FE027:
Pipeline Corrosion Integrity Management
Training Description:

The Pipeline Corrosion Integrity Management (PCIM) Course is intended to serve as the key engineering training track for the “PCIM Engineer” who is expected to focus on the implementation and management of an integrity program for a pipeline system. The goal is that an individual completing the PCIM course should be capable of interpreting integrity related data, performing an overall integrity assessment on a pipeline system, calculating and quantifying risk, and making recommendations to company management on risk management issues.

The course provides a comprehensive up-to-date coverage of the various aspects of time-dependent deterioration threats to liquid and gas pipeline systems.

Training Objective:

Current regulatory requirements and industry need for training in this area make this program a priority for NACE Education & Training. The program, which has two tracks—a field track and an engineering track, emphasizes technology, industry standards, regulations and decision-making directly related to pipeline corrosion integrity management - finding corrosion and repairing it.

PCIM Technician - PCIM Technician will focus on remediation technology and field techniques for carrying out integrity assessments.

The goal is to prepare an individual to:

✓ Accurately collect data for used for the evaluation and monitoring of a pipeline corrosion integrity plan
✓ Recognize pipeline anomalies
✓ Make recommendations for resolving technical issues “in the ditch”
✓ Recognize problems “in the ditch” and be able to collect the data necessary for further engineering evaluation

PCIM Technologist - PCIM Technologist will focus on the implementation and management of an integrity program for a pipeline system. The emphasis at this level is on integrity verification and maintenance optimization.

The goal is that an individual:

✓ Completing these courses should be capable of interpreting integrity related data,
✓ Performing an overall integrity assessment on a pipeline system, calculating and quantifying risk, and making recommendations to company management on risk management issues

Training Designed for:

This course is intended for anyone who has a technical corrosion background but is new to designing corrosion control systems, including: Senior Corrosion Engineers, Corrosion Engineers, Inspection Engineers, Civil engineers, Mechanical engineers, Design engineers, Process Engineers, consultants, Contractors and Architects.
Training Program:

**DAY ONE:**
- **PRE-TEST**
- **Introduction to Pipeline Integrity**
  - Pipeline Integrity
  - Overview of Impact of Corrosion on Pipelines Other Threats to Pipeline Integrity (non-corrosion related)
  - Pressure Testing
  - In-Line Inspection (ILI) Tools
  - Hydrostatic Testing
  - Purpose of Pipeline Integrity Programs
  - Public Safety
  - Reliability and Deliverability of the Pipeline System
  - Asset Preservation
  - Maintenance Optimization
  - Economics
- **Managing Corrosion**
  - Forms of Corrosion
  - Uniform or General Corrosion
  - Localized Corrosion
  - Galvanic Corrosion
  - Microbiological Influenced Corrosion (MIC)
  - Environmentally Assisted Cracking (EAC)
  - Intergranular Corrosion (IGC)
  - De-Alloying Cleavage
  - Velocity-Related Corrosion
  - Overview of Corrosion Control Methods
  - Material Selection
  - Protective Coatings
  - Sacrificial Coatings
  - Inhibitive Coatings
  - Conductive Coatings
  - Barrier (Dielectric) Coatings
  - Cathodic Protection
  - Components of Galvanic CP

**DAY TWO:**
- Components of Impressed Current CP
- Cathodic Protection Effectiveness
- Cathodic Protection Versus Coating Rehabilitation
- Electrical Isolation
- Dissimilar Metals
❖ Stray Current or Interference Current
❖ Environmental Control
❖ Chemical Treatments
❖ Biocides
❖ Corrosion Inhibitors
❖ Natural Gas Dehydration
❖ Maintenance (Cleaning) Pigging
❖ Environmental Stress Corrosion Control
❖ Time-Related Pipeline Defect Types
❖ Internal Corrosion
❖ External Corrosion
❖ Stress Corrosion Cracking (SCC)
❖ Sweet-Corrosion Induced SCC
❖ Sour Corrosion Induced SCC.
❖ SCC Caused by Other Factors
❖ Corrosion Detection Methods
❖ Inspection Methods
❖ In-Line Inspection (ILI) Tools
❖ Hydrostatic Testing
❖ Direct Assessment Inspection Methods
❖ Internal Corrosion
❖ ICDA Direct Examination Step: Ultrasonic (UT) Technique
❖ ICDA Direct Examination Step: Radiography Technique
❖ ICDA Post Assessment Step
❖ External Corrosion

