

AI-Enabled Process Safety Monitoring Course

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Overview

AI-Enabled Process Safety Monitoring Course is a one-week foundation course for process safety managers, HSE personnel, operations supervisors, process engineers, maintenance and reliability teams, risk analysts, and safety assurance coordinators, who leave with an AI-Enabled Process Safety Monitoring Plan. Participants connect process safety information and barriers with indicators, anomaly signals, management of change, incident learning, inspection and maintenance priorities, human validation, dashboards, and escalation. Agile Leaders Training Center provides training in AI-enabled process safety monitoring.

Who Should Attend

- Process safety personnel responsible for management-system performance and assurance
- HSE personnel responsible for indicators, evidence, and escalation
- Operations personnel responsible for operating discipline and abnormal conditions
- Process engineering personnel responsible for hazards, barriers, and change information
- Maintenance and reliability personnel responsible for equipment degradation and work priorities
- Safety assurance personnel responsible for monitoring and management review

The course assumes participants contribute to process safety, operations, engineering, maintenance, risk, or assurance and leaves out occupational safety basics, cybersecurity, emergency response specialization, technical AI development, and detailed process design.

Departments and Industries

The course supports governed AI use in process safety monitoring across hazardous-process industries.

- Process safety and HSE departments
- Operations and production functions
- Process engineering and technical assurance teams
- Maintenance, inspection, and reliability functions
- Oil, gas, petrochemical, and chemical organizations
- Energy, utilities, and process manufacturing organizations

Learning Objectives

By the end of this course, participants will be able to:

- Build traceable process safety and barrier data registers
- Apply leading and lagging process safety indicators
- Analyze anomaly, degradation, alarm, and maintenance signals
- Use AI support in change and incident-learning workflows
- Evaluate human validation, model controls, dashboards, and escalation
- Build an AI-Enabled Process Safety Monitoring Plan

Course Agenda

Day 1: Safety Information and Barriers

- Process Safety Information Source Register
- Major Hazard and Scenario Map
- Critical Barrier Inventory
- Barrier Performance Standard Sheet
- Safety Data Quality and Lineage Checklist

Day 2: Indicators and Degradation Signals

- Leading Process Safety Indicator Design
- Lagging Process Safety Event Review
- Barrier Degradation Signal Card
- Anomaly Confidence and Limitation Record
- Indicator Tolerance and Escalation Matrix

Day 3: Change and Incident Learning

- Management of Change Evidence Screen
- Permit and Inspection Analytics Table
- Incident Pattern and Learning Map
- Human Safety Judgment Review Log
- Corrective Action Priority Framework

Day 4: Operational Monitoring and Controls

- Alarm Priority and Response Review
- Predictive Maintenance Safety Signal List
- AI Model Safety Control Checklist
- Process Safety Monitoring Dashboard
- Management Review and Change Register

Day 5: Process Safety Monitoring Practice

- Suggested Exercise: Map Hazards and Barriers
- Suggested Exercise: Set Indicators and Tolerances
- Suggested Exercise: Review Change and Incident Evidence
- Suggested Exercise: Prioritize Signals and Set Controls
- Capstone Exercise: AI-Enabled Process Safety Monitoring Plan

Practical Exercises

The course uses suggested activities that turn operational data and AI-supported signals into reviewable process safety decisions.

- Suggested activity: register safety information, map scenarios, and define barrier performance
- Suggested activity: select leading and lagging indicators, set tolerances, and review degradation signals
- Suggested activity: screen change evidence, analyze inspection and incident patterns, and prioritize actions
- Suggested activity: review alarms and maintenance signals, set model controls, and build a monitoring dashboard

FAQs

Who suits AI process safety monitoring training, and what does it assume?

AI process safety monitoring training suits personnel responsible for process safety, HSE, operations, engineering, maintenance, risk, or assurance. It assumes familiarity with hazardous-process operations or control systems and requires no programming.

How does AI-enabled process safety monitoring differ from occupational safety training?

AI-enabled process safety monitoring focuses on major hazards, critical barriers, process indicators, abnormal conditions, change, incident patterns, equipment degradation, and management-system controls, while occupational safety training typically addresses individual workplace hazards and safe work practices.

How should teams use process safety anomaly signals?

Teams should verify data quality, operating context, signal confidence, affected hazards and barriers, comparison baselines, false alerts, concurrent work, and accountable human judgment before escalating a process safety anomaly signal.

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How should process safety leading and lagging indicators work together?

Leading indicators should show whether critical activities and controls are functioning before an event, while lagging indicators show outcomes and losses. Teams should review both, test their relationship to barriers, set tolerances, and revise ineffective measures.

What belongs in an AI-Enabled Process Safety Monitoring Plan?

The plan should include hazards, scenarios, barriers, data sources, indicators, tolerances, anomaly reviews, change evidence, incident learning, inspection and maintenance signals, model controls, dashboards, human validation, escalation, owners, and review cycles.

Conclusion

Participants take back an AI-Enabled Process Safety Monitoring Plan connecting hazards, barriers, indicators, signals, change, incidents, maintenance, controls, and escalation. It changes how teams monitor and review AI-supported process safety evidence. The plan provides a basis for earlier degradation detection, traceable judgment, accountable response, and management assurance.

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