Guidelines for Haz Mat/WMD Response, Planning and Prevention Training

Guidance for Hazardous Materials Emergency Preparedness (HMEP) Grant Program

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GUIDELINES

FOR RESPONSE, PLANNING
AND Prevention

TRAINING

FOR INCIDENTS INVOLVING
HAZARDOUS MATERIALS
AND WEAPONS OF MASS DESTRUCTION

Introduction

The Hazardous Materials Transportation Act (HMTA), as modified by the Hazardous Materials Uniform Safety Act (HMTUSA) of 1990, Section 117A, authorized the Department of Transportation (DOT) to make grants available to States, Territories, and Indian Tribes to conduct training of public sector employees who respond to emergencies (responders). DOT is also authorized to make grants available to States to develop improved hazardous materials emergency response plans. (Throughout this document, "State" will be understood to include also Territories and Indian Tribes.) To achieve these legislated responsibilities, DOT has established the Hazardous Materials Emergency Preparedness (HMEP) Grant Program. HMTUSA, Section 117A, also authorized DOT to develop a curriculum to accompany the training grant program that (1) functions as a tool for State self-assessment that courses funded comply with curriculum, (2) supports State self-determination of a national "list of courses," and (3) ensures that public sector employees can safely and efficiently respond to hazardous materials emergencies. Based on extensive interagency analysis and discussion, the curriculum referred to in HMTUSA, Section 117A, has been interpreted as a coordinated program that will improve the quality and comprehensiveness of hazardous materials training. The fundamental principle of this approach is that management and quality control of training are the responsibility and authority of localities as well as States, Territories, and Indian Tribes. The Federal role is to provide support and assistance to State, Tribal, and local training management in curriculum development and revision and to help improve the quality of training delivery.

The HMEP curriculum effort includes (1) the development and maintenance of guidelines against which courses can be assessed by State, Tribal, Territory and local training managers and (2) the implementation and maintenance of support systems to help State, Tribal, Territory and local training offices improve key elements that affect the quality of training, such as needs assessment, training plan development, testing, and assimilation of existing courses and materials from other jurisdictions.

This document, *Guidelines for Response, Planning and Prevention Training for Incidents involving Hazardous Materials and Weapons of Mass Destruction (Guidelines)*, constitutes one component of the overall program to provide assistance and support to State, Tribal, Territory and local hazardous materials training initiatives. This material has been developed by an author team of Federal, State, Tribal, Territory and local public sector training, planning, and response organizations and from a cross-section of professional associations involved in hazardous materials planning and response. The work has been conducted under the oversight of the Federal agencies in the HMEP Interagency Coordinating Group and has been coordinated by the Emergency Management Institute (EMI), Federal Emergency Management Agency (FEMA), under an interagency agreement with DOT.

Background

This initiative originated in the Federal Government's effort to address the problem of solid waste in general and hazardous waste in particular. The effort was first addressed by the Resource conservation and Recovery Act (RCRA) of 1976, which regulates disposal of both solid and hazardous wastes. In 1980, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) was passed to protect public health from hazardous waste. As additional information became available regarding health and safety issues, the 1986 Superfund Amendments and Reauthorization Act (SARA) Title I, Section 126(a)(b)(c), was enacted to require the Occupational Safety and Health Administration (OSHA) to develop standards for health and safety. This in turn led to the Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120 (1989), also referred to as OSHA 1910.120.

OSHA 1910.120 describes minimum levels of emergency responder skills, knowledge, and functional levels to meet the safety and health needs of emergency response personnel for both RCRA/CERCLA sites and response off-site. To further define these areas, the National Fire Protection Association (NFPA) developed a standard to define competencies for personnel responding to hazardous materials emergencies. This document is known as NFPA 472. The levels of training recommended in the most recent (1997) edition of NFPA 472 exceed the minimum levels required by OSHA. However, the basic principle that effective response is based on the competency of the responders, not on the number of training hours experienced, is fully shared.

The effort to better define training requirements that would lead to full competency of public sector responders was continued in HMTUSA Section 117A, which provided the impetus to develop *Guidelines*. In this document, the scope of personnel for whom training needs are defined is expanded from those participating in incident response to include those involved in planning for the response. In the response section, the *Guidelines* also bridges technical differences between current editions of OSHA and NFPA definitions of response competencies. The measurement of courses is expanded from length of training and general competencies to the identification of specific objectives and how student competency is measured.

In the *Guidelines*, the terms hazardous substances, hazardous materials, hazardous chemicals, and hazardous waste are considered interchangeable. The focus is on the general reduction of releases and exposures as well as on the general improvement of public sector response and planning, and the material is intended to support, without preference, various Federal agency requirements and terminologies. The *Guidelines* is written for hazardous materials training managers. It assumes that users are experienced in hazardous materials training; are familiar with OSHA 1910.120, NFPA 472, and the challenges of training program management; and have the ability in their organization to evaluate their hazard analysis and response capability as well as training requirements.

Managing Hazardous Materials Training

Managing hazardous materials training at the State and local levels is a complex task. The challenge is to conduct training with limited resources that meets the public sector response training requirements of OSHA 1910.120(q) and EPA (Environmental Protection Agency) 40 CFR 311 (EPA 311). This challenge is compounded by the additional responsibility to ensure that all public sector employees involved in planning and prevention are properly trained to perform their roles. The tasks the public sector should perform to meet these training responsibilities include:

- Ensure that proper hazard and vulnerability analyses are conducted to determine response and planning needs;
- Determine public sector employee roles and competency needs in planning and response;
- Conduct training needs assessments to establish and prioritize employee needs for competency and refresher training;

- Develop short- and long-term training plans that address the training needs for compliance with OSHA 1910.120(q) and EPA 311;
- Manage the jurisdiction's training curriculum for planning and response, including assessing courses for proper objectives, content, and methodology, and revising, updating, and developing courses to meet training requirements not presently addressed; and
- Ensure that the training delivery is effective.

Guidelines for Public Sector Hazardous Materials Training is intended to be a reference manual to assist training managers and public sector employers in accomplishing these tasks.

This Manual

The *Guidelines* is designed to be used as a working reference manual by public sector managers of hazardous materials training. It is organized and indexed to facilitate user cross-referencing of sections and content. Most material addresses the content of courses and the tools to be used in self-assessment of courses. However, course content constitutes only one factor in the training equation that determines the competency of public sector employees involved in hazardous materials planning and response. Therefore, other HMEP curriculum support programs *Guidelines* providesadditional supportive information and guidance for the public sector training management responsibilities described above.

The *Guidelines* is organized into four components:

- Introduction
- Hazardous Materials and Terrorist Incident Response Curriculum Guidelines
- Hazardous Materials and Terrorist Incident Planning Curriculum Guidelines
- Hazardous Materials Prevention Curriculum Guidelines

The guidelines describe in detail the recommended and the required substance of training courses for response and planning for hazardous materials and terrorist incidents, and for prevention of hazardous materials incidents. The information consists primarily of competency requirements to be addressed. Objectives are organized by the pubic sector planning and response functions for which training should be conducted. Included are recommendations for the organization and structure of courses in each specific area, including considerations such as length of training, course methodology, exercise and activity design, equipment and facilities needed, topic-specific testing and evaluation considerations.

The training objectives in each topic area also are organized and coded to support self-assessment of courses by State, Tribal, Territory and local public sector employers and training managers. Instructions for self-assessment of courses are provided under separate cover by the HMEP curriculum program.

Hazardous Materials and Terrorist Incident Response Curriculum Guidelines

There are two tracks of objectives in each training category of the Hazardous Materials Incident Response Curriculum Guidelines. The first track, *required training*, describes minimum training requirements as defined by OSHA 19010.120(q). The second track, *recommended training*, recommends training objectives that reflect the training organization described in the NFPA 472 and 473 standards and other training recommendations incorporated by or developed by the national author team. Both tracks describe training levels that are the *minimum* training appropriate for the competencies in each section. They can be expanded by individual jurisdictions to better ensure effectiveness of training. Directions for self-assessment of courses using the guidelines are available from the HMEP curriculum program for both required and recommended training tracks.

The Hazardous Materials and Terrorist Incident Response Guidelines are organized into the following subsections:

- General Training Issues-Incident Response
- First Responder Awareness
- First Responder Operations
- Hazardous Materials Technician
- On-Scene Incident Commander
- Hazardous Materials Branch Officer
- Safety Officer at Hazardous Materials Incidents (including Hazardous Materials Branch Safety Officer)
- Hazardous Materials Specialist (OSHA) with Private Sector Specialist Employee A and Technician Specialties: Tank Car, Cargo Tank, Intermodal Tank (NFPA)
- Specialist Employee (OSHA) with Private Sector Specialist Employee B and C (NFPA)
- Emergency Medical Services Level 1
- Emergency Medical Services Level 2
- Hospital Emergency Room Personnel
- Hazardous Materials and Terrorist Incident Response Special Topics
- Hazardous Materials and Terrorist Incident Response Related Standards

Hazardous Materials and Terrorist Incident Planning Curriculum Guidelines

The goal of the Planning Curriculum Guidelines is to enhance the knowledge, skills, and attitudes of the broad spectrum of State, Tribal, Territory and local training audiences who develop or contribute to the development of local hazardous materials response plans. The curriculum is structured into three training levels based on general skill requirements of the training audience: Planning Orientation, Planning Essentials, and Planning Specialities. Planning Orientation focuses on general awareness of the planning requirements and process and is targeted for general audiences. Planning Essentials focuses on the minimum competencies needed to develop local response plans and is targeted for local planning team members. Planning Specialties focuses on advanced, specialized planning skills that are needed by selected personnel at the State, Tribal, Territory and local levels to provide specialized roles and services in the planning process.

The Planning Curriculum Guidelines are organized into the following subsections:

- General Training Issues-Planning and Prevention
- Planning Orientation
- Planning Essentials
- Planning Specialities
  - Commodity Flow Study
  - Capability Assessment
  - Planning for Protective Actions
  - Plan Implementation and Maintenance
  - Facility Planning
  - Planning for Public Education
- Appendix A: Planning Guide Summaries
- Appendix B: Planning Models
- Appendix C: Terrorist Incident Planning Models
- Appendix D: National Response Team’s Integrated Contingency Plan Guidance

Hazardous Materials Prevention Curriculum Guidelines

Hazardous materials prevention is based on the concept that the majority of accidents don't just happen- they are caused. While the use of chemicals may involve risk, the factors that precipitate most accidents are at some point under an organization's or an individual's control. Thererefore, most chemical accidents and the damage they cause are by definition preventable.

The goal of the Prevention Curriculum Guidelines is to enhance the knowledge, skills, and attitudes of the broad spectrum of professional private and public sector State, Tribal, Territory and local training audiences who, in the course of their normal work, have the opportunity through better practices to prevent the risk and likelihood of occurence of hazardous materials incidents. The Hazardous Materials Prevention Guidelines are organized into the following sections:

- Prevention Training Issues
- Prevention Awareness
- Prevention Policy Development
- Transportation/Facility Prevention Program Management
- Community Prevention Program Management
- Prevention in Operations
- Design and Plans Review
- Inspection and Enforcement
- Appendix A: Prevention Authorities
- Appendix B: Training Mandates
- Appendix C: Federal Programs
- Appendix D: OSHA 1910.119

Hazardous Materials and Terrorist Incident Response Curriculum Guidelines

About the Response Guidelines

The Hazardous Materials Incident Response Curriculum Guidelines (Response Guidelines) are provided to assist public sector training managers and employers to understand the requirements for training public sector response personnel. Existing regulatory requirements are defined, and additional recommendations are provided to help managers improve the quality and effectiveness of hazardous materials incident response training.

The Response Guidelines are organized into 14 sections. The first section addresses general response training issues and includes:

- Employer's legal responsibilities for training
- The challenge of training to competency
- Response competency definitions
- General methodology and testing considerations
- Refresher training
- Instructor qualifications

Sections 2 through 14 display the objectives to be addressed in training and achieved by public sector response trainees for each competency area or response role that a public sector employee may be required to perform during a hazardous materials incident. The competency area sections are:

- First Responder Awareness
- First Responder Operations
- Hazardous Materials Technician
- On-Scene Incident Commander
- Hazardous Materials Branch Officer
- Safety Officer at Hazardous Materials Incidents
- OSHA: Specialist and NFPA: Specialist Employee A and Technician Specialties
- OSHA: Specialist Employee and NFPA: Specialist Employees B,C
- Emergency Medical Services Level 1
- Emergency Medical Services Level 2
- Hospital Personnel
- Special Topics
- Related Standards

In each of these competency area sections, the minimum level of *required training* is defined by the specifications from OSHA 1910.120(q). In addition, a more extensive *recommended* level of training is defined primarily by the specifications from NFPA 472 and NFPA 473.

Additional training objectives have been added to the recommended level of training beyond those specified in NFPA 472 to address special topics such as radiological first responder, cleanup considerations, and skilled support personnel. Each topic and the rationale for the additional training objectives are discussed in the Special Topics section.

For all *recommended* training objectives in each competency area section, the source and relationship training *required* under OSHA 1910.120(q) are given. The relationship of *recommended* objectives to regulatory requirements is provided to assist in assessing courses for compliance.

Directions for using this material to assess courses and support overall planning of training programs are provided in the Guidelines for Hazardous Materials Program Management section.

Hazardous Materials
and Terrorist Incident
Response

General
Training Issues

General Training Issues

The Need to Train

Public sector employees who respond to hazardous materials and related terrorist emergencies must be properly trained to perform their jobs safely and efficiently. Their employers are responsible for ensuring the health and safety of the responding personnel as well as the protection of the public and the communities served.

Public sector training managers face a significant challenge in ensuring that all responding personnel are fully trained and prepared, while working within existing limited resources and conflicting priorities. Their challenge is compounded by many other factors that affect the competency of public sector personnel to respond. These factors include individual retention differences and various needs for refresher training; the changing and complex nature of the hazardous materials and terrorist incident threat; evolving incident strategies and operational techniques; and unpredictable team, expertise, and resource combinations during incident response.

Employer's Legal Responsibilities

OSHA 29 CFR 1910.120(q) and EPA 40 CFR 311 (EPA 311) require that emergency response employees be completely trained before they perform in emergencies. At a minimum, such training should include the elements of the emergency response plan, standard operating procedure (SOP's) established by the employer, and procedures for notification and handling of emergency incidents.

The employer must certify annually that each employee has successfully completed the required training. The method used to demonstrate competency for certification of training must be recorded and maintained by the employer. Important concepts to remember are:

- The chief or director is responsible for determining the appropriate level of training required based on actions required of members as stated in the SOP's.
- The chief or director is responsible for implementing the required training or certifying that members of the organization have the competencies required. Documentation of training is critical.
- OSHA 1910.120(q) rules apply to all individuals and agencies that are expected to respond to an emergency involving hazardous materials, that is, career or volunteer, fire, emergency medical services (EMS), or law enforcement personnel.

OSHA 1910.120(q) and EPA 311 apply to employers whose employees are engaged in emergency response to hazardous materials incidents. Employer responsibilities under these regulations fall into four primary areas:

- Development of an emergency response plan
- Development of specific procedures for handling hazardous materials incidents
- Training requirements
- Health and safety requirements (medical monitoring for the use of chemical protective clothing and exposure records)

Employers' Training Requirements

Employers must ensure that employees receive training in emergency response to hazardous materials incidents, based on their expected duties and functions. Such training must be performed before employees are permitted to perform in emergencies.

- An employer is responsible for determining the appropriate level of training required, based on actions expected of employees as stated in the agency's SOP's.

- An employer is responsible for implementing the required training. Emphasis should be on achieving the required competencies for the appropriate level of response rather than on minimal requirements for length of training.
- An employer is responsible for selecting qualified, competent instructors.
- An employer must provide annual refresher training sufficient to maintain competencies, or employees must demonstrate required competencies annually.
- An employer must maintain a record of demonstrated competencies including an explanation of how each competency was demonstrated. Training records must contain dates of training, student rosters, curriculum outlines, demonstration checklists or performance records and evaluation tools, and scores, if appropriate.

The Challenge of Competency

As part of a comprehensive program to protect the public and the environment from chemical incidents resulting from such occurrences as transportation accidents, spills, discharges from industrial operations, and terrorist or other criminal activity, training must be conducted for personnel who address planning, safety, response, and technical programs. Many personnel needing training related to hazardous materials and terrorist incident response are volunteers or part-time employees. Maintaining minimum competency levels for full-time paid staff may be difficult, but training part-time or volunteer responders is an even bigger challenge. Two of the most significant challenges are determining what constitutes a minimal level and ensuring minimal requirements are met. Another challenge is presented by part-time and volunteer responders' time constraints and limited flexibility to attend training.

No single generic course can fit the needs of all elements of the diverse national response audience. Although there are basic competencies, trainers must adjust material to suit police, fire, emergency medical service (EMS), public works, transportation, sanitation employees, and so forth. Training options must be offered accordingly, given these variations of need.

OSHA has defined the *minimum* number of hours for training at operations, technician, specialist, and incident commander levels. However, each employer is responsible for employees being trained to competency, and agencies often exceed the minimum hours of training to teach and test for competencies at the levels outlined by OSHA. The training needed to reach competency depends on the preexisting skills and experience of the trainees. Agencies frequently discover that training needs exceed the minimum required hours. On the other hand, employees of a response agency who have sufficient skills and experience may require minimal time to attain the competency level desired. An effective response is based on the competency of the responders, not the number of their training hours. At a minimum, employers should evaluate the amount of learning that resulted from the instruction.

OSHA is concerned that the knowledge and skills gained during initial hazardous materials training will be lost if refresher training is not provided. OSHA realizes that it will not take as many hours to cover the information in a review as during the initial presentation; therefore, there is no hour requirement for refresher training. It is up to the employer to determine that employees maintain their original competencies through refresher training. If it is determined that employees maintain their competency without refresher training, OSHA allows them to demonstrate this annually. If the employer decides to use demonstrated competencies instead of providing training, the employer must document how each employee demonstrated competency.