**DAY THREE:**
❖ External Corrosion Direct Assessment (ECDA)
❖ Stress Corrosion Cracking
❖ Stress Corrosion Cracking Direct Assessment (SCCDA)
❖ Corrosion Monitoring Methods
❖ Internal Corrosion
❖ Coupons
❖ Electrical Resistance (ER) Probes
❖ Linear Polarization Resistance (LPR) Probes
❖ Galvanic Probes
❖ Hydrogen Probes
❖ Chemical Methods of Corrosion Monitoring
❖ Ultrasonic (UT) Monitoring
❖ Radiographic Monitoring
❖ External Corrosion
❖ Stress Corrosion Cracking
❖ Corrosion Mediation Methods
❖ Material Selection
❖ Ferrous Alloys – Carbon Steels
❖ Non-Metals – Thermoplastics
❖ Non-Metals – Elastomers
❖ Cementitious Materials – Cement and Concrete
❖ Protective Coatings
❖ Cathodic Protection.
❖ Galvanic Anodes
❖ Anode Backfill for Galvanic Anodes
❖ Impressed Current Anodes
❖ Impressed Current Power Supply
❖ Stray or Interference Current
❖ Environmental Control
❖ Pipeline Cleaning
❖ Chemical Treatment
❖ Corrosion Remediation Methods
❖ External Corrosion Affected Pipelines
❖ Internal Corrosion Affected Pipelines
❖ SCC-Affected Pipelines

**DAY FOUR:**

❖ Regulations
  • Hazardous Liquid
  • Integrity Management Process
  • Pipeline Assessments and Inspection
  • Baseline Assessment Plan
  • Direct Assessment
  • Regulatory Interpretations

❖ Data Collection, Verification and Integration
  • Program Requirements and Elements Data Collection
  • Current Integrity of Pipeline
  • Current Level of Protection
  • Historical Data
  • Unusually Sensitive Area (USA) Data
  • Prioritizing Repair / Remediation of Defects for Investigation
  • Threat Identification and Assessment (Internal and External Corrosion)
  • Integration and Interpretation of Integrity Related Data

❖ Risk Assessment
  • Overview of Risk Assessment Objectives
  • History of Failure/Probability of Failure
  • History of Pipeline Failures
  • Probability of Pipeline Failures
  • Consequence Analysis
• Risk Assessment: Prescriptive and Performance Based
• Prescriptive-Based Risk Assessment
• Performance-Based Risk Assessment
• Risk Assessment Models
• Effective Risk Assessment Approach

**DAY FIVE:**
❖ Using Risk Assessment Models
❖ Calculating and Quantifying Risk
❖ Risk Minimization through Corrosion Control
❖ Overview of Integrity Verification Objectives
❖ Overview of Integrity Verification Tools
❖ In-Line Inspection (ILI) Tools
❖ Metal Loss Tools
❖ Crack Detection Tools
❖ Geometry / Deformation Tools
❖ Mapping / INS Tools
❖ Combination Tools
❖ Other ILI Technologies, Concepts, and Research
❖ Pressure Testing
❖ Direct Assessment (DA)
❖ External Corrosion Direct Assessment (ECDA)
❖ Internal Corrosion Direct Assessment (ICDA).
❖ Stress Corrosion Cracking Direct Assessment (SCCDA)
❖ **Integrity Verification/Assessment**
  • Performing an Overall Assessment on a Pipeline System.
  • Integrity Assessment Methods.
  • In-Line Inspection (ILI)
  • ILI in Liquid and Gas Pipelines
  • Hydrostatic Testing
  • Direct Assessment (DA)
  • Internal Corrosion Direct Assessment (ICDA)
❖ Course Conclusion
❖ POST-TEST and EVALUATION

**Training Requirement:**

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request”.
Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 30% Workshops & Work Presentations, Techniques
- 20% Based on Case Studies & Practical Exercises
- 20% Videos, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant’s manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:
- 07:45 - 08:00  Morning Coffee / Tea
- 08:00 - 10:00  First Session
- 10:00 - 10:20  Recess (Coffee/Tea/Snacks)
- 10:20 - 12:20  Second Session
- 12:20 - 13:30  Recess (Prayer Break & Lunch)
- 13:30 - 15:00  Last Session

For training registrations or in-house enquiries, please contact:
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