Contact Point Corrosion inspection on uninsulated & Insulated piping

**Carbon Steel Piping:** Inspecting for Corrosion & Pitting.
**Stainless Steel Piping:** inspecting for stress corrosion cracking (SCC)

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What is Contact Point Corrosion

- A non-destructive technique that utilizes the basic laws of electricity to inundate the conductive material being inspected with AC or DC current
- Results are repeatable and consistent to provide trending inspections and life assessments
- Two Position Test Method
- Current electrodes connect to the voltage source or current source
- Potential electrodes measure a voltage drop along the area of concern of the test specimen in the direction of charge flow (current)
INDUSTRY WIDE ISSUES

- Process, transfer lines and structural piping hangers and supports create potential corrosion sites. "Touch Point Corrosion"
- Insulated Support, Hangers and Pads require significant amount of time and resources to remove and inspect
- Difficult to find reliable on-line inspection techniques
ADVANTAGES OF USING

- Quick inspection
- User friendly
- Conventional training
- Cost effective
- Repeatable results
- Process does not need to be shutdown in order to perform inspection
- Needs to be bare metal contact so surface must be clear of dust, debris, paint, rust, etc.
APPLICATIONS

- Pads/Clamps
- Beam Locations
- Saddle Supports
- T-connector Supports
- Hangers

- Water lines
- Water Mains
- Flair Stacks
- Off Shore
- CUI
CALIBRATION CORRECTION FACTORS

• Temperature reading is needed before each set of data
• Temperature correction factor $Rs = Rm/e(Ts - TM) \times \ln K$
  
where:
• $RM$ is the measured resistance
• $RS$ is the resistance at the desired temperature
• $TM$ is the measured temperature
• $TS$ is the desired temperature
• $K$ is the coefficient of the given material
INSPECTION VARIABLES

- OD and Nominal Wall of the Test Specimen
- Conductivity of the Material
- Temperature
- Volume (Distance between Electrodes)
- Vibration
- Test Specimen Condition of Testing Area (Clear of Debris, Rust, Water, Etc.)
- Surface Resistance
- Distance of Contacts to measure Potential Drop
T-PIPE AREA

- Inspect T-pipe on different levels of a deck
- Pulled T-Pipe results plus or minus 10%
- Radiography, Digital Radiography and GUL was performed and was unsuccessful
HIGH PRESSURE PIPING

“INSPECTION DONE WHILE UNIT IS RUNNING”
HIGH PRESSURE PIPING

Pulled Tube Results
I-BEAMS AND Y-PIPE

Pipes in Racks
Piping at Supports
INSPECTION INTERVALS

• A routine inspection should take place every year or two in order to replicate a trending inspection compared to the original baseline inspection
• This inspection will give us a time frame of degradation decay and thus we will be able to extrapolate to present the predicted life cycle of the test specimen

• CPC testing is recommended after installation of a new test specimen after process is started
• This will accurately determine a baseline inspection in order to provide a precise trending inspection and life expectancy
COST SAVINGS

- Quick inspection
- User friendly
- Conventional training
- Cost effective
- Repeatable results
- Process does not need to be shutdown in order to perform inspection
THANK YOU