Competency Definitions

First Responder Awareness Level

First responders at the awareness level are those individuals who are likely to witness or discover a release of hazardous materials and are trained to initiate an emergency response sequence. No hourly training requirement is listed in either OSHA 1910.120 or NFPA 472, but these documents indicate that first responders must have sufficient training or experience to demonstrate competency in the following areas:

- An understanding of what hazardous materials are and the associated risks
- An understanding of potential outcomes when hazardous materials are present
- The ability to recognize the presence of hazardous materials
- An understanding of the first responder's role and use of the North American Emergency Response Guidebook
- The ability to recognize the need for additional resources and the knowledge of the procedures to make the appropriate notifications

First Responder Operations Level

OSHA minimum requirement = awareness + 8 hours at operations level (24 hours operations level training is required as a prerequisite to technician and/or incident commander training)

First responders at the operations level are those individuals who respond to releases or potential releases, as part of the initial response to protect people, property, and the environment. Operations-level first responders are trained to take defensive actions rather than try to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. OSHA 1910.120 requires that first responders at the operations level receive at least 8 hours of training or have sufficient experience to demonstrate competencies objectively. First responders must have the knowledge of the awareness level, and they are required to :

- Know basic hazard and risk assessment
- Know how to select and use protective equipment provided to the first responder
- Understand basic hazardous materials terms.
- Know how to perform basic control, containment, and/or confinement operations within the capabilities of their resources and protective equipment
- Know basic decontamination procedures
- Understand relevant SOP's and termination procedures

Hazardous Materials Technician

OSHA minimum requirement= 24 hours at operations level + technician training

Hazardous materials technicians are those who respond to releases or potential releases for the purpose of stopping the release. This level requires at least 24 hours of training at the operations level, training equal to the competencies at the technician level, and certification by the employer. Hazardous materials technicians assume a more aggressive role than first responders at the operations level. They approach the point of release to plug, patch, or otherwise stop the release of a hazardous substance. They must be trained at the first responder operations level, and they are required to:

- Know how to implement the employer's emergency response plan
- Know how to identify materials by using field survey instruments
- Be able to function in an assigned role in the incident command system
- Know how to select and use specialized personal protective equipment
- Understand hazard and risk assessment techniques
- Be able to perform advanced control and containment operations within the resources and equipment available
- Understand and implement decontamination procedures

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

On Scene Incident Commander

OSHA minimum requirement= 24 hours at operations level + incident commander training

Incident commanders who assume control of the incident scene beyond the first responder awareness level should receive at least 24 hours of training equal to the first responder operations level. In addition, the employer must certify that personnel in this position:

- Are able to implement the employer's incident command system
- Are able to implement the employer's emergency response plan
- Understand the risks associated with working in chemical protective clothing
- Know how to implement the local emergency response plan
- Know of the State emergency response plan and the Federal regional response team
- Understand the importance of decontamination

Hazardous Materials Branch Officer

The hazardous materials branch officer is that person who is responsible for directing and coordinating all operations assigned to the hazardous material branch by the incident commander. This function is akin to that of hazardous materials team leader and encompasses both the general command functions at the branch chief level in an incident command system and in addition includes the responsibility for technical and tactical leadership of the team of hazardous materials technicians at the incident. While the function of hazardous materials branch officer is not directly specified in OSHA 1910.120 or EPA 311, the branch officer function is a natural derivative of the incident command system requirements and incident commander delegation options which are themselves specified as required under the OSHA and EPA regulations for hazardous materials incident response. NFPA 472, Chapter 9: Competencies for Hazardous Materials Branch Officer include:

- Analyzing the incident
- Planning the response
- Implementing the response
- Reporting and documenting the hazardous materials incident

Safety Officer at Hazardous Materials Incidents and Hazardous Materials Branch Safety Officer

SAFETY OFFICER AT HAZARDOUS MATERIALS INCIDENTS

OSHA 29 CFR 1910.120(q)(3)(vii-viii) specifies certain performance and competency requirements for the safety officer at hazardous materials incidents, and employers are required to ensure that employees demonstrate competency in the skills defined. Although the safety officer was initially defined in OSHA as advising the incident commander only, subsequent OSHA interpretations acknowledge that there may be multiple safety officers at the incident scene, advising to several levels of command. OSHA competencies include:

- Identify and evaluate hazards, and assist in developing a safe response plan
- Identify and evaluate unsafe operations, activities, and/or conditions
- Identify appropriate interventions and coordinate with incident commander

HAZARDOUS MATERIALS BRANCH SAFETY OFFICER

NFPA 472, Chapter 10: Competencies for Hazardous Materials Branch Safety Officer defines the hazardous materials branch safety officer as that person who works within an incident command system (also called an incident management system) to ensure that recognized safe practices are followed within the hazardous materials branch. The hazardous materials branch safety officer will be called upon to provide technical advice or assistance regarding safety issues to the hazardous materials branch officer and incident safety officer at a hazardous materials incident. Competencies include:

- Analyzing the incident
- Assisting in developing a safe response plan
- Assisting in implementing the response plan safely
- Evaluating the response for safety problems and identifying needed interventions

OSHA: Specialist Employee/NFPA: Specialist Employee B,C

Specialist employees are defined by OSHA 1910.120(q)(5) as persons who, in the course of their regular job duties, work with and are trained in the handling of specific hazardous substances or chemical-carrying containers and are also prepared to provide advice or assistance within their area of expertise to an incident commander of the hazardous materials team at a hazardous materials incident. Advice and assistance may include gathering, recording, and analyzing information as well as guidance regarding hazards and response options. Assistance also may include working as a technical adviser in the warm and hot zones, if the specialist employee is qualified to do so safely.

These specialist functions are addressed somewhat differently in the National Fire Protection Association Standard 472, as Private Sector Specialist Employee C and Private Sector Specialist Employee B. Private Sector Specialist Employees C are persons having training or educationally acquired expertise in a product, a container, a chemical process, or some procedure of importance to the mitigation of a hazardous materials incident. Private Sector Specialist Employees C may be asked to gather, record, and analyze information. They may serve as consultants and technical advisers to the incident commander or the hazardous materials team, or they may arrange for the provision of such assistance as necessary and related to their area of expertise. They are not expected to work in either the hot or warm zones of an incident area.

Private Sector Specialist Employees B meet the competencies of Private Sector Specialist Employees C and in addition are qualified to assist the response in the warm and hot zones of an incident area and are qualified to provide information on personal protective equipment, decontamination methods, and response evaluation.

OSHA: Specialist/NFPA: Specialist Employee A and Technician Specialties

Hazardous materials specialists is a defined response competency in OSHA 29 CFR 1910.120 (q)(6)(iv) but is not a defined competency category in NFPA 472, 2002 edition. However, there is a relationship between the OSHA Specialist competency and the competencies in NFPA 472, 2002 edition, for Private Sector Specialist Employee A and the Technician Specialties: Tank Car, Cargo Tank, and Intermodal Tank. For this reason, these competencies are grouped together in these Guidelines.

HAZARDOUS MATERIALS SPECIALIST
OSHA minimum requirement = 24 hours at technician level + specialist training

Hazardous materials specialist are those senior experienced responders who respond with, and provide support to, hazardous materials technicians. Their duties parallel those of hazardous materials technicians, but specialists are required to have more direct or specific knowledge of the various substances they may be called on to contain. They also act as senior leaders of hazardous materials teams and may act as site liaisons with Federal, State, and local government authorities with regard to site activities according to OSHA 1910.120. OSHA regulations also require that specialists should receive at least 24 hours of training equal to the technician level, and they must:

- Know how to implement the local emergency response plan
- Be able to use advanced survey instruments
- Have knowledge of the State emergency response plan
- Be able to select and use proper specialized protective equipment
- Understand in-depth hazard and risk assessment techniques
- Be able to perform specialized control and containment operations with the available equipment and resources
- Be able to implement decontamination
- Be able to develop a site safety and control plan
- Understand chemical, radiological, and toxicological terminology and behavior

PRIVATE SECTOR SPECIALIST EMPLOYEE A
NFPA 472, Chapter 8—(2002 Edition)

Those persons who are specifically trained to handle incidents involving chemicals or containers for chemicals used in their organization's area of specialization. Consistent with the organization's emergency response plan and standard operating procedures, the private sector specialist employee A shall be able to analyze an incident involving chemicals within their organization's area of specialization, plan a response to that incident, implement the planned response within the capabilities of the resources available, and evaluate the progress of the planned response.

TECHNICIAN WITH A TANK CAR SPECIALTY
NFPA 472, Chapter 11—(2002 Edition)

Those persons who provide support to the hazardous materials technician, provide oversight for product removal and movement of damaged tank cars, and act as a liaison between technicians and other outside resources. These technicians are expected to use specialized chemical-protective clothing and specialized control equipment.

TECHNICIAN WITH A CARGO TANK SPECIALTY
NFPA 472, Chapter 12—(2002 Edition)

Those persons who provide support to the hazardous materials technician, provide oversight for product removal and movement of damaged cargo tanks, and act as a liaison between technicians and other outside resources. These technicians are expected to use specialized chemical-protective clothing and specialized control equipment.

TECHNICIAN WITH AN INTERMODAL TANK SPECIALTY
NFPA 472, Chapter 13—(2002 Edition)

Those persons who provide support to the hazardous materials technician, provide oversight for product removal and movement of damaged intermodal tanks, and act as a liaison between technicians and other outside resources. These technicians are expected to use specialized chemical-protective clothing and specialized control equipment.

EMS/Hazardous Materials Responder

Emergency medical services personnel at EMS Hazardous Materials (HM) Level 1 are those persons who, in the course of their normal duties, may be called on to perform patient care activities in the “cold zone” at a hazardous materials incident. The incident’s cold zone is the area that contains the command post and other support functions. In other documents it may be referred to as the clean zone or support zone. The role of the EMS/HM Level 1 responder is to provide care *only* to those individuals who no longer pose a significant risk of secondary contamination (that is, a risk of contaminating others, including those providing care). EMS personnel at EMS/HM Level II are those persons who, in the course of their normal duties, may be called on to perform patient care activities in the “warm zone” (the area where personnel and equipment decontamination and hot zone support take place) at hazardous materials incidents. The EMS/HM Level II response personnel may provide care to individuals who still pose a significant risk of secondary contamination. In addition, personnel at this level should be able to coordinate EMS activities at a hazardous materials incident and provide medical support for hazardous materials response personnel.

EMS personnel responding to hazardous materials incidents should be trained and receive regular continuing education to maintain competency in four areas:

- Emergency medical technology
- Hazardous materials
- Special topics approved by the authority having jurisdiction
- The importance of decontamination and basic decontamination procedures

Hospital Personnel

Hospital emergency department personnel are persons who, in the course of there normal work activities, may be called upon to perform patient care and decontamination within the confines of the hospital. These personnel in the performance of their duties may be exposed to a significant risk of secondary contamination from the patients which they are charged to care for. In addition these personnel may be called upon to assist pre-hospital personnel requiring technical assistance in the area of patient decontamination.

Refresher Training

OSHA minimum requirement = annual refresher training or recertification for all levels

All public sector employees who may respond to hazardous materials emergencies must receive refresher training on an annual basis or have experience that ensures their competency to perform their roles safely and efficiently. Employers must certify on an annual basis that employees continue to meet the performance objectives as defined in OSHA 1910.120. This may be accomplished through refresher training or demonstration of competency.

Refresher training or competency retesting requirements vary for each of the response levels. In general, refresher training should include critical skills practice, technical information updates, and refinement of incident scene coordination through field exercises simulating emergencies. At a minimum, competency should be demonstrated in all refresher training for the skills directly affecting the safety of responding personnel. Minimum hours for annual refresher training for response personnel are not specified in OSHA 1910.120(q). However, in practice, many jurisdictions use the 8-hour minimum refresher training requirement for site workers in OSHA 1910.120(e) as a guide.

In each of the competency sections of the Response Guidelines, unique areas of emphasis for refresher training are noted.

Recommended Instructor Qualifications

OSHA 1910.120(q)(7) states: "Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. National Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach."

To implement the OSHA regulations and to encourage quality instruction, it is recommended that instructors possess the following:

- Job knowledge-thorough knowledge of the content to be taught; knowledge of how the information, techniques, and principles apply to performing the job; understanding the difficulties and problems that arise on the job; and specific training or education in the subject matter being taught
- Job Experience-actual work experience directly related to the subject matter (have performed that job being taught) and experience in hazardous materials incidents
- Training knowledge-successful completion of an instructor training course that covers the principles of learning, methods and sequencing of instruction, methods of testing and evaluation, preparing performance objectives and lesson plans, training liability (Reference: NFPA 1041), and oral and written communication skills
- Personal qualities-patience and understanding, enjoyment of and respect for students, and flexibility
- Sensitivity to cultural diversity among students

Some States and private organizations certify hazardous materials instructors. Professional organizations, such as NFPA, have established professional standards for instructors (NFPA 1041) that can be used to evaluate instructor training and certification. Employers and trainers should carefully examine the following criteria for certification of hazardous materials instructors.

- What standards have been applied?
- Are potential certified instructors tested in their area of subject matter expertise?
- Are candidates required to demonstrate their skills and knowledge in the classroom setting?
- Are there follow-up evaluations or rectification requirements?
- Are both instructional and technical skills addressed by certification?
- Is hands-on experience in hazardous materials response considered?
- Have the instructors performed the tasks being taught?

Hazardous Materials
and Terrorist Incident
Response
Training Guidelines

First Responder
Awareness

General Training Considerations

Introduction

First responders at the awareness level shall be trained to meet all competencies of the awareness level. In addition, first responders at the awareness level shall receive training to meet requirements of the Occupational Safety and Health Administration, local occupational health and safety regulatory agencies, or Environmental Protection Agency, as appropriate for their jurisdictions. Members of any organization that respond or can be expected to respond to a hazardous materials incident must know the requirements of the OSHA 1910.120 and EPA 311 training and emergency response plan.

Definition

First responders at the awareness level are personnel who are likely to witness or discover a hazardous materials emergency or, in the course of their normal duties, may be the first persons on the scene of an emergency involving hazardous materials. First responders at the awareness level are expected to recognize that hazardous materials are present, protect themselves, call for trained personnel, and secure the area. The most important duty of these personnel is to make proper notification to begin the emergency response sequence. The first responders' role at this level should involve no potential for their exposure to the hazards related to an incident.

Audience

Hazardous materials responders at the awareness level may be employed by public- or private-sector organizations, such as fire or emergency medical services, law enforcement, emergency management, public works, public health, utilities, and transportation, as well as volunteer agencies and manufacturers, guard and security services, and contractors.

Methodology Recommendations

The training method can use a combination of lecture and media presentations with individual or small-group exercises at intervals of 30 to 45 minutes. A course can range from 4 to 16 hours in length. The exercises can consist of activities that practice identification and recognition of hazardous materials from scenario descriptions and can use information sources such as the North American Emergency Response Guidebook to establish the presence of the hazardous materials described in the scenarios.

Refresher training should focus on renewing the skill of employees in using information sources to recognize and identify hazardous materials.

Target Training to a Specific Occupational Group

Persons training for the awareness level are a diverse group, including police, fire, EMS, public works, emergency management, and transportation personnel. Although the minimal competencies for all personnel remain the same, whenever possible training should be tailored to meet the needs of specific groups. Trainees from a specific discipline or profession should be asked to respond to scenarios that are relevant to their work. They should play roles that are consistent with their occupational responsibilities. Training managers should recruit and train instructors from a variety of occupations. Training materials should depict awareness in multiple situations. Major changes to the curriculum should not be necessary; in most cases, an instructor simply must be sensitive to the audience and its needs and use realistic scenarios.

SUMMARY: First Responder at Awareness Level

Audience	Prerequisites	Training	Refresher

Very broad. All who may first respond to hazmat incidents.	None.	- No length required; 4-16 hours is common practice.
		- Traditional classroom format.
		- Competencies:
		  - Understanding of hazmat and the role of first responder.
		  - Ability to recognize and identify hazmat.
			Very broad. All who may first respond to hazmat incidents.

Federal Requirements
For First Responder Awareness Training

OSHA establishes the following training requirements for first responders at the awareness level. Length of training and method of testing are not specified, but employers are required to ensure the employees demonstrate competency in the skills defined.

OSHA 29 CFR 1910.120(q)(6)(i)
FIRST RESPONDER AWARENESS LEVEL

First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

- *(A) An understanding of what hazardous substances are, and the risks associated with them in an incident*
- *(B) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present*
- *(C) The ability to recognize the presence of hazardous substances in an emergency*
- *(D) The ability to identify the hazardous substance, if possible*
- *(E) An understanding of the role the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook*
- *(F) The ability to realize the need for additional resources, and to make appropriate notifications to the communications center.*

Required Training can be translated directly into the following six sample principal objectives.

Identification	*Sample **Required** Training Objectives*
OSHA AWARE-A	Define the different types of hazardous substances and identify the risks associated with them in an incident.
OSHA AWARE-B	Given a simulated incident involving hazardous materials, identify the potential outcomes.
OSHA AWARE-C	Given the data available during an incident response, demonstrate recognition of the presence of hazardous substances.
OSHA AWARE-D	Given the data available during an incident response, identify hazardous substances present.
OSHA AWARE-E	Define the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the DOT Emergency Response Guidebook.
OSHA AWARE-F	Given a simulated incident, determine the need for additional resources, and make appropriate notifications to the communication center.

Recommended Training
For First Responder Awareness Training

The following training objectives are recommended for first responder awareness training. The primary source for this material is NFPA 472, Chapter 4: Competencies for First Responder Awareness Level. Training objectives from other sources are noted; the rationale for their inclusion is found in the Special Topics section at the end of the Response Guidelines.

In general, these objectives are comparable in scope to those minimally required by OSHA. They do not constitute an increased level of training but rather provide a greater definition of trainee objectives. To assist in assessing course compliance with OSHA 1910.120 (q), the relationships between these objectives and the OSHA requirements are noted. References to OSHA 1910.120 (q)(6)(i)(A through F) are abbreviated as OSHA AWARE-A through F.

Objective Identification Legend

AWARE-2.2.2
NFPA 4-2.1.7
OSHA AWARE-C,D,E

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as AWARE-1.1) indicate enabling objectives supporting the primary objective.

This indicates the origin of this objective. Usually it is directly from NFPA. In some cases, other sources are noted.

This indicates which OSHA requirement this objective supports. References to OSHA 1910.120(q)(6)(i)(A-F) are abbreviated as AWARE-A-F.

Identification	***Recommended** Training Objectives*
AWARE-1 NFPA 4.1.2.1 *OSHA AWARE-C,D,E*	Given a hazardous materials incident scenario, demonstrate an understanding of the goal of the competencies for the first responder at the awareness level.
AWARE-1.1 NFPA 2-1.3(a) *OSHA AWARE-C,D,E*	Identify the competency goal that the first responder at the awareness level shall be able to analyze the incident to determine both the hazardous materials present and the basic hazard and response information for each hazardous material.
AWARE-1.1.1 NFPA 4.1.2.2(1)a *OSHA AWARE-C*	Identify the competency goal that the first responder at the awareness level shall be able to detect the presence of hazardous materials
AWARE-1.1.2 NFPA 4.2.1.2(1)b *OSHA AWARE-D*	Identify the competency goal that the first responder at the awareness level shall be able to survey a hazardous materials incident from a safe location to identify the name, UN/NA identification number, or type placard applied for any hazardous materials involved
AWARE-1.1.3 NFPA 4.2.1.2(1)c *OSHA AWARE-E*	Identify the competency goal that the first responder at the awareness level shall be able to collect hazard information from the current edition of the *North American Emergency Response Guidebook.*

AWARE-1.2
NFPA 4.1.2.2(2)
OSHA AWARE-E

Identify the competency goal that the first responder at the awareness level shall be able to implement actions consistent with the local emergency response plan, the organization's standard operating procedures, and the current edition of the *North American Emergency Response Guidebook*, and be able to do the following:

AWARE-1.2.1
NFPA 4.1.2.2(2)a
OSHA AWARE-E

...Identify the competency goal that the first responder at the awareness level shall be able to initiate protective actions\

AWARE-1.2.2
NFPA 4.1.2.2(2)b
OSHA AWARE-A,B,F

...Identify the competency goal that the first responder at the awareness level shall be able to initiate the notification process

Analyzing the Incident
Detecting the Presence of Hazardous Materials.

AWARE-2
NFPA 4.2.1
OSHA AWARE-A,B,C,D

Given various facility or transportation situations, or both, with and without hazardous materials present, identify those situations where hazardous materials are present.

AWARE-2.1
NFPA 4.2.1(1)
OSHA AWARE-A

Identify the definition of hazardous materials (or dangerous goods, in Canada).

AWARE-2.2
NFPA 4.2.1(2)
OSHA AWARE-A,E

Identify the UN/DOT hazard classes and divisions of hazardous materials and identify common examples of materials in each hazard class or division.

AWARE-2.3
NFPA 4.2.1(3)
OSHA AWARE-B,E

Identify the primary hazards associated with each of the UN/DOT hazard classes and divisions of hazardous materials by hazard class or division.

AWARE-2.4
NFPA 4.2.1(4)
OSHA AWARE-A,B

Identify the difference between hazardous materials incidents and other emergencies.

AWARE-2.5
NFPA 4.2.1(5)
OSHA AWARE-C,D

Identify typical occupancies and locations in the community where hazardous materials are manufactured, transported, stored, used, or disposed of.

AWARE-2.6
NFPA 4.2.1(6)
OSHA AWARE-C,D

Identify typical container shapes that can indicate hazardous materials.

