

Course No. 1652

Process Hazard Analysis (PHA) Training

PROCESS SAFETY MANAGEMENT
OIL & GAS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Process Hazard Analysis (PHA) Training Course provides a comprehensive and practical framework for identifying, analyzing, and managing process hazards in oil and gas facilities and other high-hazard industrial environments. The program is designed to develop the technical and analytical capabilities required to systematically examine process deviations, understand potential accident scenarios, evaluate safeguards, and translate PHA findings into effective risk reduction actions.

Process Hazard Analysis is a critical component of process safety management in the oil and gas industry, particularly for facilities handling hydrocarbons, toxic substances, high pressures, high temperatures, and complex processing systems. A structured PHA enables organizations to understand how deviations can develop into hazardous events, identify initiating causes and potential consequences, and determine whether existing prevention and mitigation measures are adequate.

This Process Hazard Analysis Training Course covers key methodologies used in process safety, including Hazard and Operability Study, Failure Modes and Effects Analysis, Layer of Protection Analysis, Fault Tree Analysis, and Event Tree Analysis. Participants will also examine the principles of scenario development, safeguard evaluation, risk ranking, recommendation development, and effective PHA documentation.

The program emphasizes practical application rather than theoretical discussion alone. Participants will work through oil and gas process scenarios to identify hazards, define process deviations, establish causes and consequences, evaluate existing safeguards, and determine appropriate recommendations. Particular attention is given to the quality of PHA studies, team participation, documentation, assumptions, and follow-up of recommendations.

By the end of the Process Hazard Analysis (PHA) Training Course, participants will be better equipped to contribute effectively to PHA studies, review the quality of analysis and recommendations, and connect PHA findings with process safety management, management of change, engineering, operations, maintenance, and emergency preparedness. The course supports a systematic approach to reducing major accident risks and strengthening operational decision-making.

Objectives

- Analyze the fundamental principles of Process Hazard Analysis and apply them to oil and gas operations during the training program.
- Identify process hazards, operational deviations, vulnerabilities, and credible accident scenarios using structured analytical methods.
- Apply Hazard and Operability Study principles to examine process systems, equipment, operating conditions, and deviations.
- Evaluate the potential causes and consequences of process deviations and connect them to operational and safety outcomes.
- Apply Failure Modes and Effects Analysis principles to identify equipment and system failure risks.
- Assess the effectiveness and adequacy of existing safeguards and protective measures for identified process hazards.
- Apply Fault Tree Analysis and Event Tree Analysis to examine accident causes, escalation pathways, and potential consequences.
- Evaluate the quality of PHA studies based on scope, team composition, assumptions, methodology, documentation, and technical completeness.
- Develop practical and risk-based recommendations for addressing hazards and identified weaknesses.
- Connect PHA findings with Management of Change, engineering design, operations, maintenance, and process safety requirements.
- Improve the ability to identify and prioritize major accident scenarios according to their potential consequences and risk significance.
- Prepare clear PHA outputs that support technical decision-making, corrective action tracking, and continuous process safety improvement.

Who Should Attend

This training course is designed for professionals working in oil and gas companies, petroleum facilities, processing plants, refineries, petrochemical facilities, energy operations, and other high-hazard industrial environments. It is particularly relevant to Process Safety Engineers, Process Engineers, Production Engineers, Design Engineers, Reliability Engineers, HSE Professionals, and Risk Management Specialists involved in process safety activities.

The program is also suitable for Operations Managers, Maintenance Managers, Engineering Managers, Process Safety Managers, Facility Managers, Operations Supervisors, Maintenance Supervisors, and professionals participating in PHA and HAZOP teams. It is valuable for specialists involved in Management of Change, asset management, projects, commissioning, start-up, operations, maintenance, emergency planning, and incident investigation.

The course is particularly beneficial for professionals who need to understand how process hazards are identified and evaluated, how safeguards are assessed, and how PHA findings can be translated into practical risk reduction measures. It is also suitable for technical leaders and managers responsible for reviewing process safety studies and ensuring that identified risks are appropriately addressed.

Learning Outcomes

- Identify major process hazards associated with hydrocarbons, hazardous materials, equipment, and operating conditions in oil and gas facilities.
- Select an appropriate PHA methodology based on the process, system, risk profile, and purpose of the analysis.
- Define process nodes, study boundaries, assumptions, and analysis parameters for a structured PHA.
- Identify operational deviations and systematically determine their potential causes and consequences.
- Evaluate existing prevention, detection, control, and mitigation safeguards for identified hazard scenarios.
- Apply Failure Modes and Effects Analysis to evaluate equipment and system failure mechanisms.
- Apply Layer of Protection Analysis principles to examine the independence and effectiveness of protective layers.
- Use Fault Tree Analysis and Event Tree Analysis to understand accident sequences and escalation pathways.
- Review PHA study results and identify weaknesses in analysis, assumptions, documentation, or safeguard evaluation.
- Develop risk-based recommendations and establish appropriate priorities for corrective action.
- Connect PHA findings with Management of Change, engineering, operations, maintenance, and emergency response processes.

- Prepare structured PHA documentation that supports management decisions, action tracking, and continuous process safety improvement.

Course Outline

DAY 01

Fundamentals of Process Hazard Analysis in Oil & Gas

- Principles, objectives, and strategic importance of Process Hazard Analysis
- Process safety risks associated with oil and gas operations and hydrocarbon processing
- Identification of hazards, vulnerable systems, and major accident scenarios
- PHA scope, boundaries, assumptions, team composition, and responsibilities

PRACTICAL APPLICATION

Analyze an oil and gas process diagram and identify key hazards, operational risks, and priority scenarios

DAY 02

Hazard and Operability Study and Process Deviation Analysis

- Principles, methodology, and structure of Hazard and Operability Study
- Defining process nodes, design intent, operating parameters, and study boundaries
- Identification of process deviations using structured guidewords
- Analysis of causes, consequences, existing safeguards, and escalation pathways

PRACTICAL APPLICATION

Conduct a focused HAZOP-style analysis of an oil and gas process node

DAY 03

Advanced PHA Methodologies and Risk Analysis

- Failure Modes and Effects Analysis for equipment and process systems
- Fault Tree Analysis and logical evaluation of initiating events

DAY 03 — CONTINUED

- Event Tree Analysis and evaluation of accident sequences and consequences
- Layer of Protection Analysis and evaluation of independent protection layers

PRACTICAL APPLICATION

Analyze a process safety scenario using multiple PHA methodologies and compare the findings

DAY 04

Safeguard Evaluation, Risk Reduction, and Recommendations

- Identification and classification of prevention and mitigation safeguards
- Evaluation of engineering, control, procedural, and administrative safeguards
- Assessment of safeguard independence, reliability, and effectiveness
- Development, prioritization, and documentation of risk reduction recommendations

PRACTICAL APPLICATION

Review a PHA scenario, evaluate its safeguards, identify gaps, and develop prioritized recommendations

DAY 05

PHA Documentation, Follow-Up, and Process Safety Integration

- Preparation and quality review of PHA documentation and study outputs
- Integration of PHA findings with Management of Change and engineering processes
- Linking PHA recommendations with operations, maintenance, asset integrity, and emergency preparedness
- Tracking recommendations, verifying completion, and supporting continuous process safety improvement

FINAL WORKSHOP

Conduct an integrated PHA for an oil and gas scenario and prepare the hazard register, safeguards assessment, recommendations, priorities, and follow-up plan



Register or Request More Information

Course page: <https://quest-training.com/courses/process-hazard-analysis-pha-training>

Website: <https://quest-training.com>

Email: info@quest-training.com

Phone: +905016771440

