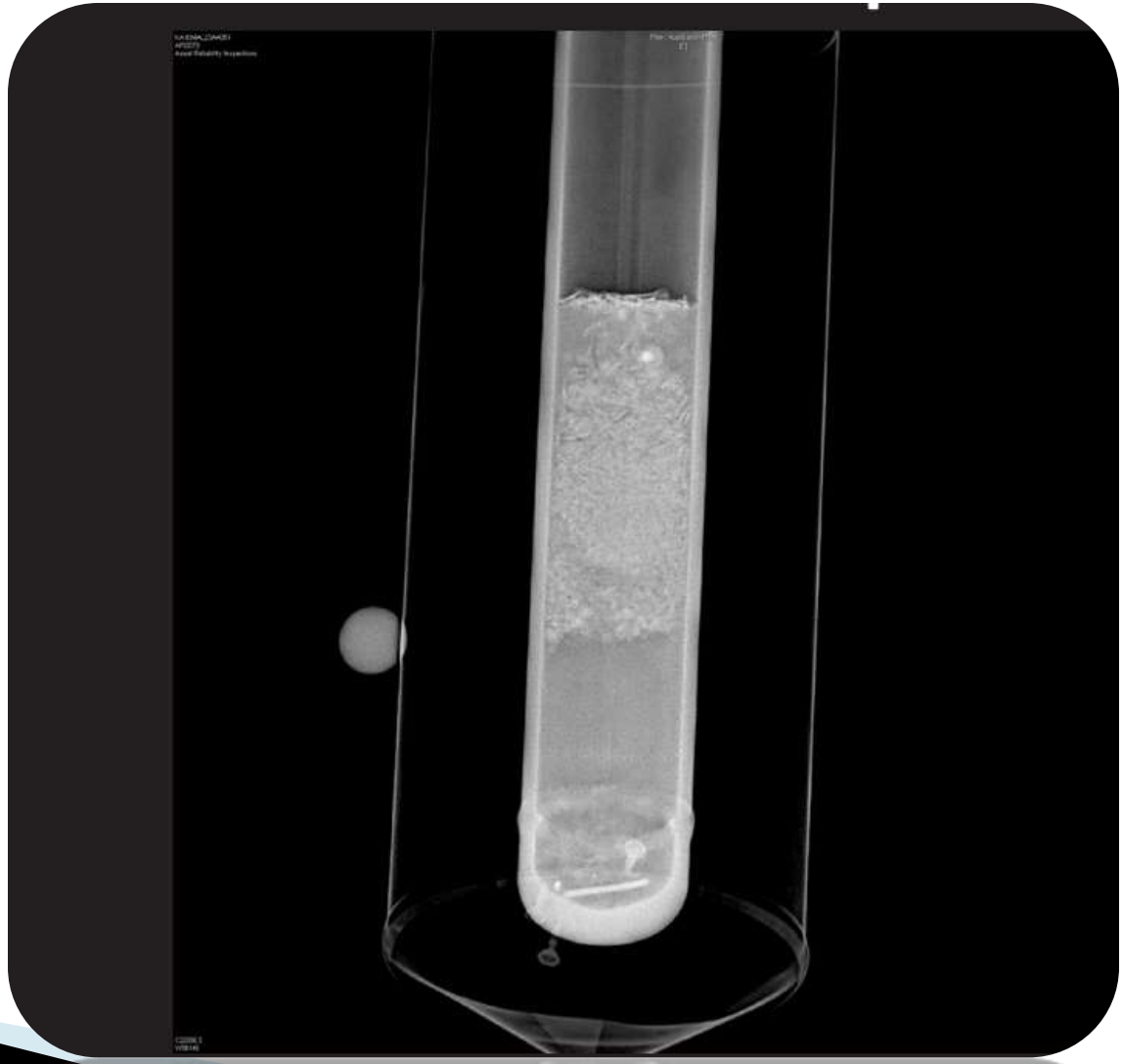
Digital Image



Water Filled Pipe



Debris Trap



Some of the Oil refineries/Clients using DRT for CUI and other Applications

- Exxon Mobil
- Shell Eastern Petroleum,
- Singapore Refining Company
- Chevron Philips
- Baker Huges Etc.,

Brands

- Some of the Key manufacturers of the DDA panels for industrial radiography are

  - **GE (Baker Hughes)**
  - **Care Stream**
  - **Fuji DR**
  - **DR Systems**
  - **NOVO DR systems**

Thank You