AWARE-2.7
NFPA 4.2.1(7)
OSHA AWARE-C,D,E

Identify facility and transportation markings and colors that indicate hazardous materials, including: (a) UN/NA identification numbers; (b) NFPA 704 markings; (c) military hazardous materials markings; (d) special hazard communication markings; (e) pipeline markings; and (f) container markings.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

AWARE-2.8 NFPA 4.2.1(8) *OSHA AWARE-D*	Given an NFPA 704 marking, describe the significance of the colors, numbers, and special symbols.
AWARE-2.9 NFPA 4.2.1(9) *OSHA AWARE-D,E*	Identify U.S. and Canadian placards and labels that indicate hazardous materials.
AWARE-2.10 NFPA 4.2.1(10) *OSHA AWARE-B*	Identify the basic information on material safety data sheets (MSDS) and shipping papers that indicates hazardous materials, and be able to do the following:
AWARE-2.10.1 NFPA 4.2.1(10)a *OSHA AWARE-B*	...Identify where to find material safety data sheets (MSDS).
AWARE-2.10.2 NFPA 4.2.1(10)b *OSHA AWARE-B*	...Identify entries on a material safety data sheet that indicate the presence of hazardous materials.
AWARE-2.10.3 NFPA 4.2.1(10)c *OSHA AWARE-B,C*	Identify the entries on shipping papers that indicate the presence of hazardous materials.
AWARE-2.10.4 NFPA 4.2.1(10)d *OSHA AWARE-B,C*	...Match the name of the shipping papers found in transportation (air, highway, rail, and water) with the mode of transportation.
AWARE-2.10.5 NFPA 4.2.1(10)e *OSHA AWARE-B*	...Identify the person responsible for having the shipping papers in each mode of transportation.
AWARE-2.10.6 NFPA 4.2.1(10)f *OSHA AWARE-B*	...Identify where the shipping papers are found in each mode of transportation.
AWARE-2.10.7 NFPA 4.2.1(10)g *OSHA AWARE-B,C*	...Identify where the papers can be found in an emergency in each mode of transportation.
AWARE-2.11 NFPA 4.2.1(11) *OSHA AWARE-C,E*	Identify examples of clues (other than occupancy/location, container shape, markings/color, placards/labels, MSDS, and shipping papers) that use the senses of sight, sound, and odor to indicate hazardous materials.
AWARE-2.12 NFPA 4.2.1(12) *OSHA AWARE-C*	Describe the limitations of using the senses in determining the presence or absence of hazardous materials.
AWARE-2.13 NFPA 4.2.1(13) *OSHA AWARE-C*	Identify at least four types of localtions that could become targets for criminal or terrorist activity using hazardous materials.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

AWARE-2.14
NFPA 4.2.1(14)
OSHA AWARE-C

Describe the difference between a chemical and a biological incident.

AWARE-2.15
NFPA 4.2.1(15)
OSHA AWARE-C

Identify at least four indicators of possible criminal or terrorist activity involving chemical agents.

AWARE-2.16
NFPA 4.2.1(16)
OSHA AWARE-C

Identify at leat four indicators of possible criminal or terrorist activity involving biological agents

Analyzing the Incident
Surveying the Hazardous Materials Incident from a Safe Location

AWARE-3
NFPA 4.2.2
OSHA AWARE-D,E

Given examples of facility and transportation situations involving hazardous materials, identify the hazardous material(s) in each situation by name, UN/NA identification number, or type placard applied.

AWARE-3.1
NFPA 4.2.2 (1)
OSHA AWARE-D

Identify difficulties encountered in determining the specific names of hazardous materials in both facilities and transportation.

AWARE-3.2
Rad.1st Resp.
(See Special Topics)

Identify the significance of the terms “Type A,” “Type B,” and “Special Form” as they relate to radioactive material packaging.

AWARE-3.3
Rad. 1st Resp.
(See Special Topics)

Identify additional information concerning radionuclide identity and activity provided on radioactive material labels and shipping papers.

AWARE-3.4
Rad. 1st Resp.
(See Special Topics)

Identify additional information concerning physical and chemical form and packaging type provided on radioactive material shipping papers.

AWARE-3.5
NFPA 4.2.2 (2)
OSHA AWARE-D

Identify sources for obtaining the names of, UN/NA identification numbers for, or types of placard associated with hazardous materials in transportation.

AWARE-3.6
NFPA 4.2.2 (3)
OSHA AWARE-D

Identify sources for obtaining the names of hazardous materials in a facility.

Analyzing the Incident
Collecting Hazard Information

AWARE-4
NFPA 4.2.3
OSHA AWARE-A,B,E

Given the identity of various hazardous materials (name, UN/NA identification number, or type placard, identify the fire, explosion, and health hazard information for each material by using the current edition of the *North American Emergency Response Guidebook*.

AWARE-4.1
NFPA 4.2.3 (1)
OSHA AWARE-A,B,E

Identify the three methods for determining the guide page for a hazardous material.

AWARE-4.2
NFPA 4.2.3 (2)
OSHA AWARE-A,B,E

Identify the two general types of hazards found on each guide page.

AWARE-4.3
Rad. 1st Resp.
(See Special Topics)

Identify difficulties encountered in using the senses to recognize radioactive material releases and radiation.

Implementing the Response
Initiating Protective Actions

AWARE-5
NFPA 4.4.1
OSHA AWARE-E

Given examples of facility and transportation hazardous materials incidents, the local emergency response plan, the organization's standard operating procedures, and the current edition of the *North American Emergency Response Guidebook*, identify the actions to be taken to protect themselves and others and to control access to the scene.

AWARE-5.1
NFPA 4.4.1(1)
OSHA AWARE-E

Identify the location of both the local emergency response plan and the organization's standard operating procedures.

AWARE-5.2
NFPA 4.4.1(2)
OSHA AWARE-E,F

Identify the role of the first responder at the awareness level during a hazardous materials incident.

AWARE-5.3
NFPA 4.4.1(3)
OSHA AWARE-E

Identify the basic precautions to be taken to protect themselves and others in a hazardous materials incident.

AWARE-5.3.1
NFPA 4.4.1 (3)(a)
OSHA AWARE-E

Identify the precautions necessary when providing emergency medical care to victims of hazardous materials incidents.

AWARE-5.3.2
NFPA 4.4.1(3)(b)
OSHA AWARE-E

Identify typical ignition sources found at the scenes of hazardous materials incidents.

AWARE-5.3.3
NFPA 4.4.1(3)(c)
OSHA AWARE-A,B

Identify the ways hazardous materials are harmful to people, the environment, and property at hazardous materials incidents.

AWARE-5.3.4
NFPA 4.4.1(3)(d)
OSHA AWARE-A,B,C

Identify the general routes of entry for human exposure to hazardous materials for each hazard class.

AWARE-5.4
NFPA 4.4.1(4)
OSHA AWARE-E

Given the identity of various hazardous materials (name, UN/NA identification number, or type placard), identify the following response information:
(a)Emergency action (fire, spill, or leak and first aid)
(b)Personal protective equipment necessary
(c)Initial isolation and protective action distances

AWARE-5.5
NFPA 4.4.1(5)
OSHA AWARE-A,E

Given the name of a hazardous material, identify the recommended personal protective equipment from the following list:
(a)Street clothing and work uniforms
(b)Structural fire-fighting protective clothing
(c)Positive pressure self-contained breathing apparatus
(d)Chemical-protective clothing and equipment

AWARE-5.6
NFPA 4.4.1(6)
OSHA AWARE-A,E

Identify the definitions for each of the following protective actions:
(a)Isolation of the hazard area and denial of entry
(b)Evacuation
(c)Sheltering in-place protection

AWARE-5.7
NFPA 4.4.1(7)
OSHA AWARE-B,C,E

Identify the shapes of recommended initial isolation and protective action zones.

AWARE-5.8
NFPA 4.4.1(8)
OSHA AWARE-B,C,E

Describe the difference between small and large spills as found in the table of Initial Isolation and Protective Action Distances.

AWARE-5.9
NFPA 4.4.1(9)
OSHA AWARE-B,C,E

Identifying the circumstances under which the following distances are used at a hazardous materials incident:
(a)Table of initial isolation and protective action distances
(b)Isolation distances in the numbered guides

AWARE-5.10
NFPA 4.4.1(10)
OSHA AWARE-B,C,E

Describe the difference between the isolation distances in the orange-bordered guide pages and the protective action distances in the green-bordered pages in the document.

AWARE-5.11
NFPA 4.4.1(11)
OSHA AWARE-E

Identify the techniques used to isolate the hazard area and deny entry to unauthorized persons at hazardous materials incidents.

AWARE-5.12

NFPA 4.4.1(12)

Identify at least four specific actions necessary when an incident is suspected to involve criminal or terrorist activity.

Implementing the Response

Initiating the Notification Process

AWARE-6

NFPA 4.4.2
OSHA AWARE-E,F

Given either a facility or transportation scenario involving hazardous materials, with and without criminal or terrorist activities, identify the appropriate initial notifications to be made and how to make them, consistent with the local emergency response plan or the organization's standard operating procedures.

Hazardous Materials and Terrorist Incident Response Training Guidelines

First Responder Operations

General Training Considerations

Introduction

First responders at the operations level shall be trained to meet all requirements at the awareness and operational levels. In addition, first responders at the operations level shall receive training to meet requirements of OSHA, local occupational health and safety regulatory agencies, or EPA, as appropriate for their jurisdiction. (Source: NFPA 472)

Definition

First responders at the operations level are those persons who respond to releases or potential releases of hazardous materials as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property from the effects of the release. They shall be trained to respond in a defensive fashion, to control the release from a safe distance and keep it from spreading. (Source: NFPA 472)

Audience

First responders at the operations level are typically those persons who are the first to arrive at the scene of a hazardous materials incident. They may be employed by law enforcement, public service, fire or emergency services, or a variety of private organizations. Generally, they are not members of a hazardous materials response team.

Methodology

First responder operations training is best conducted in a classroom environment, with opportunities for small- and large-group exercises either in the classroom or as a field exercise in conjunction with the training. Training ranges from 8 to 40 hours, and longer courses often include awareness training with the operations program. Lectures with small-group student activities are appropriate for much of the material. However, incident scene organization and command drill and practice will require large-group simulated incidents that can be best conducted in a simulator or as a field exercise.

Refresher training should include (1) competency retesting of all response skills, (2) technical information updates, and (3) critique of incident scene decision-making using simulated emergencies.

SUMMARY: First Responder at the Operations Level

OSHA minimum requirement = Awareness + 8 hours Operations training (24 hours operations training is required as a prerequisite to technician and/or incident commander training)

Audience	Prerequisites	Training	Refresher
Broad. All who may participate in initial operations at a hazmat incident.	First Responder Awareness training.	- 8-40 hours (minimum 8 required). - Classroom and simulator/field instruction. - Competencies: -Understanding of hazmat terms, basic hazard and risk assessment, and role of first responder at operational level. - Ability to perform basic control, containment and/or confinement techniques with proper use or personal protective equipment and following standard operating procedure. - Ability to implement basic decontamination procedures.	1. Competency retesting of all response skills. 2. Technical information updates. 3. Incident scene decision-making using simulated emergencies.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Federal Requirements

For First Responder Operations Training

OSHA establishes the following training requirements for first responders at the operations level: a minimum of 8 hours of training beyond the awareness level or, as an alternative, certification of sufficient experience. Training in excess of 8 hours may be necessary, especially for additional skills and knowledge such as for flammable gas firefighting. Employers are required to ensure that employees demonstrate competency in the skills defined.

OSHA 29 CFR 1910.120(q)(6)(ii)
FIRST RESPONDER OPERATIONS LEVEL

First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least 8 hours of training or have had sufficient experience to objectively demonstrate competency in the following areas, in addition to those listed for the awareness level and the employer shall so certify:

- *(A) Knowledge of the basic hazard and risk assessment techniques*
- *(B) Know how to select and use proper personal protective equipment provided to the first responder operational level*
- *(C) An understanding of basic hazardous materials terms*
- *(D) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit*
- *(E) Know how to implement basic decontamination procedures*
- *(F) An understanding of the relevant standard operating procedures and termination procedures*

Required Training can be translated into the following six sample principal objectives.

Identification	*Sample **Required** Training Objectives*
OSHA OPS-A	Given a simulated incident involving hazardous materials, demonstrate knowledge of basic hazard and risk assessment techniques.
OSHA OPS-B	Given a simulated incident involving hazardous materials, select and demonstrate correct use of proper personal protective equipment.
OSHA OPS-C	Define basic hazardous materials terms.
OSHA OPS-D	Given a simulated incident involving hazardous materials, describe basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available within the student's unit.
OSHA OPS-E	Given a simulated incident involving hazardous materials, list and define appropriate basic decontamination procedures.
OSHA OPS-F	Given a simulated incident involving hazardous materials, identify relevant SOP's and termination procedures.

Recommended Training

For First responder Operations Training

The following training objectives are recommended for first responder operations training. The primary source for this material is NFPA 472, Chapter 5: Competencies for the Responder at the Operational Level. Training objectives from other sources are so noted, with discussion of the rationale for their inclusion to be found in the Special Topics section at the end of the Response Guidelines.

The scope of training reflected in the recommended objectives exceeds those minimally required for the first responder at the operations level. The additional training recognizes the responsibility of the first responder to establish command using an incident management system at the beginning of the emergency. Therefore, several recommended objectives relate to OSHA requirements for incident commander in addition to OSHA requirements for first responder operations. To assist in assessing course compliance with OSHA 1910.120(q), the relationships between these objectives and the OSHA requirements are noted. References to OSHA are abbreviated as noted.

Objective Identification Legend

OPS-1
NFPA 5-1.3
OSHA OPS-A

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as OPS 1.1) indicate enabling objectives supporting the primary objective.

This indicates the origin of this objective. Usually it is directly from NFPA. In some cases, other sources are noted.

This indicates which OSHA requirement this objective supports. References to OSHA are abbreviated as follows:

OSHA 29 CFR 1910.120(q)(6)(ii)(A-F) = OSHA OPS-A to F
OSHA 29 CFR 1910.120(q)(6)(i)(A-F) = OSHA AWARE-A to F
OSHA 29 CFR 1910.120(q)(6)(v)(A-F) = OSHA I.C.-A to F
OSHA 29 CFR 1910.120(q)(3)(i-ix) are subsumed under OSHA I.C.-A to F (see Incident Commander)

Identification	***Recommended** Training Objectives*
OPS-1 NFPA 5.1.2 *OSHA OPS-A* *OSHA AWARE-B*	Given a hazardous materials incident scenario, demonstrate an understanding of the goal of the competencies of the first responder at the operations level.
OPS-1.1 NFPA 5.1.2.1(1) *OSHA OPS-A* *OSHA AWARE-B*	Identify the competency goal that the first responder at the operations level shall be able to analyze a hazardous materials incident and determine the magnitude of the problem in terms of outcomes, and shall be able to demonstrate the ability to do the following:
OPS-1.1.1 NFPA 5.1.2.1(1)(a) *OSHA OPS-A* *OSHA AWARE-B*	...survey the hazardous materials incident to identify the containers and materials involved, determine whether hazardous materials have been released, and evaluate the surrounding conditions.
OPS-1.1.2 NFPA 5.1.2.1(1)(b) *OSHA OPS-B*	...collect hazard and response information from material safety data sheets (MSDS), CHEMTREC/CANUTEC/SETIQ, and shipper/manufacturer contacts.

OPS-1.1.3
NFPA 5.1.2.1(1)(c)
OSHA OPS-A
OSHA AWARE-B

...predict the likely behavior of a material as well as its container.

OPS-1.1.4
NFPA 5.1.2.1(1)(d)
OSHA OPS-A
OSHA AWARE-B

...estimate the potential harm at a hazardous materials incident.

OPS-1.2
NFPA 5.1.2.1(2)
OSHA OPS-B,D

Identify the competency goal that the first responder at the operations level shall be able to plan an initial response within the capabilities and competencies of available personnel, personal protective equipment, and control equipment, by demonstrating skill inthe following tasks:

OPS-1.2.1
NFPA 5.1.2.1(2)(a)
OSHA OPS-A

...describe the response objectives for hazardous materials incidents.

OPS-1.2.2
NFPA 5.1.2.1(2)(b)
OSHA OPS-D

...describe the defensive options available for a given response objective.

OPS-1.2.3
NFPA 5.1.2.1(2)(c)
OSHA OPS-B

...determine whether the personal protective equipment provided is appropriate for implementing each defensive option.

OPS-1.2.4
NFPA 5.1.2.1(2)(d)
OSHA OPS-E

...identify the emergency decontamination procedures.

OPS-1.3
NFPA 5.1.2.1(3)
OSHA OPS-B,D,F
OSHA I.C.-A,B,D

Identify the competency goal that the first responder at the operations level shall be able to implement the planned response to favorably change the outcomes consistent with the local emergency response plan and the organization’s standard operating procedures, by demonstrating skill in the following tasks:

OPS-1.3.1
NFPA 5.1.2.1(3)(a)
OSHA OPS-F
OSHA I.C.-B,D

...establish and enforce scene control procedures including control zones, emergency decontamination, and communications.

OPS-1.3.2
NFPA 5.1.2.1(3)(b)
OSHA I.C.-A

...initiate an incident management system (IMS) for hazardous materials incidents.

OPS-1.3.3
NFPA 5.1.2.1(3)(c)
OSHA OPS-B

...don, work in, and doff personal protective equipment provided by the authority having jurisdiction.

OPS-1.3.4
NFPA 5.1.2.1(3)(d)
OSHA OPS-D

...perform defensive control functions identified in the plan of action.

OPS-1.4
NFPA 5.1.2.1(4)
OSHA OPS-D

Identify the competency goal that the first responder at the operations level shall be able to evaluate the progress of the actions taken to ensure that the response objectives are being met safely, effectively, and efficiently, by demonstrating skill in the following tasks:

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

OPS-1.4.1
NFPA 5.1.2.1(4)(a)
OSHA OPS-D

...evaluate the status of the defensive actions taken in accomplishing the response objectives.

OPS-1.4.2
NFPA 5.1.2.1(4)(b)
OSHA OPS-D

...communicate the status of the planned response

Analyzing the Incident
Surveying the Hazardous Materials Incident

OPS-2
NFPA 5.2.1
OSHA OPS-A
OSHA AWARE-B

Given examples of both facility and transportation scenarios involving hazardous materials, survey the incident to identify the containers and materials involved, determine whether hazardous materials have been released, and evaluate the surrounding conditions.

OPS-2.1
NFPA 5.2.1.1
OSHA OPS-A
OSHA AWARE-C

Given three (3) examples each of liquid, gas, and solid hazardous materials, identify the general shapes of containers in which the hazardous materials are typically found.

OPS-2.1.1
NFPA 5.2.1.1(A)
OSHA OPS-A
OSHA AWARE-C

Given examples of the following tank cars, identify each tank car by type:

(1) Cryogenic liquid tank cars
(2) High-pressure tube cars
(3) Nonpressure tank cars
(4) Pneumatically unloaded hopper cars
(5) Pressure tank cars

OPS-2.1.2
NFPA 5.2.1.1(B)
OSHA OPS-A
OSHA AWARE-C

Given examples of the following intermodal tank containers, identify each intermodal tank container by type and identify at least one material and its hazard class that is typically found in each tank:

(1) Nonpressure intermodal tank containers, such as:
  (a) IM-101 (IMO Type 1 internationally) portable tank
  (b) IM-102 (IMO Type 2 internationally) portable tank
(2) Pressure intermodal tank containers
(3) Specialized intermodal tanks, such as the following:
  (a) Cyrogenic intermodal tanks
  (b) Tube modules

OPS-2.1.3
NFPA 5.2.1.1(C)
OSHA OPS-A
OSHA AWARE-C

Given examples of the following cargo tanks, identify each cargo tank by type:

(1) Nonpressure liquid tanks
(2) Low pressure chemical tanks
(3) Corrosive liquid tanks
(4) High pressure tanks
(5) Cryogenic tanks
(6) Dry bulk cargo tanks
(7) Compressed gas tube trailers

OPS-2.1.4
NFPA 5.2.1.1(D)
OSHA OPS-A
OSHA AWARE-C

Given examples of the following tanks, identify at least one material, and its hazard, that is typically found in each tank

(1) Nonpressure facility tanks
(2) Pressure facility tanks
(3) Cryogenic liquid tanks

OPS-2.1.5
NFPA 5.2.1.1(E)
OSHA OPS-A
OSHA AWARE-C

Given examples of the following nonbulk packages, identify each package by type:
(1) Bags
(2) Carboys
(3) Cylinders
(4) Drums

OPS-2.1.6
NFPA 5.2.1.1(F)
OSHA OPS-A

Given examples of the following radioactive material containers, identify each container/package by type
(1) Type A
(2) Type B
(3) Industrial
(4) Excepted
(5) Strong, tight containers

OPS-2.2
NFPA 5.2.1.2
OSHA OPS-A

Given examples of facility and transportation containers, identify the markings that differentiate one container from another.

