

Scandinavian Academy Training Center

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Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Cathodic Protection System in Oil and Gas Exploration Industry

Code	City	hotel	Start	End	price	Language - Hours
OG-750SA	Al Baha	Hotel Meeting	2027-03-21	2027-03-25	13950 SR	En - 25

Introduction

Maintaining the ageing infrastructure such as underground pipelines is a challenge to the oil and gas industry worldwide. Corrosion is one of the major causes of ageing the industrial infrastructures. Understanding its mechanism and how to control it, can lead to a remarkable reduce in the cost of the products. Cathodic Protection (CP) is one of the most widely used methods to control corrosion control in industry. The CP is a method of that eliminates the corrosion of metals by the application of an electric current. It is a technique that has been known for 160 years, and is extensively applied to offshore pipelines and tank farms, etc with great success. However, despite this long history and broad applicability, it is a technique that is all too often inadequately, or even improperly. Applied; with the result that structures are poorly protected or, worse, adversely interfered with.

Objectives

- This course is designed to provide the theoretical basis and the practical ability necessary operate and maintain Cathodic Protection (CP) systems in the oil and gas surface production facilities.
- The course provides understanding of the basic principles of corrosion and applications of galvanic and impressed current CP systems.
- The course provides understanding of the field equipment used to monitor CP systems and how they work.
- The course provides understanding of the various factors that impact the performance of these systems.

- The course provides understanding of increase productivity by avoiding costly shutdowns thus reducing the cost of the overall corrosion control program.

The Content

Significance of Corrosion Control

- Corrosion - Largest Single Cause of Plant Failure
- Economic Effects
- Environmental Effects
- Safety Effects
- Corrosion Management Preventive Strategies
- Cost of Corrosion
- Case Study: Catastrophic Corrosion Accidents

Corrosion & Its Control

- Requirements for Corrosion to Occur
- Metallurgical Factors
- Forms of Corrosion
- Corrosion Control Methods
- Material Selection
- Environmental Modification
- Protective Coatings
- Cathodic Protection

Corrosive Environments & Construction of Materials

- Atmospheric Environments
- Marine atmospheres
- Industrial Atmospheres
- Underground Environments
- Concrete Structure Environment

- Corrosion Properties of Carbon Steels
- Corrosion Properties of Cast Iron
- Corrosion Properties of Stainless Steels
- Corrosion Resistance Properties of Aluminum
- Corrosion Properties of Copper
- Corrosion Properties of Nickle

Section IV - Fundamentals of Cathodic Protection Systems

- Galvanic Series
- General Application of Cathodic Protection
- Economic Considerations
- Industry Standard & Codes
- Principle of CPS
- The Cathodic Protection Cell
- Methods of Applying Cathodic Protection
- Sacrificial Cathodic Protection System
- Impressed-Current Cathodic Protection System
- Advantages of SCPS
- Disadvantages SCPS
- Advantages ICCP
- Disadvantages ICCP
- CPS Selection
- Basic Requirements for Cathodic Protection
- Principles Of Cathodic Protection
- Cathodic Protection Criteria
- Current Rectifiers/DC Power Source
- Applicable NACE Standard for Cathodic Protection Systems

Cathodic Protection Systems and Coatings

- Role of Protective Coating in CPS
- Selection Factors

- Coating Defects
- Coating Efficiency
- Overvoltage
- Cathodic Disbondment
- Commonly used Coating in Conjunction with CPS

Cathodic Protection System Design

- Design Factors
- Electrolyte resistivity survey
- Electrolyte pH survey
- Structure versus electrolyte potential survey
- Current requirement
- Coating resistance
- Protective current required
- Sacrificial anode (galvanic) cathodic protection design
- Impressed current cathodic protection system design
- Soil resistivity
- Current requirement test
- Typical CPS Design Parameters
- pH TESTING PROCEDURES
- Current Requirement Testing

Anodes & Rectifiers

- Anode Selection
- Current output
- Driving Potential
- Anode life
- Anode Shape & Dimension
- Anode Material Cost
- Anode Efficiency
- Galvanic Anode Types

- Current Requirements for ICCP System
- Anode Materials for ICCP
- Anode Backfilling
- Installation of Sacrificial Anodes
- Anode Vent Piping
- Impressed Current Anode Beds
- Quality Control and Quality Assurance
- Impressed Current Rectifiers/DC Power Source

Practicing & Construction of Cathodic Protection System

- Components of Cathodic Protection Systems
- Essential Components
- Isolating joints
- Junction Boxes
- Test stations, measuring points and coupons
- Sleeve pipe
- Thermite Weld
- Earthing Systems
- Line current measurement
- Pipe Sleeves/Casings
- Concrete Encased Pipe
- Cathodic Protection Vessels & Tank Internals Vessels & Tank
- Tanks for Storage of Chemicals
- Water Circulating Systems
- Heat exchangers (tube and shell)
- Water box coatings
- Submarine pipelines
- Construction of Cathodic Protection Systems

Instrumentation & Safety Aspects

- Alkalinity

- Hydrogen Evolution
- Chloride Evolution
- Installation Adjacent to Telecommunication Services
- Installation Adjacent to Railway Signal & Protection Circuits
- Interaction at Discontinuities in Cathodically Protected Structures
- Installation at Jetties & Ships
- Danger of Electric Shock
- Installations on Immersed Structures
- Installations for the Internal Protection of Plant
- Fault Conditions in Electricity Power Systems
- Stray Current Corrosion
- High Impedance Voltmeter
- Reference Cells (Half Cells) Reference Cells

Corrosion Management Systems

- Oilfield Cathodic Protection Systems
- Corrosion Economy
- Corrosion Key Performance Indicators (KPIs)
- Asset Integrity and Corrosion Management
- Corrosion Data Management

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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