

Chemical Process Industry

International Association of Fire Fighters Hazardous Materials and Weapons of Mass Destruction Training Department

Course Goal: Reduce first responder injuries and fatalities at chemical process industries

Terminal objectives (what students will be able to do at the end of the course)

Given a scenario of a chemical process emergency, follow the APIE process (below) and use the Chemical Process Response Checklist to identify the actions first responders should take to safely respond by:

- Analyzing the incident
- Planning response objectives
- Implementing response objectives
- Evaluating response actions

Enabling objectives (knowledge, skills and attitudes needed to meet the terminal objectives)

Identify:

- Differences between emergencies at chemical process sites and other emergencies
- Key regulations related to emergencies at chemical process sites
- Key terms related to emergencies at chemical process sites
- Types of sites where chemical process emergencies occur
- Types of emergencies/incidents that can occur at chemical process sites
- Value of pre-incident planning for responders of chemical process emergencies
- Four phases of the APIE model and the responder actions for each step
- Factors related to each step in APIE when responding to emergencies at chemical process sites
- First responder actions taken during each step in APIE

Target Audience

- Fire fighters, first responders, including EMS or other personnel expected to respond to incidents at chemical processing facilities in areas with OSHA-approved state plans, who are career, paid (non-volunteer) personnel.
- Course participants should be competent at the hazmat operations level as described in the National Fire Protection Association (NFPA) *Standard for Professional Competence of Responders to Hazardous Materials* (NFPA 472), in addition to OSHA and EPA regulations. Specifically, participants are expected to be knowledgeable in the recognition and identification of hazardous materials, the U.S. Department of Transportation (DOT) hazardous materials classes, and the use of the response objectives described in the DOT **Emergency Response Guidebook (ERG)**.
- Workers in the chemical process industry who are not first responders (e.g., industrial hygiene, public safety officials) may also be included in this course.



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Case Studies

Case studies involving fire/explosion, toxic release, confined space and reactive chemical incidents are central to this curriculum. By studying actual cases, students learn about the risk, hazards and appropriate response actions related to the chemical process industry. The course emphasizes the importance of pre-planning a safe response to incidents in the chemical process industry. The following case studies are included:

Case Study #1	Bhopal incident
Case Study #2	Isotec/Sigma Aldrich, Miami Township, OH---liquid nitric oxide release
Case Study #3	CAI Ink Plant, Danvers, MA---fire/explosion
Case Study #4	BP-Amoco Polymers, Augusta, GA---confined space
Case Study #5	DPC Enterprises, L.P., Festus, MO---toxic release
Case Study #6	Barton Solvents, Des Moines, IA---fire/explosion
Case Study #7	MFG Chemical Inc., Dalton, GA---reactive chemicals
Case Study #8	BP Refinery, Texas City, TX---fire/explosion

Course Outline

Module 1: Introduction

Lesson 1: Chemical Process Industry (CPI)

- How are chemical process industries incidents different from fire and hazmat incidents?
- Case Study #1—Bhopal gas leak disaster
 - What happened
 - Regulatory changes
- Types of sites
 - Identify types of sites
 - Link back to students' jurisdictions (Instructors customize curriculum)
 - Types of incidents
 - Fire/explosion
 - Toxic release
 - Confined space
 - Reactive chemicals

Lesson 2: Responding to Chemical Process Incidents

- APIE introduction/overview
- Checklist for working an incident
 - Based on APIE
 - Case Study #2



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Module 2: Analyze

Lesson 1: Pre-Incident Planning

- Value of pre-incident planning
- Procedures (how it is done)
- Factors to consider

Lesson 2: How to Analyze

- Factors to consider when analyzing incidents for each type of chemical process incident: fire/explosion, toxic release, confined space, reactive chemicals, other possible scenarios

Lesson 3: Application

- Team assignment
 - Case study update
 - Analyze Case Study #3
 - Report backs
 - Link back to students' jurisdictions

Module 3: Plan

Lesson 1: How to Plan

- Factors to consider when analyzing incidents for each type of chemical process incident: fire/explosion, toxic release, confined space, reactive chemicals, other possible scenarios

Lesson 2: Application

- Team assignment
 - Case study update
 - Plan for Case Study #3
 - Report backs
 - Link back to students' jurisdictions

Module 4: Implement

Lesson 1: How to Implement

- Factors to consider when analyzing incidents for each type of chemical process incident: fire/explosion, toxic release, confined space, reactive chemicals, other possible scenarios
- Balancing Risk-Benefits at an Incident---safety considerations when attempting rescue

Lesson 2: Application

- Team assignment
 - Case study update
 - Implement for Case Study #3
 - Report backs
 - Link back to students' jurisdictions



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Module 5: Evaluate

Lesson 1: How to Evaluate

- Factors to consider when analyzing incidents for each type of chemical process incident: fire/explosion, toxic release, confined space, reactive chemicals, other possible scenarios

Lesson 2: Application

- Team assignment
 - Case study update
 - Evaluate Case Study #3
 - Report backs
 - Link back to students' jurisdictions

Module 6: Group/Team Case Study Exercise

- Case Studies (#4 - #7) Each team works through a different case study through the entire APIE process.
 - Fire
 - Toxic release
 - Confined space
 - Reactive chemicals
- Report backs

Module 7: Test

- Case Study #8
- 25 questions