OPS-2.2.1
NFPA 5.2.1.2(A)
OSHA OPS-A

Given examples of the following marked transport vehicles and their corresponding shipping papers, identify the vehicle or tank identification marking:
(1) Rail transport vehicles, including tank cars
(2) Intermodal equipment including tank containers
(3) Highway transport vehicles, including cargo tanks

OPS-2.2.2
NFPA 5.2.1.2(B)
OSHA OPS-A

Given examples of facility containers, identify the markings indicating container size, product contained, and/or site identification numbers.

OPS-2.3
NFPA 5.2.1.3
OSHA OPS-A
OSHA AWARE-E

Given examples of facility and transportation situations involving hazardous materials, identify the name(s) of the hazardous material(s) in each situation.

OPS-2.3.1
NFPA 5.2.1.3(A)
OSHA OPS-A
OSHA AWARE-E

Identify the following information on a pipeline marker:
(a) Product
(b) Owner
(c) Emergency telephone number

OPS-2.3.2
NFPA 5.2.1.3(B)
OSHA OPS-A
OSHA AWARE-E

Given a pesticide label, identify each of the following pieces of information; then match the piece of information to its significance in surveying the hazardous materials incident:
(a) Name of pesticide
(b) Signal word
(c) Pest control product (PCP) number (in Canada)
(d) Precautionary statement
(e) Hazard statement
(f) Active ingredient

OPS-2.3.3
NFPA 5.2.1.3(C)
OSHA OPS-A

Given a label for a radioactive material, identify vertical bars, contents, activity, and transport index.

OPS-2.4
NFPA 5.2.1.4
OSHA OPS-A

Identify and list the surrounding conditions that should be noted by the first responders when surveying hazardous materials incidents.

OPS-2.5
NFPA 5.2.1.5
OSHA OPS-A

Give examples of ways to verify information obtained from the survey of a hazardous materials incident.

OPS-2.6
NFPA 5.2.1.6
OSHA OPS-A

Identify at least three additional hazards that could be associated with an incident involving criminal or terrorist activity.

Analyzing the Incident

Collecting Hazard and Response Information

OPS-3
NFPA 5.2.2
OSHA OPS-A

Given known hazardous materials, collect hazard and response information using material safety data sheets (MSDS); CHEMTREC/CANUTEC/SETIQ; local, state and federal authorities; and contacts with the shipper/manufacturer, and be able to:

OPS-3.1
NFPA 5.2.2(1)
OSHA OPS-A
OSHA AWARE-E

...Match the definitions associated with the DOT hazard classes and divisions of hazardous materials, including refrigerated liquefied gases and cryogenic liquids, with the class or division.

OPS-3.2
NFPA 5.2.2(2)
OSHA OPS-A

...Identify two ways to obtain a material safety data sheet (MSDS) in an emergency.

OPS-3.3
NFPA 5.2.2(3)
OSHA OPS-A,B,C,D,F
OSHA AWARE-A
OSHA I.C.-C.4

...Using a material safety data sheet (MSDS) for a specified material, identify the following hazard and response information:

(a) Physical and chemical characteristics
(b) Physical hazards of the material
(c) Health hazards of the material
(d) Signs and symptoms of exposure
(e) Routes of entry
(f) Permissible exposure limits
(g) Responsible party contact
(h) Precautions for safe handling (including hygiene practices, protective measures, procedures for cleanup of spills or leaks)
(i) Applicable control measures including personal protective equipment
(j) Emergency and first aid procedures

OPS-3.4
NFPA 5.2.2(4)
OSHA OPS-A
OSHA AWARE-E

...Identify the following:

(a) Type of assistance provided by CHEMTREC/CANUTEC/SETIQ, and local and state federal authorities
(b) Procedure for contacting CHEMTREC/CANUTEC/SETIQ, , and local and state federal authorities
(c) Information to be furnished to CHEMTREC/CANUTEC/SETIQ, and local and state federal authorities

OPS-3.5
NFPA 5.2.2(5)
OSHA OPS-A
OSHA AWARE-E

...Identify two methods of contacting the manufacturer or shipper to obtain hazard and response information.

OPS-3.6
NFPA 5.2.2(6)
OSHA OPS-A
OSHA AWARE-E
OSHA I.C.-C.4

...Identify the type of assistance provided by the federal defense authorities with respect to criminal or terrorist activities involving hazardous materials.

OPS-3.7
NFPA 5.2.2(7)
OSHA OPS-A
OSHA AWARE-E
OSHA I.C.-C.4

...Identify the procedure for contacting local, state, and federal authorities as specified in the local emergency response plan (ERP) or the organization's standard operating procedures.

OPS-3.8
NFPA 5.2.2(8)
OSHA OPS-A,B,C,D,F
OSHA AWARE-A
OSHA I.C.-C.4

...Describe the properties and characteristics of the following:

(a) Alpha particles
(b) Beta particles
(c) Gamma rays
(d) Neutrons

Analyzing the Incident

Predicting the Behavior of a Material and its Container

OPS-4
NFPA 5.2.3
OSHA OPS-A

Given an incident involving a single hazardous material, predict the likely behavior of the material and its container, and be able to:

OPS-4.1
NFPA 5.2.3(1)
OSHA OPS-A,C

....Given two examples of scenarios involving known hazardous materials, interpret the hazard and response information obtained from the current edition of the *North American Emergency Response Guidebook*; material safety data sheets (MSDS); CHEMTREC/ CANUTEC/SETIQ; local, state, and federal authorities; and shipper/manufacturer contacts, as follows:

OPS-4.1a
NFPA 5.2.3(1)(a)
OSHA OPS-A,C

(a) Match the following chemical and physical properties with their significance and impact on the behavior of the container and/or its contents:

i. Boiling point
ii. Chemical reactivity
iii. Corrosivity (pH)
iv. Flammable (explosive) range (LEL & UEL)
v. Flash point
vi. Ignition (autoignition) temperature
vii. Physical state (solid, liquid, gas)
viii. Specific gravity
ix. Toxic products of combustion
x. Vapor density
xi. Vapor pressure
xii. Water solubility
xiii. Radiation (ionizing and non-ionizing)

OPS-4.1b
NFPA 5.2.3(1)(b)
OSHA OPS-A,C

(b) Identify the differences among the following terms:

i. Exposure and hazard
ii. Exposure and contamination
iii. Contamination and secondary contamination
iv. Radioactive material exposure (internal and external) and radioactive contamination

OPS-4.2 NFPA 5.2.3(2) *OSHA OPS-A*	...Identify three types of stress that could cause a container system to release its contents.
OPS-4.3 NFPA 5.2.3(3) *OSHA OPS-A*	...Identify five ways in which containers can breach.
OPS-4.4 NFPA 5.2.3(4) *OSHA OPS-A*	...Identify four ways in which containers can release their contents.
OPS-4.5 Rad. 1st Resp. *(See Special Topics)*	Identify the general testing requirements for “Type A,” ”Type B,” and “Special Form” packaging used for radioactive material transportation.
OPS-4.6 Rad. 1st Resp. *(See Special Topics)*	Identify common “industrial radiography” sources and any specialized large-quantity radioactive materials packages commonly transported through the local jurisdiction by their shapes and characteristics.
OPS-4.7 NFPA 5.2.3(5) *OSHA OPS-A*	Identify at least four dispersion patterns that can be created upon release of a hazardous material.
OPS-4.8 NFPA 5.2.3(6) *OSHA OPS-A*	Identify the three general time frames for predicting the length of time that exposures can be in contact with hazardous materials in an endangered area.
OPS-4.9 NFPA 5.2.3(7) *OSHA OPS-A*	Identify the health and physical hazards that could cause harm.
OPS-4.10 NFPA 5.2.3(8) *OSHA OPS-A,C*	Identify the health hazards associated with the following terms: (a) Asphyxiant (b) Chronic health hazard (c) Convulsant (d) Irritant/corrosive (e) Sensitizer/allergen (f) Alpha, beta, gamma, and neutron radiation
OPS-4.11 NFPA 5.2.3(9) *OSHA OPS-A*	Given the following types of warfare agents, identify the corresponding UN/DOT hazard class and division: (a) Nerve agents (b) Vesicants (blister agents) (c) Blood agents (d) Choking agents (e) Irritants (riot control agents) (f) Biological agents and toxins

Analyzing the Incident

Estimating the Potential Harm

OPS-5 NFPA 5.2.4 *OSHA OPS-A*	Given simulated incidents involving hazardous materials, estimate the potential harm within the endangered area at a hazardous materials incident, and be able to:
OPS-5.1 NFPA 5.2.4(1) *OSHA OPS-A*	...Identify a resource for determining the size of an endangered area of a hazardous materials incident.
OPS-5.2 NFPA 5.2.4(2) *OSHA OPS-A*	...Given the dimensions of the endangered area and the surrounding conditions at a hazardous materials incident, estimate the number and type of exposures within that endangered area.
OPS-5.3 NFPA 5.2.4(3) *OSHA OPS-A*	...Identify resources available for determining the concentrations of a released hazardous material within an endangered area.
OPS-5.4 NFPA 5.2.4(4) *OSHA OPS-A*	...Given the concentrations of the released material, identify the factors for determining the extent of physical, health, and safety hazards within the endangered area of a hazardous materials incident.
OPS-5.5 NFPA 5.2.4(5) *OSHA OPS-A*	...Describe the impact that time, distance, and shielding have on exposure to radioactive materials specific to the expected dose rate
OPS-5.6 NFPA 5.2.4(6) *OSHA OPS-A*	...Describe the prioritization of emergency medical care and removal of victims from the hazard area relative to exposure and contamination concerns.

Planning the Response

Describing Response Objectives for Hazardous Materials Incidents

OPS-6 NFPA 5.3.1 *OSHA OPS-B,D*	Given at least two scenarios involving hazardous materials incidents (one facility and one transportation), describe the first responder's response objectives for each problem, and be able to:
OPS-6.1 NFPA 5.3.1(1) *OSHA OPS-B,D*	...Identify the steps for determining the number of exposures that could be saved by the first responder with the resources provided by the authority having jurisdiction and operating in a defensive fashion, given an analysis of a hazardous materials problem and the exposures already lost.
OPS-6.2 NFPA 5.3.1(2) *OSHA OPS-B.D*	...Describe the steps for determining defensive response objectives, given an analysis of a hazardous materials incident.
OPS-6.3 NFPA 5.3.1(3) *OSHA OPS-B.D*	...Describe how to assess the risk to a responder for each hazard class in rescuing injured persons at a hazardous materials incident.

Planning the Response
Identifying Defensive Options

OPS-7
NFPA 5.3.2
OSHA OPS-D

Given simulated facility and transportation hazardous materials problems, identify the defensive options for each response objective, and be able to:

OPS-7.1
NFPA 5.3.2(1)
OSHA OPS-D,F

...Identify the defensive options to accomplish a given response objective.

OPS-7.2
NFPA 5.3.2(2)
OSHA OPS-F

...Identify the purpose for, and the procedures, equipment, and safety precautions used with, each of the following control techniques:

(a) Absorption
(b) Dike, dam, diversion, retention
(c) Dilution
(d) Remote valve shutoff
(e) Vapor dispersion
(f) Vapor suppression

Planning the Response
Determining Appropriateness of Personal Protective Equipment

OPS-8
NFPA 5.3.3
OSHA OPS-B
OSHA IC-B.1,C.2

Given the name of the hazardous material involved and the anticipated type of exposure, determine whether available personal protective equipment is appropriate for implementing a defensive option, and be able to:

OPS-8.1
NFPA 5.3.3(1)
OSHA OPS-B
OSHA IC-B.1,C.2

...Identify the appropriate respiratory protection required for a given defensive option, and be able to:

OPS-8.1a
NFPA 5.3.3(1)a
OSHA OPS-B
OSHA IC-B.1,C.2

(a) Identify the three types of respiratory protection and the advantages and limitations presented by the use of each at hazardous materials incidents.

OPS-8.1b
NFPA 5.3.3(1)b
OSHA OPS-B
OSHA IC-B.1,C.2

(b)Identify the required physical capabilities and limitations of personnel working in positive pressure self-contained breathing apparatus.

OPS-8.2
NFPA 5.3.3(2)
OSHA OPS-B
OSHA IC-B.1,C.2

Identify the appropriate personal protective clothing required for a given defensive option, and be able to:

OPS-8.2a
NFPA 5.3.3(2)a
OSHA OPS-B
OSHA IC-B.1,C.2

(a) Identify skin contact hazards encountered at hazardous materials incidents.

OPS-8.2b
NFPA 5.3.3(2)b
OSHA OPS-B
OSHA IC-B.1,C.2

(b) Identify the purpose, advantages, and limitations of the following levels of protective clothing at hazardous materials incidents:

i. Structural fire-fighting protective clothing
ii. High temperature-protective clothing
iii. Chemical-protective clothing
iv. Liquid splash-protective clothing
v. Vapor-protective clothing

Planning the Response

Identifying Emergency Decontamination Procedures

OPS-9
NFPA 5.3.4
OSHA OPS-E,F

Given a plan of action for a hazardous materials incident, identify emergency decontamination procedures, and be able to do the following:

OPS-9.1
NFPA 5.3.4 (1)
OSHA OPS-A
OSHA AWARE-A,B

...Identify ways that personnel, personal protective equipment, apparatus, and tools and equipment become contaminated.

OPS-9.2
NFPA 5.3.4 (2)
OSHA OPS-A
OSHA AWARE-A,B

...Describe how the potential for secondary contamination determines the need for emergency decontamination procedures.

OPS-9.3
NFPA 5.3.4 (3)
OSHA OPS-E,F

...Identify the purpose of emergency decontamination procedures at hazardous materials incidents.

OPS-9.4
NFPA 5.3.4 (4)
OSHA OPS-A,E,F

...Identify the advantages and limitations of emergency decontamination procedures.

OPS-9.5
Rad. 1st Resp.
(See Special Topics)

...Identify appropriate procedures for dealing with accident victims with life-threatening injuries who are known or suspected to be contaminated with radioactive material.

OPS-9.6
NFPA 5.3.4 (5)
OSHA OPS-A,E,F

...Describe the procedure listed in the local Emergency Response Plan or the organization's Standard Operating Procedures for decontamination of a large number of people exposed to hazardous materials.

OPS-9.6
NFPA 5.3.4 (6)
OSHA OPS-A,E,F

...Describe procedures, such as those listed in the local emergency response plan or the organization's standard operating procedures, to preserve evidence at hazardous materials incidents involving suspected criminal or terrorist acts.

Implementing the Planned Response
Establishing and Enforcing Scene Control Procedures

OPS-10
NFPA 5.4.1
OSHA OPS-F
OSHA I.C.-B,D

Given scenarios for facility and/or transportation hazardous materials incidents, identify how to establish and enforce scene control including control zones, emergency decontamination, and communications, and be able to do the following:

OPS-10.1
NFPA 5.4.1(1)
OSHA OPS-F
OSHA I.C.-B,D

...Identify the procedures for establishing scene control through control zones.

OPS-10.2
NFPA 5.4.1(2)
OSHA I.C.-B,D

...Identify the criteria for determining the locations of the control zones at hazardous materials incidents.

OPS-10.3
NFPA 5.4.1(3)
OSHA I.C.-B,D

...Identify the basic techniques for the following protective actions at hazardous materials incidents:
(a) Evacuation
(b) Sheltering in-place protection

OPS-10.4
NFPA 5.4.1(4)
OSHA OPS-E,F

...Identify the considerations associated with locating emergency decontamination areas.

OPS-10.5
NFPA 5.4.1(5)
OSHA OPS-E

...Demonstrate the ability to perform emergency decontamination.

OPS-10.6
NFPA 5.4.1(6)
OSHA OPS-F
OSHA I.C.-B.1
(See Special Topics: Terrorism)

...Identify the items to be considered in a safety briefing prior to allowing personnel to work at the following:
(a) Hazardous materials incident
(b) Hazardous materials incident with criminal or terrorist activities

Implementing the Planned Response
Initiating the Incident Management System (IMS)

OPS-11
NFPA 5.4.2
OSHA I.C.-A,A.2

Given simulated facility and/or transportation hazardous materials incidents, initiate the incident management system (IMS) specified in the local emergency response plan and the organization's standard operating procedures, and be able to do the following:

OPS-11.1
NFPA 5.4.2(1)
OSHA OPS-F
OSHA I.C.-D

...Identify the role of the first responder at the operational level during hazardous materials incidents as specified in the local emergency response plan and the organization's standard operating procedures.

OPS-11.2
NFPA 5.4.2(2)
OSHA I.C.-D

...Identify the levels of hazardous materials incidents as defined in the local emergency response plan.

OPS-11.3
NFPA 5.4.2(3)
OSHA I.C.-A,A.1,A.2,B,D

...Identify the purpose, need, benefits, and elements of an incident management system (IMS) at hazardous materials incidents.

OPS-11.4
NFPA 5.4.2(4)
OSHA I.C.-A,B,D

...Identify the considerations for determining the location of the command post for a hazardous materials incident.

OPS-11.5
NFPA 5.4.2(5)
OSHA I.C.-A,B,D

...Identify the procedures for requesting additional resources at a hazardous materials incident.

OPS-11.6
NFPA 5.4.2(6)
OSHA I.C.-A.3,C.1.

...Identify the authority and responsibilities of the safety officer.

Implementing the Planned Response
Using Personal Protective Equipment

OPS-12
NFPA 5.4.3
OSHA OPS-B

Demonstrate the ability to don, work in, and doff the personal protective equipment provided by the authority having jurisdiction, and be able to do the following:

OPS-12.1
NFPA 5.4.3(1)
OSHA I.C.-C.5

...Identify the importance of the buddy system in implementing the planned defensive options.

OPS-12.2
NFPA 5.4.3(2)
OSHA I.C.-C.2

...Identify the importance of the backup personnel in implementing the planned defensive options.

OPS-12.3
NFPA 5.4.3(3)
OSHA OPS-F

...Identify the safety precautions to be observed when approaching and working at hazardous materials incidents.

OPS-12.4
NFPA 5.4.3(4)
OSHA OPS-F

...Identify the symptoms of heat and cold stress.

OPS-12.5
NFPA 5.4.3(5)
OSHA I.C.-C

...Identify the physical capabilities required for, and the limitations of, personnel working in the personal protective equipment as provided by the authority having jurisdiction.

OPS-12.6
NFPA 5.4.3(6)
OSHA OPS-C

...Match the function of the operational components of the positive pressure self-contained breathing apparatus provided to the hazardous materials responder with the name of the component.

OPS-12.7
NFPA 5.4.3(7)
OSHA 29 CFR 1910.134

...Identify the procedures for cleaning, disinfecting, and inspecting respiratory protective equipment.

Response Training Issues | Awareness | Operations | Technician | Incident Commander | HM Branch Officer | HM Safety Officer | OSHA Specialist NFPA SpEmp A & Tech Spec | OSHA SpecEmpl NFPA SpEmp B,C | EMS Level 1 | EMS Level 2 | Hospital Personnel | Special Topics | Related Standards

OPS-12.8
NFPA 5.4.3(8)
OSHA 29 CFR 1910.134

...Identify the procedures for donning, working in, and doffing positive pressure self-contained breathing apparatus.

OPS-12.9
NFPA 5.4.3(9)
OSHA 29 CFR 1910.134

...Demonstrate donning, working in, and doffing positive pressure self-contained breathing apparatus.

