



Corrosion Control in the Oil & Gas
Exploration Industry



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Introduction:

The oil and gas exploration industry is profoundly impacted by corrosion-related issues, which result in adverse economic and safety consequences. As billions of dollars are spent annually on tackling corrosion in oil & gas exploration, it has become pivotal for industry players to engage in advanced corrosion management techniques rigorously.

Exploration in the oil and gas industry demands that industry operators constantly seek efficient corrosion control methods to ensure facilities' safety and uninterrupted operation. An integrated approach to predicting corrosion behaviors, estimating the remaining useful life of assets, and implementing proactive corrosion prevention strategies is essential.

Engineering consulting services often provide critical expert guidance for developing comprehensive corrosion management frameworks that aim to mitigate the effects of corrosion in the oil and gas industry. By leveraging specialized knowledge in material selection, chemical treatments, and protective coatings, companies can significantly reduce corrosion's economic impact and enhance their assets' longevity.

Targeted Groups:

This corrosion control course in the oil and gas exploration industry is designed for professionals in technical functions related to asset integrity management within the oil and gas exploration industry.

The corrosion control training in the oil and gas exploration industry encompasses roles that involve addressing corrosion monitoring and control.

Course Objectives:

By the end of this corrosion control course in the oil and gas exploration industry, participants will:

- Gain a thorough understanding of corrosion causes and control methods in oil and gas exploration and production.
- Receive a comprehensive overview of corrosion, its major issues, and the types of corrosion specific to the oil and gas industry.
- Learn about the various materials used in the industry and how they are prone to corrosion.
- Develop techniques for corrosion monitoring and learn the basic principles of corrosion control.
- Acquire the necessary skills and knowledge to effectively manage and resolve corrosion problems in oil and gas exploration.

Targeted Competencies:

Participants in this corrosion control training in the oil and gas exploration industry will develop competencies in:

- Understand metallurgy and engineering material properties.
- Assess the financial impact of corrosion damages within the industry.
- Identify proper corrosion mechanisms related to oil and gas exploration.
- Formulate central corrosion control and mitigation strategies.
- Apply advanced techniques for corrosion monitoring.

Corrosion Control in Oil and Gas Pipelines:

Understanding corrosion in oil and gas pipelines is critical to maintaining the integrity of the vast network of pipelines essential for the transportation and distribution of oil and gas. The course will address the various types of corrosion in oil and gas pipelines, the corrosion problems prevalent in the industry, and the latest methods for corrosion prevention.

With the proper corrosion controls and monitoring strategies, the lifetime of pipeline infrastructure can be significantly extended, reducing the risk of leaks and environmental incidents. Controller oil and gas professionals will benefit from this knowledge to make informed decisions regarding the maintenance and protection of pipeline assets.

Course Content:

Unit 1: Oil and Gas Production Fluid:

- Origin and Production of Oil and Gas.
- Chemical Compositions of Production Fluids.
- Oilfield Equipment.
- Overview of Oilfield Processes and Operations.

Unit 2: Metallurgy:

- Chemical Properties of Metals.
- Mechanical Properties.
- Alloying Elements.
- Cooling of Metals.
- Crystalline Forms of Metals.
- Metal Defects.
- UNS Numbers.
- Properties of Common Oilfield Metals and Alloys.
- Metallurgy of Oilfield Equipment.

Unit 3: Corrosion Damage:

- Corrosion Fundamentals.
- Common Forms of Corrosion.
- Corrosion Monitoring in Plant and Facilities.
- Non-Destructive Testing NDT.
- Corrosion Failure and Root Cause Analysis.
- Group Discussion - Applicable Standard Study for Corrosion Monitoring.

Unit 4: Oilfield-Specific Corrosion:

- Internal Corrosion.
- Water Corrosion.
- Sour Corrosion.
- Sweet Corrosion.
- Oxygen Corrosion.
- Top of Line Corrosion TLC.
- Microbiologically Induced Corrosion MIC.
- Sand Erosion.
- External Corrosion.
- Atmospheric Marine Corrosion.
- Corrosion Under Insulation CUI.
- Corrosion of Pipe Flanges.
- Underground Corrosion.
- Stray Current Corrosion.
- Seawater Corrosion.
- Oilfield Equipment Corrosion.

Unit 5: Corrosion Prevention and Control Measures:

- Corrosion Control by Operations.
- Corrosion Control by Processes.
- Corrosion Control Design.
- Corrosion Control by Material Selection.

Unit 6: Cathodic Protection CPS Systems:

- Cathodic Protection Fundamentals.
- Galvanic Anodes CPS.
- Impressed Current CPS.
- CPS System Maintenance.

Unit 7: Barrier Film Coatings and Lining:

- Coating Fundamentals.
- Performance Characteristics of Industrial Coatings.
- Types of Coating Systems.
- Surface Preparations.
- Coating Applications.
- Coating Defects.



Unit 8: Chemical Treatment:

- Corrosion inhibitors.
- Performance Evaluation of Corrosion Inhibitor.
- Application of Corrosion Inhibitors.

Unit 9: Biocide Treatment:

- Microbiologically Influenced Corrosion MIC.
- Sulfate-reducing Bacteria.
- Biocide Selection and Treatment.

Unit 10: Non-Metallic Materials:

- Polymers.
- Composite Materials.

Unit 11: Corrosion Management Strategy CMS:

- Corrosion Management of Oilfield Equipment.
- Corrosion Economy.
- Corrosion Key Performance Indicators KPIs.
- Asset Integrity and Corrosion Management.
- Codes and Standards.
- Corrosion Data Management.