

Course No. 1840

Corrosion Prevention Techniques in Oil & Gas Exploration Training Course

**DOWNSTREAM OPERATIONS, REFINING, PETROCHEMICALS &
INDUSTRIAL OPERATIONS
OIL & GAS**

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Corrosion Prevention Techniques in Oil & Gas Exploration Training Course provides a comprehensive professional program focused on understanding, controlling, and preventing corrosion risks across oil and gas exploration activities. The course examines how geological conditions, formation fluids, produced water, gases, temperature, pressure, materials, and operating environments contribute to corrosion and equipment degradation.

Participants will develop a practical understanding of corrosion mechanisms affecting exploration equipment and facilities, including drilling systems, wellheads, casing, tubing, pipelines, separators, storage systems, and associated production equipment. The program emphasizes early identification of corrosion threats and the selection of appropriate prevention and control strategies.

The course covers key corrosion prevention techniques including material selection, corrosion-resistant materials, chemical inhibition, coatings, cathodic protection, corrosion monitoring, inspection, water management, and operational controls. Participants will learn how to match prevention techniques to specific corrosion mechanisms and operating conditions.

Particular attention is given to corrosion associated with carbon dioxide, hydrogen sulfide, oxygen, chlorides, water, microbiological activity, erosion-corrosion, and high-temperature environments. Practical case studies and field-based exercises enable participants to evaluate corrosion problems, identify root causes, select mitigation measures, and develop effective corrosion management programs.

Objectives

- By the end of the course, participants will be able to:
- Analyze the fundamental principles and mechanisms of corrosion in oil and gas exploration.
- Identify corrosion threats associated with drilling, well completion, and early production activities.
- Evaluate the influence of temperature, pressure, fluids, gases, and contaminants on corrosion rates.
- Assess carbon dioxide, hydrogen sulfide, oxygen, chloride, and microbiologically influenced corrosion risks.
- Select appropriate materials and corrosion-resistant solutions for exploration applications.

- Apply chemical inhibition strategies to control internal corrosion.
- Evaluate the use of coatings, linings, and cathodic protection systems.
- Develop effective corrosion monitoring and inspection strategies.
- Analyze corrosion data and identify deterioration trends at an early stage.
- Evaluate erosion-corrosion and other combined degradation mechanisms.
- Develop practical corrosion prevention and mitigation plans.
- Integrate corrosion management with inspection, maintenance, integrity, and operational programs.

Who Should Attend

This course is designed for corrosion engineers, materials engineers, drilling engineers, production engineers, petroleum engineers, mechanical engineers, pipeline engineers, inspection engineers, and integrity professionals involved in oil and gas exploration and production activities.

It is also suitable for maintenance and reliability engineers, well integrity specialists, asset integrity professionals, inspection personnel, chemical treatment specialists, field supervisors, and technical staff responsible for equipment reliability and corrosion control.

The program is particularly valuable for managers, technical leaders, and decision-makers responsible for asset integrity, drilling and production performance, equipment reliability, maintenance strategy, material selection, and corrosion risk management in exploration operations.

Learning Outcomes

- Upon completion of the course, participants will be able to:
- Explain the fundamental electrochemical principles governing corrosion.
- Identify major corrosion mechanisms affecting oil and gas exploration assets.
- Assess corrosion risks associated with drilling fluids, formation fluids, produced water, and gases.
- Evaluate the impact of carbon dioxide, hydrogen sulfide, chlorides, oxygen, and microorganisms.
- Identify vulnerable equipment, materials, and operating conditions.
- Select suitable materials and corrosion-resistant solutions for specific applications.

- Apply appropriate chemical corrosion inhibition approaches.
- Evaluate coating, lining, and cathodic protection requirements.
- Develop corrosion monitoring and inspection programs.
- Interpret corrosion monitoring and inspection data.
- Identify early warning indicators of corrosion-related deterioration.
- Evaluate erosion-corrosion and other interacting damage mechanisms.
- Develop corrosion prevention and mitigation strategies based on risk.
- Integrate corrosion control with asset integrity and maintenance management.
- Establish practical corrosion management strategies for exploration assets.

Course Outline

DAY 01

Fundamentals of Corrosion in Oil & Gas Exploration

- Basic corrosion science, electrochemical reactions, and corrosion cells.
- Corrosion mechanisms affecting exploration and production equipment.
- Influence of temperature, pressure, water, gases, salts, and contaminants.
- Identification of corrosion-prone equipment and operating environments.

PRACTICAL APPLICATION

Conduct a preliminary corrosion risk assessment for selected exploration equipment.

DAY 02

Corrosion Mechanisms & Environmental Threats

- Carbon dioxide corrosion and factors influencing corrosion rates.
- Hydrogen sulfide, sulfide-related damage, and material degradation.
- Oxygen, chloride, water, and microbiologically influenced corrosion.
- Erosion-corrosion, localized corrosion, pitting, crevice corrosion, and galvanic corrosion.

DAY 02 — CONTINUED

PRACTICAL APPLICATION

Diagnose corrosion mechanisms from field conditions, inspection findings, and operating data.

DAY 03**Materials Selection & Corrosion Prevention**

- Material selection principles for drilling and exploration applications.
- Carbon steel, alloy steels, corrosion-resistant materials, and material compatibility.
- Chemical corrosion inhibitors and treatment strategies.
- Coatings, linings, surface protection, and cathodic protection.

PRACTICAL APPLICATION

Select appropriate corrosion prevention measures for different exploration equipment and operating environments.

DAY 04**Corrosion Monitoring, Inspection & Integrity Management**

- Corrosion monitoring principles, techniques, and data requirements.
- Inspection methods for detecting and evaluating corrosion damage.
- Thickness measurement, corrosion-rate calculation, and condition trending.
- Risk-based corrosion monitoring and inspection planning.

PRACTICAL APPLICATION

Analyze corrosion monitoring and inspection data and develop an intervention strategy.

DAY 05**Integrated Corrosion Management & Field Application**

- Development of corrosion control and prevention programs.
- Integration of corrosion management with inspection, maintenance, integrity, and operations.

DAY 05 — CONTINUED

- Performance monitoring, documentation, reporting, and continuous improvement.
- Risk-based decision-making and long-term corrosion management strategies.
- Final Application: Develop a comprehensive corrosion prevention and management program for an oil and gas exploration asset covering corrosion threats, material selection, chemical inhibition, protective systems, monitoring, inspection, risk assessment, mitigation, and long-term integrity improvement.

Register or Request More Information

Course page: <https://quest-training.com/courses/corrosion-prevention-techniques-in-oil-gas-exploration-training-course>

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