Implementing the Planned Response
Performing Defensive Control Actions

OPS-13
NFPA 5.4.4
OSHA OPS-D

Given a plan of action for a hazardous materials incident within their capabilities, demonstrate defensive control actions set out in the plan, and be able to do the following:

OPS-13.1
NFPA 5.4.4(1)
OSHA OPS-D

...Using the type of fire-fighting foam or vapor suppressing agent and foam equipment furnished by the authority having jurisdiction, demonstrate the proper application of the fire-fighting foam(s) or vapor suppressing agent(s) on a spill or fire involving hazardous materials.

OPS-13.2
NFPA 5.4.4(2)
OSHA OPS-D

...Identify the characteristics and applicability of the following foams:

- (a) Protein
- (b) Fluoroprotein
- (c) Special purpose
  1. Polar solvent alcohol-resistant concentrates
  2. Hazardous materials concentrates
- (d) Aqueous film-forming foam (AFFF)
- (e) High expansion

OPS-13.3
NFPA 5.4.4(3)
OSHA OPS-D,F

...Given the appropriate tools and equipment, demonstrate how to perform the following defensive control activities:

- (a) Absorption
- (b) Damming
- (c) Diking
- (d) Dilution
- (e) Diversion
- (f) Retention
- (g) Vapor dispersion
- (h) Vapor suppression

OPS-13.4
NFPA 5.4.4(4)
OSHA OPS-D,F

...Identify the location and describe the use of the mechanical, hydraulic, and air emergency remote shutoff devices as found on cargo tanks.

OPS-13.5
NFPA 5.4.4(5)
OSHA OPS-D,F

...Describe the objectives and dangers of search and rescue missions at hazardous materials incidents.

OPS-13.6
NFPA 5.4.4(6)
OSHA OPS-D,F

...Describe methods for controlling the spread of contamination to limit impacts of radioactive materials.

Evaluating Progress

Evaluating the Status of Defensive Actions

OPS-14
NFPA 5.5.1
OSHA OPS-D

Given simulated facility and/or transportation hazardous materials incidents, evaluate the status of the defensive actions taken in accomplishing the response objectives, and be able to do the following:

OPS-14.1
NFPA 5.5.1(1)
OSHA OPS-D
OSHA I.C.-A,D

...Identify the considerations for evaluating whether defensive options are effective in accomplishing the objectives.

OPS-14.2
NFPA 5.5.1(2)
OSHA OPS-D,F
OSHA I.C.-A,D

...Describe the circumstances under which it would be prudent to withdraw from a hazardous materials incident.

Evaluating Progress

Communicating the Status of the Planned Response

OPS-15
NFPA 5.5.2
OSHA OPS-D

Given simulated facility and/or transportation hazardous materials incidents, communicate the status of the planned response to the incident commander and other response personnel, and be able to do the following:

OPS-15.1
NFPA 5.5.2(1)
OSHA OPS-D

...Identify the methods for communicating the status of the planned response to the incident commander through the normal chain of command.

OPS-15.2
NFPA 5.5.2(2)
OSHA OPS-A,D

...Identify the methods for immediate notification of the incident commander and other response personnel about critical emergency conditions at the incident.

**Hazardous Materials
and Terrorist Incident
Response
Training Guidelines**

Hazardous Materials Technician

General Training Considerations

Introduction

Hazardous materials technicians shall be trained to meet all requirements of the first responder at the awareness and operations level and the technician level of emergency hazardous materials response. In addition, technicians shall meet the training requirements and be provided medical surveillance in accordance with requirements of OSHA, local occupational health and safety regulatory agencies, or EPA, as appropriate for their jurisdiction.

Definition

Technicians are those persons who respond to releases or potential releases of hazardous materials for the purpose of controlling the release. They are more aggressive than first responders at the operations level in that they will approach the point of release to plug, patch, or otherwise stop the release of a hazardous materials substance. They are expected to use specialized chemical protective clothing and specialized control equipment.

Audience

Technicians typically are members of hazardous materials response teams, which consist of specifically trained personnel who respond to hazardous materials incidents. The teams perform various response actions including assessment, firefighting, rescue, and containment; they are *not* responsible for cleanup operations following the incidents. Technicians are employed by various public and private organizations including fire or emergency medical services, law enforcement, public health, utilities, manufacturers, and contractors. By definition, technicians must be well versed in a wide variety of topics. They are expected to respond to most kinds of hazardous materials incidents that would occur in their jurisdictions. Therefore, training managers should be careful not to make this broad-based training too specialized. A community's analysis may suggest modifications. Emphasis should be placed on the most prevalent types of chemicals and incidents.

Equipment, Facilities, and Resources

Hazardous materials technician training requires both classroom and hands-on workspace as well as reference materials, equipment, and props. Consideration must be given to class size, weather conditions, number of instructors or evaluators, and available equipment and props. Because of the time involved in demonstration and performance activities, class size must be limited. A reasonable student-to-teacher ratio is 30:1 for lecture and 10:1 for hands-on activities, although some blocks of instruction (such as work with live chemicals) may require a 5:1 ratio. Extreme cold or heat will affect outdoor activities involving protective clothing, chemicals, and props. If outdoor exercises involving chemical protective clothing or actual chemicals are to be conducted, neighboring residences and facilities must be considered and notified. Arrangements for secured storage must be made to handle the expensive equipment that will have to be located near the classroom and work area.

Methodology Recommendation

Hazardous materials technician training is best conducted with a combination of classroom instruction using traditional lecture and small-group activities, field exercises involving group practice in simulated emergencies, and hands-on skill training in doing actual control, confinement, and containment exercises. Typically, training ranges from 40 to 240 hours, and longer courses often include awareness and operations training. There should be a strong emphasis on hands-on practice and incident decision-making. Content instruction should be synthesized in student activities requiring analysis of incident information to determine plans of action. Skill training should be performed on actual containers with simulated releases, using full protective equipment and proper response tools. Skill training should include instructor modeling, student walk-throughs, and student practice under stress until competency is achieved. Proper critiques and corrective instruction are essential. Refresher training should include (1) competency retesting of all response skills, (2) technical information updates, and (3) critique of incident scene decision-making using simulated emergencies

Federal Requirements

For Hazardous Materials Technician Training

OSHA establishes the following training requirements for hazardous materials technicians. Methods of testing are not specified. Technicians shall have awareness training and operations training (for a minimum of 24 hours) and training at the technician level. Employers are required to ensure that employees demonstrate competency in the skills defined.

OSHA CFR 1910.120 (q)(6)(iii)
HAZARDOUS MATERIALS TECHNICIAN

Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch, or otherwise stop the release of a hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following area and the employer shall so certify:

- *(A) Know how to implement the employer's emergency response plan*
- *(B) Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment*
- *(C) Be able to function within an assigned role in the Incident Command System*
- *(D) Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician*
- *(E) Understand hazard and risk assessment techniques*
- *(F) Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit*
- *(G) Understand and implement decontamination procedures*
- *(H) Understand termination procedures*
- *(I) Understand basic chemical and toxicological terminology and behavior*

OSHA 29 CFR 1910.120(q)(10)

(10) Chemical protective clothing. Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, shall meet the requirements of paragraphs (g)(3) through (5) of this section.

Required Training is specified in the OSHA regulations listed above. For the convenience of course assessment, the requirements are translated directly into the following nine sample principal objectives.

Identification	*Sample **Required** Training Objectives*
OSHA TECH-A	Given a simulated incident involving hazardous materials, demonstrate implementation of the employer's emergency response plan.
OSHA TECH-B	Using field survey instruments and equipment, classify, identify, and verify known and unknown hazardous materials.
OSHA TECH-C	Given a simulated incident involving hazardous materials, demonstrate functioning within an assigned role in the incident command system.

Required Training

OSHA TECH-D	Given a simulated incident involving hazardous materials, select and demonstrate use of proper specialized chemical personal protective equipment provided to the hazardous materials technician.
OSHA TECH-E	Identify hazard and risk assessment techniques.
OSHA TECH-F	Given simulated incidents involving different hazardous materials containers and releases, demonstrate advanced control, containment, and/or confinement operations.
OSHA TECH-G	Given a simulated incident involving hazardous materials, identify and demonstrate decontamination procedures.
OSHA TECH-H	List and describe hazardous materials incident termination procedures.
OSHA TECH-I	Define basic chemical and toxicological terms and describe basic chemical and toxicological behavior.

SUMMARY: Hazardous Materials Technician

OSHA minimum requirement=24 hours Operations training + Technician training

Audience	Prerequisites	Training	Refresher
Narrow. Prospective hazardous materials team members and others who are designated in response plans as a general resource to perform advanced defensive/ offensive operations at all anticipated hazardous materials emergencies.	1. First Responder Awareness training. 2. First Responder Operations training (min. 24 hours required).	- 40-240 hours. - Classroom and simulator/field instruction, with emphasis on hands-on training. - Competencies: - Knowledge of role of technician within incident command system and responsibilities within employer's emergency response plan. - Knowledge of hazardous materials terminology, behavior, and ability to perform advanced hazard and risk assessment using field survey instruments and equipment. - Ability to perform advanced control, containment and/or confinement techniques. - Ability to select and use specialized personal protective equipment. - Ability to implement decontamination procedures. - Knowledge of termination procedures.	1. Competency retesting of all response skills. 2. Technical information updates. 3. Incident scene decision-making using simulated emergencies.

Recommended Training

For Hazardous Materials Technician Training

The following training objectives are recommended for hazardous materials technician training. The primary source for this material is NFPA 472, Chapter 6: Hazardous Materials Technician. Training objectives from other sources are noted, with discussion of the rationale for their inclusion to be found in the Special Topics section at the end of the Response Guidelines.

In general, these objectives compare in scope to those minimally required by OSHA. They do not constitute an increased level of training, but rather provide greater depth of definition of student objectives. To assist in assessing course compliance with OSHA 1910.120(q), the relationships between these objectives and the OSHA requirements are noted. References to OSHA 29 CFR 1910.120(q)(6)(iii)(A to I) are abbreviated as OSHA TECH-A to I.

Objective Identification Legend

TECH-1
NFPA 6-1.3
OSHA TECH-A

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as TECH-1.1) indicate enabling objectives supporting the primary objective.

This indicates the origin of this objective, Usually it is directly from NFPA. In some cases, other sources are noted.

This indicates which OSHA requirement this objective supports. References to OSHA are abbreviated as follows:

OSHA 29 CFR 1910.120(q)(6)(iii)(A to I) = OSHA TECH-A to I

OSHA 29 CFR 1910.120(q)(6)(iv)(A to I) = OSHA HMSPEC-A to I

OSHA 29 CFR 1910.120(q)(6)(v)(A to F) = OSHA I.C.-A to F

OSHA 29 CFR 1910.120(q)(3)(i-ix) are subsumed under OSHA I.C.-A to F

Identification	***Recommended** Training Objectives*
TECH-1 NFPA 6.1.2.2 *OSHA TECH-A,B,E*	Given a hazardous materials incident scenario, demonstrate an understanding of the role of the hazardous materials technician.
TECH-1.1 NFPA 6.1.2.2(1) *OSHA TECH-B,E,I*	Describe the responsibility to analyze the hazardous materials incident and determine the magnitude of the problem in terms of outcomes, and be able to do the following:
TECH-1.1.1 NFPA 6.1.2.2(1)a *OSHA TECH-B,E,I*	...(a)Identify the responsibility to survey the hazardous materials incident to identify special containers involved, to identify or classify unknown materials, and to verify the presence and concentrations of hazardous materials through the use of monitoring equipment.
TECH-1.1.2 NFPA 6.1.2.2(1)b *OSHA TECH-B,E,I*	...(b) Identify the responsibility to collect and interpret hazard and response information from printed resources, technical resources, computer data bases, and monitoring equipment.

TECH-1.1.3
NFPA 6.1.2.2(1)c
OSHA TECH-B,E,I

...(c)Identify the responsibility to determine the extent of damage to containers.

TECH-1.1.4
NFPA 6.1.2.2(1)b
OSHA TECH-B,E,I

...(d)Identify the responsibility to predict the likely behavior of released materials and their containers when multiple materials are involved.

TECH-1.1.5
NFPA 6.1.2.2(1)e
OSHA TECH-B,E,I

...(e)Identify the responsibility to estimate the size of an endangered area using computer modeling, monitoring equipment, or specialists in this field.

TECH-1.2
NFPA 6.1.2.2(2)
OSHA TECH-A,B,C,D,E

Describe the responsibility to plan a response within the capabilities of available personnel, personal protective equipment, and control equipment, and be able to do the following:

TECH-1.2.1
NFPA 6.1.2.2(2)a
OSHA TECH-A,B,C,D,E

...(a)Identify the response objectives for hazardous materials incidents.

TECH-1.2.2
NFPA 6.1.2.2(2)b
OSHA TECH-A,B,C,D,E

...(b) Identify the potential action options available by response objective.

TECH-1.2.3
NFPA 6.1.2.2(2)c
OSHA TECH-A,B,C,D,E

...(c) Identify the responsibility to select the personal protective equipment required for a given action option.

TECH-1.2.4
NFPA 6.1.2.2(2)d
OSHA TECH-A,B,C,D,E

...(d) Identify the responsibility to select the appropriate decontamination procedures.

TECH-1.2.5
NFPA 6.1.2.2(2)e
OSHA TECH-A,B,C,D,E

...(e)Identify the responsibility to develop a plan of action, including safety considerations, consistent with the local emergency response plan and the organization's standard operating procedures, and within the capability of the available personnel, personal protective equipment, and control equipment.

TECH-1.3
NFPA 6.1.2.2(3)
OSHA TECH-D,F,G,H

Describe the responsibility to implement the planned response to favorably change the outcomes consistent with the organization's standard operating procedures and safety considerations, and be able to do the following:

TECH-1.3.1
NFPA 6.1.2.2(3)a
OSHA TECH-D,F,G,H

...(a) Identify the responsibility to perform the duties of an assigned hazardous materials branch position within the local incident management system (IMS).

TECH-1.3.2
NFPA 6.1.2.2(3)b
OSHA TECH-D,F,G,H

...(b) Identify the responsibility to don, work in, and doff appropriate personal protective clothing, including, but not limited to, both liquid splash- and vapor-protective clothing with appropriate respiratory protection.

TECH-1.3.3
NFPA 6.1.2.2(3)c
OSHA TECH-D,F,G,H

...(c) Identify the responsibility to perform the control functions identified in the plan of action.

TECH-1.4
NFPA 6.1.2.2(4)
OSHA TECH-C,F

Describe the responsibility to evaluate the progress of the planned response by evaluating the effectiveness of the control functions.

TECH-1.5
NFPA 6.1.2.2(5)
OSHA TECH-H

Describe the responsibility to terminate the incident, and be able to do the following:

TECH-1.5.1
NFPA 6.1.2.2(5)a
OSHA TECH-C,H

...(a) Identify the responsibility to assist in the incident debriefing.

TECH-1.5.2
NFPA 6.1.2.2(5)b
OSHA TECH-C,H

...(b) Identify the responsibility to assist in the incident critique.

TECH-1.5.3
NFPA 6.1.2.2(5)c
OSHA TECH-A,H

...(c) Identify the responsibility to provide reports and documentation of the incident.

Analyzing the Incident
Surveying the Hazardous Materials Incident

TECH-2
NFPA 6.2.1
OSHA TECH-B,E

Identify special containers involved and, given the appropriate equipment, identify or classify unknown materials, verify the identity of the hazardous materials, and determine the concentration of hazardous materials.

TECH-2.1
NFPA 6.2.1.1
OSHA TECH-E

Given examples of various specialized containers, identify each container by name and identify the material, and its hazard class, that is typically found in the container.

TECH-2.1.1
NFPA 6.2.1.1(A)
OSHA TECH-E

Given examples of the following railroad cars, identify each car by type and identify at least one material, and its hazard class, that is typically found in each car:

(1) Cryogenic liquid tank cars
(2) High-pressure tube cars
(3) Nonpressure tank cars
(4) Pneumatically unloaded hopper cars
(5) Pressure tank cars

TECH-2.1.2
NFPA 6.2.1.1(B)
OSHA TECH-E

Given examples of the following intermodal tanks, identify each intermodal tank by type and identify at least one material, and its hazard class, that is typically found in each tank:

(1) Nonpressure intermodal tanks:
  (a) IM-101 (IMO Type 1 internationally) portable tank
  (b) IM-102 (IMO Type 2 internationally) portable tank
(2) Pressure intermodal tanks (DOT 51) (IMO Type 5 internationally)
(3) Specialized intermodal tanks:
  (a) Cryogenic intermodal tanks (IMO Type 7 internationally)
  (b) Tube modules

TECH-2.1.3
NFPA 6.2.1.1(C)
OSHA TECH-E

Given examples of the following cargo tanks, identify each cargo tank by type:
(1) Nonpressure liquid tanks
(2) Low pressure chemical tanks
(3) Corrosive liquid tanks
(4) High pressure tanks
(5) Cryogenic liquid tanks
(6) Tube trailers
(7) Cryogenic liquid tanks

TECH-2.1.4
NFPA 6.2.1.1(D)
OSHA TECH-E

Given examples of the following facility tanks, identify at least one material, and its hazard class, that is typically found in each tank:
(1) Nonpressure tank
(2) Pressure tank
(3) Cyrogenic liquid tank

TECH-2.1.5
NFPA 6.2.1.1(E)
OSHA TECH-E

Given examples of the following nonbulk containers, identify at least one material, and its hazard class, that is typically found in each container:
(1) Bags
(2) Carboys
(3) Cylinders
(4) Drums

TECH-2.1.6
NFPA 6.2.1.1(F)
OSHA TECH-E

Given examples of the following radioactive materials packages, identify each package by type and identify at least one typicial material found in each package:
(1) Type A
(2) Type B
(3) Industrial
(4) Excepted
(5) Strong, tight containers

TECH-2.1.7
NFPA 6.2.1.1(G)
OSHA TECH-E

For each of the following, describe a method that can be used to detect them:
(a) Nerve agents
(b) Vesicants (blister agents)
(c) Biological agents and toxin
(d) Irritants (riot control agents)

TECH-2.2
NFPA 6.2.1.2
OSHA TECH-E

Given three examples of facility and transportation containers, identify the approximate capacity of each container.

TECH-2.2.1
NFPA 6.2.1.2(A)
OSHA TECH-E

Using the markings on the container, identify the capacity (by weight and/or volume) of the following examples of transportation vehicles:
(1) Cargo tanks
(2) Tank cars
(3) Tank containers

TECH-2.2.2
NFPA 6.2.1.2(B)
OSHA TECH-E

Using the markings on the container and other available resources, identify the capacity (by weight and/or volume) of each of the following facility containers:
(1) Nonpressure tank
(2) Pressure tank
(3) Cryogenic liquid tank

TECH-2.3
NFPA 6.2.1.2
OSHA TECH-B

Given at least three unknown materials, one of which is a solid, one a liquid, and one a gas, identify or classify by hazard each unknown material, and be able to do the following:

TECH-2.3.1
NFPA 6.2.1.2(A)
OSHA TECH-B

Identify the steps in an analysis process for identifying unknown solid and liquid materials.

TECH-2.3.2
NFPA 6.2.1.2(B)
OSHA TECH-B

Identify the steps in an analysis process for identifying an unknown atmosphere.

TECH-2.3.3
NFPA 6.2.1.2(C)
OSHA TECH-B

Identify the type(s) of monitoring equipment, test strips, and reagents used to determine the following hazards:
(1) Corrosivity (pH)
(2) Flammability
(3) Oxidation potential
(4) Oxygen deficiency
(5) Radioactivity
(6) Toxic levels

TECH-2.3.4
NFPA 6.2.1.2(D)
OSHA TECH-B

Identify the capabilities and limiting factors associated with the selection and use of the following monitoring equipment, test strips, and reagents:
(1) Carbon monoxide meter
(2) Colorimetric tubes
(3) Combustible gas indicator
(4) Oxygen meter
(5) Passive dosimeter
(6) Photoionization detectors
(7) pH indicators and/or pH meters
(8) Radiation detection instruments
(9) Reagents
(10) Test strips

TECH-2.3.5
Rad. 1st Resp.
(See Special Topics)
OSHA TECH-B

Demonstrate how radiation detection instruments may be used defensively.

TECH-2.3.6
NFPA 6.2.1.2(E)
OSHA TECH-B

Given three hazardous materials, one of which is a solid, one a liquid, and one a gas, and the following monitoring equipment, test strips, and reagents, select the appropriate equipment and demonstrate the proper techniques to identify and quantify the materials:
(1) Carbon monoxide meter
(2) Colorimetric tubes
(3) Combustible gas indicator
(4) Oxygen meter
(5) pH indicators and/or pH meters
(6) Radiation detection instruments
(7) Reagents
(8) Test strips

TECH-2.3.7
NFPA 6.2.1.2(F)
OSHA TECH-B

Demonstrate the field maintenance and testing procedures for the monitoring equipment, test strips, and reagents provided by the authority having jurisdiction.

TECH-2.4
NFPA 6.2.1.4
OSHA TECH-B

Given a label for a radioactive material, identify vertical bars, contents, activity, and transport index, then describe the labeled item and its significance in surveying a radioactive materials incident.

Analyzing the Incident

Collecting and Interpreting Hazard and Response Information

TECH-3
NFPA 6.2.2
OSHA TECH-B,E

Given access to printed resources, technical resources, computer data bases, and monitoring equipment, collect and interpret hazard and response information not available from the current edition of the *North American Emergency Response Guidebook* or a material safety data sheet (MSDS), and be able to do the following:

TECH-3.1
NFPA 6.2.2(A)
OSHA TECH-B,E

Identify and interpret the types of hazard and response information available from each of the following resources and explain the advantages and disadvantages of each resource:

(1) Hazardous materials data bases
(2) Maps and diagrams
(3) Monitoring equipment
(4) Reference manuals
(5) Technical information centers (i.e., CHEMTREC/CANUTEC/SETIQ)
(6) Technical information specialists

TECH-3.2
NFPA 6.2.2(B)
OSHA TECH-E

Describe the following terms and explain their significance in the risk assessment process:

(1)Acid, caustic
(2) Air reactivity
(3) Biological agents and toxins
(4) Boiling point
(5) Catalyst
(6) Chemical interactions
(7) Chemical reactivity
(8) Compound, mixture
(9) Concentration
(10) Corrosivity (pH)
(11) Critical temperatures and pressure
(12) Dose
(13) Dose rate
(14) Expansion ratio
(15) Flammable (explosive) range (LEL & UEL)
(16) Fire point
(17) Flash point
(18) alf life
(19) Halogenated hydrocarbon
(20) Ignition (autoignition) temperature
(21) Inhibitor
(22) Instability
(23) Ionic & covalent compounds
(24) Irritants (riot control agents)
(25) Maximum safe storage temperature (MSST)
(26) Melting point/freezing point
(27) Miscibility
(28) Nerve agents
(29) Organic and inorganic
(30) Oxidation potential; (31) pH
(32) Physical state (solid, liquid, gas)
(33) Polymerization
(34) Radioactivity
(35) Saturated, unsaturated, and aromatic hydrocarbons
(36) Self-accelerating decomposition temperature (SADT)
(37) Solution, slurry
(38) Specific gravity
(39) Strength
(40) Sublimation
(41) Temperature of product
(42) Toxic products of combustion
(43) Vapor density
(44) Vapor pressure
(45) Vesicants (blister agents)
(46) Viscosity
(47) Volatility
(48) Water reactivity
(49) Water solubility

TECH-3.3
NFPA 6.2.2(C)
OSHA TECH-E

Describe the heat transfer processes that occur as a result of a cryogenic liquid spill.

TECH-3.4
NFPA 6.2.2(D)
OSHA TECH-E

Given five hazardous material scenarios and the associated reference materials, identify the signs and symptoms of exposure to each material and the target organ effects of exposure to that material.

TECH-3.5
NFPA 6.2.2(E)
OSHA TECH-B,E

Given the scenario of a domestic gas line break and the readings from a combustible gas indicator, determine the area of evacuation.

TECH-3.6
NFPA 6.2.2(F)
OSHA TECH-B,E

Identify two methods for determining the pressure in bulk packaging or facility containers.

TECH-3.7
NFPA 6.2.2(G)
OSHA TECH-B,E

Identify one method for determining the amount of lading remaining in damaged bulk packaging or facility containers.

Analyzing the Incident

Describing the Condition of the Container Involved in the Incident

TECH-4
NFPA 6.2.3
OSHA TECH-E

Given simulated facility and transportation container damage, describe the damage and be able to do the following:

TECH-4.1
NFPA 6.2.3.1
OSHA TECH-E

Given three examples of containers, DOT specification markings for nonbulk and bulk packaging, and the associated reference guide, identify the basic design and construction features of each container.

TECH-4.1.1
NFPA 6.2.3.1(A)
OSHA TECH-E

Identify the basic design and construction features, including closures, of the following bulk containers:

(1) Cargo tanks:
- (a) Nonpressure liquid tanks
- (b) Low pressure chemical tanks
- (c) Corrosive liquid tanks
- (d) High pressure tanks
- (e) Cryogenic liquid tanks
- (f) Dry bulk cargo tanks
- (g) Compressed gas tube trailers

(2) Fixed facility tanks:
- (a) Nonpressure tank
- (b) Pressure tank

(3) Intermodal tanks:
- (a) Nonpressure intermodal tanks:
  - i. IM- 101 portable tank
  - ii. IM-102 portable tank
- (b) Pressure intermodal tanks (specification 51)
- (c) Specialized intermodal tanks:
  - i. Cryogenic intermodal tanks
  - ii. Tube modules

(4) One-ton containers

(5) Pipelines

(6) Railroad cars:
- (a) Cryogenic liquid tank cars
- (b) High-pressure tube cars
- (c) Nonpressure tank cars
- (d) Pneumatically unloaded hopper cars
- (e) Pressure tank cars

(7) Intermediate bulk containers (also known as tote tanks)

TECH-4.1.2
NFPA 6.2.3.1(B)
OSHA TECH-E

Identify the basic design and construction features including closures of the following nonbulk containers:
(1) Carboys
(2) Drums
(3) Pressurized cylinders

TECH-4.1.3
NFPA 6.2.3.1(C)
OSHA TECH-E

Identify the basic design and construction features of the following radioactive materials containers:
(1) Type A package
(2) Type B package
(3) Industrial
(4) Excepted
(5) Strong, tight containers

TECH-4.1.4
NFPA 6.2.3.1(D)

Demonstrate a method for collecting samples of the following:
(1) liquid
(2) solid
(3) gas

TECH-4.2
NFPA 6.2.3.2
OSHA TECH-E

Describe how a liquid pipeline can carry different products.

TECH-4.3
NFPA 6.2.3.3
OSHA TECH-E

Given an example of a pipeline, identify the following:
(1) Ownership of the line
(2) Procedures for checking for gas migration
(3) Procedure for shutting down the line or controlling the leak
(4) Type of product in the line

TECH-4.4
NFPA 6.2.3.4
OSHA TECH-E

Identify the types of damage that a pressure container could incur.

TECH-4.5
NFPA 6.2.3.5
OSHA TECH-E

Given examples of tank car damage, identify the type of damage in each example by name.

TECH-4.6
NFPA 6.2.3.6
OSHA TECH-E

Given a scenario involving radioactive materials, determine if the integrity of any container has been breached, using available survey and monitoring equipment.

Analyzing the Incident

Predicting Likely Behavior of Materials and Their Containers When Multiple Materials are Involved

TECH-5
NFPA 6.2.4
OSHA TECH-E

Given examples of both facility and transportation incidents involving multiple hazardous materials, predict the likely behavior of the material in each case, and be able to:

TECH-5.1
NFPA 6.2.4.1
OSHA TECH-E

Identify at least three resources available that indicate the effects of mixing various hazardous materials.

TECH-5.2
NFPA 6.2.4.2
OSHA TECH-E

Identify the impact of the following fire and safety features on the behavior of the products during an incident at a bulk storage facility and explain their significance in the risk assessment process:
(1) Fire protection systems
(2) Monitoring and detection systems
(3) Product spillage and control (impoundment and diking)
(4) Tank spacing
(5) Tank venting and flaring systems
(6) Transfer operations

Analyzing the Incident
Estimating the Likely Size of an Endangered Area

TECH-6
NFPA 6.2.5
OSHA TECH-E

Given various facility and transportation hazardous materials incidents, estimate the likely size, shape, and concentrations associated with the release of materials involved in the incident by using computer modeling, monitoring equipment, or specialists in this field, and demonstrate the ability to do the following:

TECH-6.1
NFPA 6.2.5.1
OSHA TECH-E

Identify local resources for dispersion pattern prediction and modeling including computers, monitoring equipment, or specialists in the field.

TECH-6.2
NFPA 6.2.5.2
OSHA TECH-E

Given the concentrations of the released material, identify the steps for determining the extent of the hazards (e.g., physical, safety, and health) within the endangered area of a hazardous materials incident.

TECH-6.2.1
NFPA 6.2.5.2(A)
OSHA TECH-I

Describe the following toxicological terms and exposure values and explain their significance in the risk assessment process:
(1) Parts per million (ppm)
(2) Parts per billion (ppb)
(3) Lethal dose (LD_{50})
(4) Lethal concentrations (LC_{50})
(5) Permissible exposure limit (PEL)
(6) Threshold limit value time-weighted average (TLV-TWA)
(7) Threshold limit value short-term exposure limit (TLV-STEL)
(8) Threshold limit value ceiling (TLV-C)
(9) Immediately dangerous to life and health value (IDLH)
(10) Rad
(11) Roentgen equivalent Man (Rem); Millirem (mrem)
(12) Roentgen

TECH-6.2.2
NFPA 6.2.5.2(B)
OSHA TECH-E,I

Describe the following radiological terms and explain their significance in predicting the extent of health hazards and environmental impact in a hazardous materials incident:
(a) Types
(b) Measurement
(c) Protection

TECH-6.2.3
NFPA 6.2.5.2(C)
OSHA TECH-E,I

Identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials incident.

TECH-6.3
NFPA 6.2.5.3
OSHA TECH-E,I

Identify a method for estimating the outcomes within an endangered area of a hazardous materials incident.

Planning the Response
Identifying Response Objectives

TECH-7.1
NFPA 6.3.1.1
OSHA TECH-F

Given simulated facility and transportation problems, describe the response objectives for each problem

TECH-7.2
NFPA 6.3.1.2
OSHA TECH-F

Describe the steps for determining response objectives (defensive, offensive, nonintervention) given an analysis of a hazardous materials incident.

Planning the Response
Identifying the Potential Action Options

TECH-8.1
NFPA 6.3.2.1
OSHA TECH-F

Given simulated facility and transportation hazardous materials incidents, identify the possible action options (defensive, offensive, and nonintervention) by response objective for each problem.

TECH-8.2
NFPA 6.3.2.2
OSHA TECH-F

Identify the possible action options to accomplish a given response objective.

Planning the Response
Selecting Personal Protective Equipment

TECH-9
NFPA 6.3.3
OSHA TECH-D
OSHA I.C.-B.2

Given situations with known and unknown hazardous materials, determine the appropriate personal protective equipment for the action options specified in the plan of action in each situation, and be able to do the following:

TECH-9.1
NFPA 6.3.3.1
OSHA TECH-D

Identify the four levels of personal protective equipment (as specified by EPA, NIOSH and NFPA 471) and describe the equipment for each level and the condition under which each level is used.

TECH-9.2
NFPA 6.3.3.2
OSHA TECH-D
OSHA I.C.-C.1

Identify the factors to be considered in selecting the proper respiratory protection for a specified action option.

TECH-9.2.1
NFPA 6.3.3.2(A)
OSHA TECH-D
OSHA I.C.-B.2,C.1

Describe the advantages, limitations, and proper use of the following types of respiratory protection at hazardous materials incidents:

(1) Positive pressure self-contained breathing apparatus
(2) Positive pressure air line respirators with required escape unit
(3) Air purifying respirators

TECH-9.2.2
NFPA 6.3.3.2(B)
OSHA TECH-D
OSHA I.C.-B.2,C.1

Identify the process for selecting the proper respiratory protection at hazardous materials incidents.

TECH-9.2.3
NFPA 6.3.3.2(C)
OSHA TECH-D
OSHA I.C.-B.2,C.1

Identify the operational components of air purifying respirators and air line respirators by name and describe their functions.

TECH-9.3
NFPA 6.3.3.3
OSHA TECH-D
OSHA I.C.-B.2,C.1

Identify the factors to be considered in selecting the proper chemical-protective clothing for a specified action option.

TECH-9.3.1
NFPA 6.3.3.3 (A)
OSHA TECH-D,I

Describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:
(1) Degradation
(2) Penetration
(3) Permeation

TECH-9.3.2
NFPA 6.3.3.3 (B)
OSHA TECH-D,I

Identify at least three indications of material degradation of chemical-protective clothing.

TECH-9.3.3
NFPA 6.3.3.3 (C)
OSHA TECH-D,I

Identify the three types of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type.

TECH-9.3.4
NFPA 6.3.3.3 (D)
OSHA TECH-D

Identify the relative advantages and disadvantages of the following heat exchange units used for the cooling of personnel in chemical-protective clothing:
(1) Air cooled
(2) Ice cooled
(3) Water cooled

TECH-9.3.5
NFPA 6.3.3.3 (E)
OSHA TECH-D
OSHA I.C.-B.2,C.1

Identify the process for selecting the proper protective clothing at hazardous materials incidents.

TECH-9.3.6
NFPA 6.3.3.3 (F)
OSHA TECH-D
OSHA I.C.-B.2

Given three examples of various hazardous materials, determine the appropriate protective clothing construction materials for a given action option using chemical compatibility charts.

TECH-9.3.7
NFPA 6.3.3.3 (G)
OSHA TECH-D
OSHA I.C.-C

Identify the physical and psychological stresses that can affect users of specialized protective clothing.

Planning the Response
Developing Appropriate Decontamination Procedures

TECH-10
NFPA 6.3.4
OSHA TECH-A,G

Given a simulated hazardous materials incident, select an appropriate decontamination procedure and determine the equipment required to implement that procedure, and be able to do the following:

TECH-10.1
NFPA 6.3.4(1)
OSHA TECH-A,G

Identify the advantages and limitations and describe an example where each of the following decontamination methods would be used: (a) Absorption; (b) Adsorption; (c) Chemical degradation; (d) Dilution; (e) Disposal; (f) Evaporation; (g) Neutralization; (h) Solidification; (i) Vacuuming; and (j) Washing.

TECH-10.2
NFPA 6.3.4 (2)
OSHA TECH-A,G

Identify three sources of technical information for selecting appropriate decontamination procedures and identify how to contact those sources in an emergency.

Planning the Response
Developing a Plan of Action

TECH-11
NFPA 6.3.5
OSHA TECH-F
OSHA I.C.-A,B,C,D

Given simulated hazardous materials incidents in facility and transportation settings, develop a plan of action, including safety considerations, which are consistent with the local emergency response plan and the organization's standard operating procedures and are within the capability of available personnel, personal protective equipment, and control equipment for that incident, and be able to do the following:

TECH-11.1
NFPA 6.3.5 (A)
OSHA TECH-F

Describe the purpose of, procedures for, equipment required, and safety precautions used with the following techniques for hazardous materials control:

(1) Absorption
(2) Neutralization
(3) Overpacking
(4) Patching
(5) Plugging

TECH-11.2
NFPA 6.3.5 (B)
OSHA TECH-F

Given MC-306/DOT-406, MC-307/DOT-407, MC-312/DOT-412, MC-331, and MC-338 cargo tanks, identify the common methods for product transfer from each type of cargo tank.

TECH-11.3
NFPA 6.3.5 (C)
OSHA TECH-F
OSHA HMSPEC-H

Given a simulated hazardous materials incident, develop the safety considerations that must be included in the plan of action, and be able to:

TECH-11.3.1
NFPA 6.3.5 (C)(1)
OSHA TECH-F
OSHA HMSPEC-H

List and describe the safety considerations to be included.

TECH-11.3.2
NFPA 6.3.5 (C)(2)
OSHA TECH-F
OSHA HMSPEC-H

Identify the points that should be made in a safety briefing prior to working at the scene.

TECH-11.4
NFPA 6.3.5 (D)
OSHA TECH-F

Identify the atmospheric and physical safety hazards associated with hazardous materials incidents involving confined spaces.

TECH-11.5
NFPA 6.3.5 (E)
OSHA TECH-F

Identify the pre-entry activities to be performed.

TECH-11.6
NFPA 6.3.5 (F)
OSHA TECH-F

Identify the procedures, equipment, and safety precautions for collecting legal evidence at hazardous materials incidents.

Implementing the Planned Response
Performing Incident Management Duties

TECH-12
NFPA 6.4.1
OSHA TECH-C,H

Given the local emergency response plan or organization's standard operating procedures and a simulated hazardous materials incident, demonstrate the duties of an assigned hazardous materials branch position within the local incident management system (IMS).

TECH-12.1
NFPA 6.4.1(1)
OSHA TECH-C,H

Identify the role of the hazardous materials technician during an incident involving hazardous materials.

TECH-12.2
NFPA 6.4.1(2)
OSHA I.C.-A,A.1,B,B.1,D

Identify the duties and responsibilities of the following hazardous materials branch functions within the incident management system:
(a) Backup
(b) Decontamination
(c) Entry
(d) Hazardous Materials Branch Management
(e) Hazardous Materials Branch Safety
(f) Information/research
(g) Reconnaissance
(h) Resources

TECH-12.3
NFPA 6.4.1(3)
OSHA TECH-A,C,G
OSHA HMSPEC-G

Given a simulated hazardous materials incident, demonstrate setup of the decontamination corridor as specified in the planned response.

TECH-12.4
NFPA 6.4.1(4)
OSHA TECH-A,G

Given a simulated hazardous materials incident, demonstrate the decontamination process specified in the planned response.

Implementing the Planned Response
Using Protective Clothing and Respiratory Protection

TECH-13
NFPA 6.4.2
OSHA TECH-D

Demonstrate the ability to don, work in, and doff both liquid splash- and vapor-protective chemical-protective clothing and any other specialized personal protective equipment provided by the authority having jurisdiction, including the appropriate respiratory protection, and be able to do the following:

TECH-13.1
NFPA 6.4.2(1)
OSHA TECH-A,D

Describe three safety procedures for personnel wearing vapor-protective clothing.

TECH-13.2
NFPA 6.4.2(2)
OSHA TECH-A,D

Describe three emergency procedures for personnel wearing vapor-protective clothing.

TECH-13.3
NFPA 6.4.2(3)
OSHA TECH-D
OSHA 29 CFR 1910.134

Identify the procedures for donning, working in, and doffing the following types of respiratory protection:
(a) Air line respirator with required escape unit
(b) Air purifying respirator

TECH-13.4
NFPA 6.4.2(4)
OSHA TECH-D

Demonstrate donning, working in, and doffing chemical-protective clothing in addition to any other specialized protective equipment provided by the authority having jurisdiction.

TECH-13.5
NFPA 6.4.2(5)
OSHA TECH-D
OSHA (q)(10)

Demonstrate the ability to record the use, repair, and testing of chemical-protective clothing according to manufacturer's specifications and recommendations.

TECH-13.6
NFPA 6.4.2(6)
OSHA TECH-A
OSHA (q)(10)

Describe the maintenance, testing, inspection, and storage procedures for personal protective equipment provided by the authority having jurisdiction according to the manufacturer's specifications and recommendations.

Implementing the Planned Response

Performing Control Functions Identified in Plan of Action

TECH-14
NFPA 6.4.3
OSHA TECH-F

Given various simulated hazardous materials incidents involving nonbulk and bulk packaging and facility containers, select the tools, equipment, and materials for the control of hazardous materials incidents and identify the precautions for controlling releases from those packaging/containers, and be able to do the following:

TECH-14.1
NFPA 6.4.3 (1)
OSHA TECH-F

Given a pressure vessel, select the appropriate material or equipment and demonstrate a method(s) to contain leaks from the following locations:
- (a) Fusible metal of plug
- (b) Fusible plug threads
- (c) Side wall of cylinder
- (d) Valve blowout
- (e) Valve gland
- (f) Valve inlet threads
- (g) Valve seat
- (h) Valve stem assembly blowout

TECH-14.2
NFPA 6.4.3 (2)
OSHA TECH-F

Given the fittings on a pressure container, demonstrate the ability to perform the following:
- (a) Close valves that are open
- (b) Replace missing plugs
- (c) Tighten loose plugs

TECH-14.3
NFPA 6.4.3 (3)
OSHA TECH-F

Given a 55-gal (208-L) drum, demonstrate the ability to contain the following types of leaks using appropriate tools and materials:
- (a) Bung leak
- (b) Chime leak
- (c) Forklift puncture
- (d) Nail puncture

TECH-14.4
NFPA 6.4.3 (4)
OSHA TECH-F

Given a 55-gal (208-L) drum and an overpack drum, demonstrate the ability to place the 55-gal drum into the overpack drum using the following methods:
- (a) Rolling slide-in
- (b) Slide-in
- (c) Slip-over

TECH-14.5
NFPA 6.4.3 (5)
OSHA TECH-A,F

Identify the maintenance and inspection procedures for the tools and equipment provided for the control of hazardous materials releases according to the manufacturer's specifications and recommendations.

TECH-14.6
NFPA 6.4.3 (6)
OSHA TECH-E

Identify three considerations for assessing a leak or spill inside a confined space without entering the area.

TECH-14.7
NFPA 6.4.3 (7)
OSHA TECH-A,E,F

Identify three safety considerations for product transfer operations.

TECH-14.8
NFPA 6.4.3 (8)
OSHA TECH-F

Given an MC-306/DOT-406 cargo tank and a dome cover clamp, demonstrate the ability to install the clamp on the dome properly.

TECH-14.9
NFPA 6.4.3 (9)
OSHA TECH-A,E,F

Identify the methods and precautions used when controlling a fire involving an MC-306/DOT-406 aluminum shell cargo tank.

TECH-14.10
NFPA 6.4.3 (10)
OSHA TECH-A,E,F

Describe at least one method for containing each of the following types of leaks in MC-306/DOT-406, MC-307/DOT-407, and MC-312/DOT- 412 cargo tanks:
(a) Dome cover leak
(b) Irregular-shaped hole
(c) Puncture
(d) Split or tear

TECH-14.11
NFPA 6.4.3 (11)
OSHA TECH-A,E,F

Describe three product removal and transfer considerations for overturned MC-306/DOT-406, MC-307/DOT-407, MC-312/DOT-412, MC-331, and MC-338 cargo tanks.

Evaluating Progress
Evaluating the Effectiveness of the Control Functions

TECH-15
NFPA 6.5
OSHA TECH-A,E,F

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging and the plan of action, evaluate the effectiveness of any control functions identified in the plan of action.

Terminating the Incident
Assisting in the Debriefing

TECH-16
NFPA 6.6.1
OSHA TECH-H

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, participate in the debriefing of the incident, and be able to do the following:

TECH-16.1
NFPA 6.6.1(1)
OSHA TECH-H

Describe three components of an effective debriefing.

TECH-16.2
NFPA 6.6.1(2)
OSHA TECH-H

Describe the key topics of an effective debriefing.

TECH-16.3
NFPA 6.6.1(3)
OSHA TECH-H

Describe when a debriefing should take place.

TECH-16.4
NFPA 6.6.1(4)
OSHA TECH-H

Describe who should be involved in a debriefing.

Terminating the Incident
Assisting in the Incident Critique

TECH-17
NFPA 6.6.2
OSHA TECH-H

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, provide operational observations of the activities that were performed in the hot and warm zones during the incident, and be able to do the following:

TECH-17.1
NFPA 6.6.2(1)
OSHA TECH-H

Describe three components of an effective critique.

TECH-17.2
NFPA 6.6.2(2)
OSHA TECH-H

Describe who should be involved in a critique.

TECH-17.3
NFPA 6.6.2(3)
OSHA TECH-H

Describe why an effective critique is necessary after a hazardous materials incident.

TECH-17.4
NFPA 6.6.2(4)
OSHA TECH-H

Describe which written documents should be prepared as a result of the critique.

Terminating the Incident
Providing Reports and Documentation

TECH-18
NFPA 6.6.3
OSHA TECH-A,H

Given a simulated hazardous materials incident, complete the reporting and documentation requirements consistent with the organization's emergency response plan and standard operating procedures, and be able to do the following:

TECH-18.1
NFPA 6.6.3 (1)
OSHA TECH-A,H

Identify the reports and supporting documentation required by the local emergency response plan and the organization's standard operating procedures.

TECH-18.2
NFPA 6.6.3 (2)
OSHA TECH-A,H

Demonstrate the proper completion of the reports required by the local emergency response plan and the organization's standard operating procedures.

TECH-18.3
NFPA 6.6.3 (3)
OSHA TECH-A,H

Describe the importance of personnel exposure records.

TECH-18.4
NFPA 6.6.3 (4)
OSHA TECH-A,H

Describe the importance of debriefing records.

TECH-18.5
NFPA 6.6.3 (5)
OSHA TECH-A,H

Describe the importance of critique records.

TECH-18.6 Identify the steps in keeping an activity log and exposure records.
NFPA 6.6.3 (6)
OSHA TECH-A,H

TECH-18.7 Identify the steps to be taken in compiling incident reports that meet federal, state, local, and organizational requirements.
NFPA 6.6.3 (7)
OSHA TECH-A,H

TECH-18.8 Identify the requirements for compiling hot zone entry and exit logs.
NFPA 6.6.3 (8)
OSHA TECH-A,H

TECH-18.9 Identify the requirements for compiling personal protective equipment logs.
NFPA 6.6.3 (9)
OSHA TECH-A,H

TECH-18.10 Identify the requirements for filing documents and maintaining records.
NFPA 6.6.3 (10)
OSHA TECH-A,H

Hazardous Materials
and Terrorist Incident
Response
Training Guidelines

On-Scene
Incident Commander

General Training Considerations

Introduction

In title 29 of the Code of Federal Regulations, 1910. 120 (q)(6)(v), OSHA sets the minimum level of training and competencies required for incident commanders. Incident commanders who will assume control of the incident scene beyond the first responder at the awareness level shall receive at least 24 hours of training equal to the first responder at the operations level as well as training to the competencies defined in this section. The U.S. Environmental Protection Agency, individual States, and local agencies may require that incident commanders have additional training or competencies, such as those competencies defined in 29 CFR 1910.120(q)(3).

Definition

The incident commander is the person responsible for all decisions relating to the management of an incident and is in charge of the incident site. This is the equivalent to the on-scene incident commander as defined by OSHA 1910,120.

Audience

Incident commanders may be employed by public emergency response or private agencies that may respond to hazardous materials incidents. They are typically employees of law enforcement agencies, fire departments, emergency medical responders, emergency management agencies, public works departments, or any other agencies that may be expected to take the lead responsibility at a hazardous material incident.

Methodology Recommendations

Hazardous materials incident commander training should include a combination of traditional classroom lecture with small-group activities and large group field exercises. Training can range from 16 to 40 hours in length. Small-group classroom activities focusing on using the incident command system should be progressive in terms of incident complexity and resource management complexity. Table-top, field exercises, or large group incident scene simulations are optimal for overall command structure practice to develop effective incident management skills. For proper skill development during scenario practice, it is essential that there be proper critiques and corrective instructions of incident resource organization, style, and choice of delegation of command responsibilities, management of communication systems, and transfer of command. Testing and evaluation consist of a written examination and post-incident critique of simulations, including solutions to small-group activities and field exercises. Refresher training should include review of command structure SOP's, technical updates on State and federal response plans, and field exercise practice performing command roles in simulated emergencies.

SUMMARY: Incident Commander

OSHA requirement=24 hours Operations training + Incident Commander training

Audience	Prerequisites	Training	Refresher
Moderate in size. Responders whose level of command responsibility may include incident commander at all phases of a hazmat incident, from initial response through stabilization to incident termination.	1. First Responder Awareness training. 2. First Responder Operations training (min. 24 hours required).	- 16-40 hours. - Classroom and simulator/field instruction, with emphasis on incident management and resource coordination. - Competencies: - Knowledge of role of incident commander within incident command system and responsibilities within employer's emergency response plan. - Knowledge of State and federal emergency response plans. - Ability to manage and coordinate a hazmat incident response, including supervising hazard and risk assessment, coordinating control, containment and confinement operations, ensuring proper use of personal protective equipment, employing proper notification procedures, and ensuring correct decontamination procedures. - Ability to implement transfer of command and incident termination procedures.	1. Review of command structure SOP's. 2. Information updates on State and federal response plans. 3. Refresher practice incident scene management, coordination and decision-making using simulated emergencies.

Federal Requirements

For Incident Commander Training

OSHA establishes the following training requirements for incident commanders: a minimum of 24 hours of training at the first responder operations level plus training to the competencies described below or certification of sufficient experience as an alternative. Employers are required to ensure that employees demonstrate competency in the skills defined.

OSHA 29 CFR 1910.120(q)(6)(v)
ON-SCENE INCIDENT COMMANDER

Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify.

(A) Know and be able to implement the employers incident command system
(B) Know how to implement the employers emergency response plan
(C) Know and understand the hazards and risks associated with employees working in chemical protective clothing
(D) Know how to implement the local emergency response plan
(E) Know of the state emergency response plan and of the Federal Regional Response Team
(F) Know and understand the importance of decontamination procedures

The following are additional OSHA requirements that must be reflected in the development of training objectives.

OSHA 29 CFR 1910.120(q)(3)(i-ix)

(i) The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

Note to (q)(3)(i)- The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first- due piece of responding emergency apparatus to arrive on the incident scene. As more senior officials arrive (i.e., battalion chief, fire chief, State law enforcement official, state coordinator, etc.) the position is passed up the line of authority which has been previously established.

(ii) The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

(iii) Based on the hazardous substances and/or conditions present, the individual in charge of the ICS shall implement appropriate emergency operations., and assure that the personal protective equipment worn is appropriate for the hazards to be encountered. However, personal protective equipment shall meet, at a minimum, the criteria contained in 29 CFR 1910.156(e) when worn while performing fire fighting operations beyond the incipient stage for any incident.

(iv) Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in the emergency response, until such time that the individual in charge of the ICS determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees.

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(v) *The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to the incident or site hazards, to those who are actively performing emergency operations. However, operations in hazardous areas shall be performed using the buddy system in groups of two or more.*

(vi) *Back-up personnel shall stand by with equipment ready to provide assistance or rescue. Qualified basic life support personnel, as a minimum, shall also be standing by with medical equipment and transportation capability.*

(vii) *The individual in charge of the ICS shall designate a safety officer, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.*

(viii) *When activities are judged by the safety officer to be an IDLH and/or involve an imminent danger condition, the safety officer shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any action needed to be taken to correct these hazards at the emergency scene.*

(ix) *After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.*

See also OSHA 29 CFR 1910.120 Appendix C, Compliance Guidelines (6) in ICS and (7) Site Safety and Control Plans.

The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern of the incident commander. The use of a site safety and control plan could greatly assist those in charge of assuring the safety and health of employees on the site.

A comprehensive site safety and control plan should include the following: summary analysis of hazards on the site and risk analysis of those hazards; site map or sketch; site work zones (clean zone transition or decontamination zone, work or hot zone); use of the buddy system; site communications; command post or command center; standard operating procedures and safe work practices; medical assistance and triage area; hazard monitoring plan (air contamination monitoring, etc.); decontamination procedures and area; and other relevant areas. This plan should be part of the employer's emergency response plan or an extension of it to the specific site.

Required Training can be translated directly into the following six sample objectives:

Identification	*Sample **Required** Training Objectives*
OSHA I.C.-A	Given a simulated incident involving hazardous materials, demonstrate implementation of the employer's incident command system.
OSHA I.C.-A.1	Demonstrate establishing command, organizing resources and assigning subordinate units and personnel, and establishing lines of communication.- OSHA 29 CFR 1910.120(q)(3)(i)
OSHA I.C.-A.2	Demonstrate transfer of command.- Note to OSHA 29 CFR 1910.120(q)(3)(i)
OSHA I.C.-A.3	Define the roles and responsibilities of the safety officer.- OSHA 29 CFR 1910.120 (q)(3)(vii and viii)
OSHA I.C.-B	Given a simulated incident involving hazardous materials, demonstrate implementation of the employer's emergency response plan.
OSHA I.C.-B.1	Identify all hazardous substances or conditions present and describe as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies. OSHA 29 CFR 1910.120(q)(3)(ii)
OSHA I.C.-B.2	Determine and describe appropriate emergency operations, including correct use of personal protective equipment, based on the hazardous substance and/or conditions present. OSHA 29 CFR 1910.120(q)(3)(iii)
OSHA I.C.-C	Given a simulated incident involving hazardous materials, identify the hazards and risks associated with employees working in chemical protective clothing.
OSHA I.C.-C.1	Identify the process to determine, through the use of air monitoring, when it is safe for subordinate personnel to discontinue use of positive pressure self-contained breathing apparatus. OSHA 29 CFR 1910.120(q)(3)(iv)
OSHA I.C.-C.2	Identify strategies and tactics to minimize the number of emergency response personnel working in areas of potential or actual exposure to incident or site hazards, while using the buddy system in groups of two or more. OSHA 29 CFR 1910.120(q)(3)(v)
OSHA I.C.-C.3	Identify requirements for backup assistance and rescue personnel and qualified basic life support personnel, equipment, and transportation capability. OSHA 29 CFR 1910.120(q)(3)(vi)
OSHA I.C.-D	Given a simulated incident involving hazardous materials, demonstrate implementation of the local emergency response plan.
OSHA I.C.-E	Identify and describe the State emergency response plan and the federal regional response team.
OSHA I.C.-F	Given a simulated incident involving hazardous materials, identify and demonstrate management of decontamination procedures.

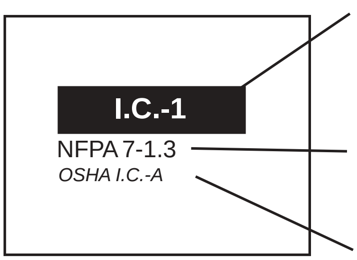
Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Recommended Training
For Incident Commander

The following training objectives are recommended for on-scene incident commander training. The incident commander is responsible for directing and coordinating all aspects of a hazards materials incident. The primary source for the material is NFPA 472, Chapter 7: Competencies for the Incident Commander. Training objectives from other sources are so noted, with discussion of the rationale for their inclusion to be found in the Special Topics section at the end of the Response Guidelines.

In general, these objectives are comparable in scope to those minimally required by OSHA. They do not constitute an increased scope of training but rather provide greater depth of definition of trainee objectives and may suggest a greater length of training. To assist in assessing course compliance with OSHA 1910.120(q), the relationship between these objectives and the OSHA requirements are noted. References to OSHA are abbreviated as noted.

The incident commander should be trained to meet all requirements indicated for the first responder at the awareness and operational levels as well as the requirements defined below. In addition, the incident commander should receive any additional training necessary to meet OSHA, local occupational health and safety regulations, or EPA requirements, whichever is appropriate for his or her jurisdiction.



Objective Identification Legend

This is the identification of the objective in this document. It matches the identification code used in course assignment references. Decimal numbers (such as I.C.-1.1) indicate enabling objectives supporting the primary objective.

This indicates the origin of the objective. Usually it is directly from NFPA. In some cases, other source are noted.

This indicates which OSHA requirement this objective supports. References to OSHA are abbreviated as follows:

OSHA 1910.120(q)(6)(v)(A-F)= OSHA I.C.-A to F

OSHA 29 CFR 1910.120(q)(3)(i-ix) are subsumed under
OSHA I.C.-A to F

Identification	***Recommended** Training Objectives*
I.C.-1 NFPA 7.1.2.2 *OSHA I.C.-A to F*	Given a hazardous materials incident scenario, demonstrate an understanding of the role of the incident commander, and be able to do the following:
I.C.-1.1 NFPA 7.1.2.2 (1) *OSHA I.C.-A,B,D*	Describe the responsibility to analyze a hazardous materials incident to determine the magnitude of the problem in terms of outcomes.
I.C.-1.1.1 NFPA 7.1.2.2 (1)a *OSHA I.C.-A,B,D*	Identify the responsibility to collect and interpret hazard and response information from printed resources, technical resources, computer data bases, and monitoring equipment.

I.C.-1.1.2
NFPA 7.1.2.2 (1)b
OSHA I.C.-A,B,D

Identify the responsibility to estimate the potential outcomes within the endangered area at a hazardous materials incident.

I.C.-1.2
NFPA 7.1.2.2 (2)
OSHA I.C.-A,B,D

Describe the responsibility to plan response operations within the capabilities and competencies of available personnel, personal protective equipment, and control equipment.

I.C.-1.2.1
NFPA 7.1.2.2 (2)a
OSHA I.C.-A,B,D

Identify the response objectives for hazardous materials incidents.

I.C.-1.2.2
NFPA 7.1.2.2 (2)b
OSHA I.C.-A,B,D

Identify the potential action options (defensive, offensive, and nonintervention) available by response objective.

I.C.-1.2.3
NFPA 7.1.2.2 (2)c
OSHA I.C.-A,B,D

Identify the responsibility to approve the level of personal protective equipment required for a given action option.

I.C.-1.2.4
NFPA 7.1.2.2 (2)d
OSHA I.C.-A,B,D

Identify the responsibility to develop a plan of action, including safety considerations consistent with the local emergency response plan and the organization's standard operating procedures and within the capability of available personnel, personal protective equipment, and control equipment.

I.C.-1.3
NFPA 7.1.2.2(3)
OSHA I.C.-A,B,D

Describe the responsibility to implement a response to favorably change the outcome consistent with the local emergency response plan and the organization's standard operating procedures.

I.C.-1.3.1
NFPA 7.1.2.2(3)a
OSHA I.C.-A,B,D

Identify the responsibility to implement an incident management system (IMS), including the specified procedures for notification and utilization of nonlocal resources, e.g., private, state, and federal government personnel.

I.C.-1.3.2
NFPA 7.1.2.2(3)b
OSHA I.C.-A,B,D

Identify the responsibility to direct resources (private, governmental, and others) with expected task assignments and on-scene activities and provide management overview, technical review, and logistical support to private and governmental sector personnel.

I.C.-1.3.3
NFPA 7.1.2.2(3)c
OSHA I.C.-A,B,D

Identify the responsibility to provide a focal point for information transfer to media and local elected officials through the IMS structure.

I.C.-1.4
NFPA 7.1.2.2(4)
OSHA I.C.-A,B,D

Describe the responsibility to evaluate the progress of the planned response to ensure the response objectives are being met safely, effectively, and efficiently and adjust the plan of action accordingly by evaluating the effectiveness of the control functions.

I.C.-1.5
NFPA 7.1.2.2(5)
OSHA I.C.-A,B,D

Describe the responsibility to terminate the incident.

I.C.-1.5.1
NFPA 7.1.2.2(5)a
OSHA I.C.-A,B,D

Identify the responsibility to transfer command (control) when appropriate.

I.C.-1.5.2
NFPA 7.1.2.2(5)b
OSHA I.C.-A,B,D

Identify the responsibility to conduct an incident debriefing.

I.C.-1.5.3
NFPA 7.1.2.2(5)c
OSHA I.C.-A,B,D

Identify the responsibility to conduct a multi-agency critique.

I.C.-1.5.4
NFPA 7.1.2.2(5)d
OSHA I.C.-A,B,D

Identify the responsibility to report and document the hazardous materials incident and submit the report to the proper entity.

Analyzing the Incident
Collecting and Interpreting Hazard and Response Information

I.C.-2.1
NFPA 7.2.1.1
OSHA I.C.-B.1

Given access to printed and technical resources, computer data bases, and monitoring equipment, collect and interpret hazard and response information not available from the current edition of the *North American Emergency Response Guidebook* or a material safety data sheet (MSDS).

I.C.-2.2
NFPA 7.2.1.2
OSHA I.C.-B.1

Identify and interpret the types of hazard and response information available from each of the following resources and explain the advantages and disadvantages of each resource:
(1) Reference manuals
(2) Hazardous materials data bases
(3) Technical information centers
(4) Technical information specialists
(5) Monitoring equipment

Analyzing the Incident
Estimating Potential Outcomes

I.C.-3
NFPA 7.2.2
OSHA I.C.-B.1

Given simulated facility or transportation incidents involving hazardous materials, the surrounding conditions, and the predicted behavior of the container and its contents, estimate the potential outcomes within the endangered area.

I.C.-3.1
NFPA 7.2.2 (1)
OSHA I.C.-B.1

Identify the steps for estimating the number of exposures within the endangered area.

Describe the following toxicological terms and exposure values and explain their significance in the risk assessment process:
(a) Parts per million (ppm)
(b) Parts per billion (ppb)
(c) Lethal dose (LD_{50})
(d) Lethal concentrations (LC_{50})
(e) Permissible exposure limit (PEL)
(f) Threshold limit value time-weighted average (TLV-TWA)
(g) Threshold limit value short-term exposure limit (TLV-STEL)
(h) Threshold limit value ceiling (TLV-C)
(i) Immediately dangerous to life and health value (IDLH)
(j) Rad
(k) Roentgen eqivalent Man; Millirem
(l) Roentgen

I.C.-3.3
NFPA 7.2.2 (3)
OSHA I.C.-B.1

Describe the following radiological materials terms and explain their significance in predicting the extent of health hazards and environmental impact in a hazardous materials incident:
(a) Types
(b) Measurement
(c) Protection

I.C.-3.4
NFPA 7.2.2 (4)

Identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials incident.

I.C.-3.5
NFPA 7.2.2 (5)
OSHA I.C.-B.1

Identify the methods available to the organization for obtaining local weather conditions and predictions for short-term future weather changes.

I.C.-3.6
NFPA 7.2.2 (6)
OSHA I.C.-B.1

Explain the basic toxicological principles relative to assessment and treatment of personnel exposed to hazardous materials, including the following:
(a) Acute and delayed toxicity (chronic)
(b) Routes of exposure to toxic materials
(c) Local and systemic effects
(d) Dose response
(e) Synergistic effects

I.C.-3.7
NFPA 7.2.2 (7)
OSHA I.C.-B.1,B.2

Describe the health risks associated with the following:
(a) Nerve agents
(b) Vesicants (blister agents)
(c) Blood agents
(d) Choking agents
(e) Biological agents and toxins
(f) Irritants (riot control agents)

Planning the Response
Identifying Response Objectives

I.C.-4.1
NFPA 7.3.1.1
OSHA I.C.-B.2

Given simulated facility and transportation hazardous materials incidents, identify the possible action options (defensive, offensive, and nonintervention) by response objectives for each problem.

I.C.-4.2
NFPA 7.3.1.1
OSHA I.C.-B.2

Describe the steps for determining response objectives (defensive, offensive, and nonintervention) given an analysis of a hazardous materials incident.

Planning the Response
Identifying the Potential Action Options

I.C.-5
NFPA 7.3.2
OSHA I.C.-B.2

Given simulated facility and transportation hazardous materials incidents, identify the possible action options (defensive, offensive, and non-intervention) by response objective for each problem, and be able to do the following:

I.C.-5.1 NFPA 7.3.2(1) *OSHA I.C.-B.2*	Identify the possible action options to accomplish a given response objective.
I.C.-5.2 NFPA 7.3.2(2) *OSHA I.C.-B.2*	Identify the purpose of each of the following techniques for hazardous materials control: (a) Absorption (b) Neutralization (c) Overpacking (d) Patching (e) Plugging

Planning the Response
Approving the Level of Personal Protective Equipment

I.C.-6 NFPA 7.3.3 *OSHA I.C.-C*	Given situations with known and unknown hazardous materials, approve the appropriate personal protective equipment for the action options specified in the plan of action in each situation, and be able to do the following:
I.C.-6.1 NFPA 7.3.3 (1) *OSHA I.C.-B.2,C,C.1*	Identify the four levels of chemical protection (EPA/NIOSH) and describe the equipment required for each level with the conditions under which each level is used.
I.C.-6.2 NFPA 7.3.3 (2) *OSHA I.C.-C*	Describe the following terms and explain their impact and significance on the selection of chemical- protective clothing: (a) Degradation (b) Penetration (c) Permeation
I.C.-6.3 NFPA 7.3.3 (3) *OSHA I.C.-C*	Describe three safety considerations for personnel wearing vapor-protective, liquid splash-protective, and high temperature-protective clothing.
I.C.-6.4 NFPA 7.3.3 (4) *OSHA I.C.-C*	Identify the physical and psychological stresses that can affect users of personal protective equipment.
I.C.-6.5 NFPA 7.3.3 (5) *OSHA I.C.-C*	Identify the limitations of military chemical/biological protective clothing.

Planning the Response
Developing a Plan of Action

I.C.-7 NFPA 7.3.4 *OSHA I.C.-A,A.1,B.1*	Given simulated facility and transportation hazardous materials incidents, develop a plan of action consistent with the local emergency response plan and the organization's standard operating procedures that is within the capability of the available personnel, personal protective equipment, and control equipment, and be able to do the following:
I.C.-7.1 NFPA 7.3.4.1 *OSHA I.C.-B,D*	Identify the steps for developing a plan of action.
I.C.-7.2 NFPA 7.3.4.2 *OSHA I.C.-B,D*	Identify the factors to be evaluated in selecting public protective actions including evacuation and sheltering in-place.

I.C.-7.3
NFPA 7.3.4.3
OSHA I.C.-A,B,D,E

Given the local emergency response plan and/or the organization's standard operating procedures, identify which agency will perform the following:

(1) Receive the initial notification
(2) Provide secondary notification and activation of response agencies
(3) Make ongoing assessments of the situation
(4) Command on-scene personnel (incident management system)
(5) Coordinate support and mutual aid
(6) Provide law enforcement and on-scene security (crowd control)
(7) Provide traffic control and rerouting
(8) Provide resources for public safety protective action (evacuation or shelter in-place)
(9) Provide fire suppression services when appropriate
(10) Provide on-scene medical assistance (ambulance) and medical treatment (hospital)
(11) Provide public notification (warning)
(12) Provide public information (news media statements)
(13) Provide on-scene communications support
(14) Provide emergency on-scene decontamination
(15) Provide operational-level hazard control services
(16) Provide technician-level hazard mitigation services
(17) Provide environmental remedial action ("cleanup") services
(18) Provide environmental monitoring
(19) Implement on-site accountability
(20) Provide on-site responder identification
(21) Provide command post security
(22) Provide crime scene investigation
(23) Provide evidence collection and sampling

I.C.-7.4
NFPA 7.3.4.4
OSHA I.C.-A

Identify the process for determining the effectiveness of an action option on the potential outcomes.

I.C.-7.5
NFPA 7.3.4.5
OSHA I.C.-A.3,B,C

Identify the safe operating practices/procedures that are required to be followed at a hazardous materials incident.

I.C.-7.5.1
NFPA 7.3.4.4 (A)
OSHA I.C.-B,C

Identify the importance of pre-incident planning relating to safety during responses to specific sites.

I.C.-7.5.2
NFPA 7.3.4.4 (B)
OSHA I.C.-A.3,B,C

Identify the procedures for presenting a safety briefing prior to allowing personnel to work on a hazardous materials incident.

I.C.-7.5.3
NFPA 7.3.4.4 (C)
OSHA I.C.-A.3,B,C

Identify at least three safety precautions associated with search and rescue missions at hazardous materials incidents.

I.C.-7.5.4 NFPA 7.3.4.5 (D) *OSHA I.C.-B,C,F*	Identify the advantages and limitations and describe an example where each of the following decontamination methods would be used: (1) Absorption (2) Adsorption (3) Chemical degradation (4) Dilution (5) Disposal (6) Evaporation (7) Neutralization (8) Solidification (9) Vacuuming (10) Washing
I.C.-7.5.5 NFPA 7.3.4.5 (E) *OSHA I.C.-B,C*	Identify the atmospheric and physical safety hazards associated with hazardous materials incidents involving confined spaces.

Implementing the Planned Response
Implementing the Incident Management System

I.C.-8 NFPA 7.4.1 *OSHA I.C.-A,A.1,B,B.1,D*	Given a copy of the local emergency response plan, identify the requirements of the plan, including the required procedures for notification and utilization of nonlocal resources (private, state, and federal government personnel), and be able to do the following:
I.C.-8.1 NFPA 7.4.1 (1) *OSHA I.C.-B,D*	Identify the role of the incident commander during an incident involving hazardous materials.
I.C.-8.2 NFPA 7.4.1 (2) *OSHA I.C.-B,D*	Identify the duties and responsibilities of the following hazardous materials branch functions within the incident management system: (a) Backup (b) Decontamination (c) Entry (d) Hazardous Materials Branch Management (e) Hazardous Materials Branch Safety (f) Information/research (g) Reconnaissance (h) Resources
I.C.-8.3 NFPA 7.4.1 (3) *OSHA I.C.-B,D,E*	Identify the steps for implementing the local and related emergency response plans as required under SARA Title III (EPCRA) Section 303 of the federal regulations or other state and local emergency response planning legislation.
I.C.-8.4 NFPA 7.4.1 (4) *OSHA I.C.-D*	Given the local emergency response planning documents, identify the elements of each of the documents.
I.C.-8.5 NFPA 7.4.1 (5) *OSHA I.C.-A*	Identify the elements of the incident management system necessary to coordinate response activities at hazardous materials incidents.
I.C.-8.6 NFPA 7.4.1 (6) *OSHA I.C.-D,E*	Identify the primary local, state, regional, and federal government agencies and identify the scope of their regulatory authority (including the regulations) pertaining to the production, transportation, storage, and use of hazardous materials and the disposal of hazardous wastes.

I.C.-8.7
NFPA 7.4.1 (7)
OSHA I.C.-B,D,E

Identify the government agencies and private sector resources offering assistance during a hazardous materials incident and identify their role and the type of assistance or resources available.

Implementing the Planned Response
Directing Resources (Private and Governmental)

I.C.-9
NFPA 7.4.2
OSHA I.C.-A,A.1,B,B.1,D

Given a simulated hazardous materials incident and the necessary resources to implement the planned response, demonstrate the ability to direct the resources in a safe and efficient manner consistent with the capabilities of those resources.

Implementing the Planned Response
Providing a Focal Point for Information Transfer to Media and Elected Officials

I.C.-10
NFPA 7.4.3
OSHA I.C.-A

Given a simulated hazardous materials incident, identify appropriate information to provide to the media and local, state, and federal officials, and be able to do the following:

I.C.-10.1
NFPA 7.4.3 (1)
OSHA I.C.-A

Identify the local policy for providing information to the media.

I.C.-10.2
NFPA 7.4.3 (2)
OSHA I.C.-A

Identify the responsibilities of the public information officer at a hazardous materials incident.

Evaluating Progress
Evaluating Progress of the Plan of Action

I.C.-11
NFPA 7.5.1
OSHA I.C.-A,B,D

Given simulated facility and transportation hazardous materials incidents, evaluate the progress of the plan of action to determine whether the efforts are accomplishing the response objectives, and be able to do the following:

I.C.-11.1
NFPA 7.5.1(1)
OSHA I.C.-A,B,D

Identify the procedures for evaluating whether the action options are effective in accomplishing the objectives.

I.C.-11.2
NFPA 7.5.1(2)
OSHA I.C.-A,B,B.2,D,F

Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.

I.C.-11.3
NFPA 7.5.1(3)
OSHA I.C.-A,B,B.2,D,F

Determine the effectiveness of the following:
(a) Personnel being used
(b) Personal protective equipment
(c) Established control zones
(d) Decontamination process

Terminating the Incident
Transferring Command/Control

I.C.-12 NFPA 7.6.1 *OSHA I.C.-A.2*	Given the details of a simulated incident, the local emergency response plan, and the organization's standard operating procedures, the incident commander shall be able to identify the steps to be taken to transfer command/control of the incident and shall be able to demonstrate the transfer of command/control.

Terminating the Incident
Conducting a Debriefing

I.C.-13 NFPA 7.6.2 *OSHA I.C.-A,B,D*	Given the details of a simulated hazardous materials incident, the incident commander shall conduct a debriefing of the incident, and be able to do the following:
I.C.-13.1 NFPA 7.6.2 (1) *OSHA I.C.-A,B,D*	Describe three components of an effective debriefing.
I.C.-13.2 NFPA 7.6.2 (2) *OSHA I.C.-A,B,D*	Describe the key topics in an effective debriefing.
I.C.-13.3 NFPA 7.6.2 (3) *OSHA I.C.-A,B,D*	Describe when a debriefing should take place.
I.C.-13.4 NFPA 7.6.2 (4) *OSHA I.C.-A,B,D*	Describe who should be involved in a debriefing.
I.C.-13.5 NFPA 7.6.2 (5) *OSHA I.C.-A,B,D*	Implement the procedures for conducting incident debriefings at a hazardous materials incident.

Terminating the Incident
Conducting a Multi-Agency Critique

I.C.-14 NFPA 7.6.3 *OSHA I.C.-A,B,D*	Given details of a simulated multi-agency hazardous materials incident, conduct a critique of the incident, and be able to:
I.C.-14.1 NFPA 7.6.3 (1) *OSHA I.C.-A,B,D*	Describe three components of an effective critique.
I.C.-14.2 NFPA 7.6.3 (2) *OSHA I.C.-A,B,D*	Describe who should be involved in a critique.
I.C.-14.3 NFPA 7.6.3 (3) *OSHA I.C.-A,B,D*	Describe why an effective critique is necessary after a hazardous materials incident.
I.C.-14.4 NFPA 7.6.3 (4) *OSHA I.C.-A,B,D*	Describe what written documents should be prepared as a result of the critique.
I.C.-14.5 NFPA 7.6.3 (5) *OSHA I.C.-A,B,D*	Implement the procedure for conducting a critique of the incident.

Terminating the Incident

Reporting and Documenting the Hazardous Materials Incident

I.C.-15 NFPA 7.6.4 *OSHA I.C.-A,B,D*	Given a simulated hazardous materials incident, demonstrate the ability to report and document the incident consistent with the local, state, and federal requirements, and be able to do the following:
I.C.-15.1 NFPA 7.6.4(1) *OSHA I.C.-A,B,D*	Identify the reporting requirements of the federal, state, and local agencies.
I.C.-15.2 NFPA 7.6.4(2) *OSHA I.C.-A,B,D*	Identify the importance of documentation for a hazardous materials incident, including training records, exposure records, incident reports, and critique reports.
I.C.-15.3 NFPA 7.6.4(3) *OSHA I.C.-A,B,D*	Identify the steps in keeping an activity log and exposure records for hazardous materials incidents.
I.C.-15.4 NFPA 7.6.4(4) *OSHA I.C.-A,B,D*	Identify the requirements for compiling hazardous materials incident reports found in the local emergency response plan as well as the organization's standard operating procedures.
I.C.-15.5 NFPA 7.6.4(5) *OSHA I.C.-A,B,D*	Identify the requirements for filing documents and maintaining records found in the local emergency response plan and the organization's standard operating procedures.
I.C.-15.6 NFPA 7.6.4(6)	Identify the procedures required for legal documentation and chain of custody/continuity described in the organization's standard operating procedure or the local emergency operating plan.

**Hazardous Materials
and Terrorism Incident
Response
Training Guidelines**

Hazardous Materials Branch Officer

General Training Considerations

Introduction

The hazardous materials branch officer shall be trained to meet all competencies for the first responder at the awareness, operational, and technician levels and the competencies in this section. They also shall receive any additional training to meet applicable U.S. D.O.T., U.S.E.P.A., O.S.H.A. and other appropriate state, local or provincial occupational health and safety regulatory requirements.

Definition

The hazardous materials branch officer is that person who is responsible for directing and coordinating all operations assigned to the hazardous material branch by the incident commander. This function is akin to that of hazardous materials team leader and encompasses both the general command functions at the branch chief level in an incident command system and in addition includes the responsibility for technical and tactical leadership of the team of hazardous materials technicians at the incident. While the function of hazardous materials branch officer is not directly specified in OSHA 1910.120 or EPA 311, the branch officer function is a natural derivative of the incident command system requirements and incident commander delegation options which are themselves specified as required under the OSHA and EPA regulations for hazardous materials incident response.

Audience

The training audience for hazardous materials branch officer is relatively small in number and is technically advanced. The training audience should include existing members of hazardous materials response teams who have experience and training at the technician level and who have also demonstrated sufficient command and leadership potential to warrant training and subsequent assignment at the hazardous materials branch officer level.

Methodology Recommendations

Hazardous materials branch officer training is best conducted with a combination of classroom instruction using traditional lecture and small-group activities, field exercises involving group practice in simulated emergencies, and hands-on skill training in doing and supervising actual control, confinement and containment exercises. There should be a strong emphasis on field training to include incident decision-making and real time practice coordinating and directing the incident scene operations of the hazardous materials team. Content instruction should be synthesized in student activities requiring analysis of incident information to determine plans of action and requiring supervisory assessment of the performance of hazardous materials team members during operations to determine needed interventions and directions from the branch chief. Skill training and practice supervising subordinate skill evolutions should be performed on actual containers with simulated releases, using full protective equipment and proper response tools. Skill training and branch chief field supervision instruction should include instructor modeling, student walk-throughs, and student practice under stress until competency is achieved. Proper critiques and corrective instruction are essential.

Refresher training should include (1) competency retesting of all response skills, (2) technical information updates, and (3) critique of incident scene decision-making and hazardous materials team leadership behaviors using simulated emergencies.

SUMMARY: Hazardous Materials Branch Officer

Audience	Prerequisites	Training	Refresher
Small in number. Members of hazmat teams at the technician level who have branch command and leadership potential.	Prior training and demonstrated competency at the awareness, operational, and technician levels.	- No specific length of training is recommended or commonly in use. Length of training should be sufficient to achieve competency. - Classroom, lab, and field exercise formats recommended. - Competencies include: Analyzing the incident; Planning the response; Implementing the response; Reporting and documenting the haz mat incident.	1. Retesting of resp skills. 2. Technical info updates. 3. Refreshing of incident scene decision-making and branch team leadership .

Recommended Training

For Hazardous Materials Branch Officer

The following training objectives are recommended for hazardous materials branch officer training. The primary source for this material is NFPA 472, Chapter 9: Competencies for the Hazardous Materials Branch Officer. Training objectives from other sources are noted, with discussion of the rationale for their inclusion to be found in the Special Topics section at the end of the Response Guidelines.

These objectives define competencies for a response function which is not directly specified by OSHA. However, the branch officer function is a natural derivative of the use of the incident command system and of the performance of the incident commander, including branch level delegation, both of which are required by OSHA. Because the function of hazardous materials branch officer is not directly specified in OSHA 29 CFR 1910.120, the following recommended training objectives are not individually cross-referenced to specific OSHA competency requirements. The general OSHA requirements which support this function are OSHA 29 CFR 1910.120 (q) (6) (v) for On Scene Incident Commander responsibilities including branch delegation and OSHA 29 CFR 1910.120 (q) (3) (i-ix) for the use of the Incident Command System during hazardous materials response.

Objective Identification Legend

HMBO-1
NFPA 9.1.3

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as HMBO-1.1) indicate enabling objectives supporting the primary objective.

This indicates the origin of this objective. Usually it is directly from NFPA 472, Chapter 7.

Identification	***Recommended** Training Objectives*
HMBO-1 NFPA 9.1.2.2	Given a hazardous materials incident scenario, demonstrate an understanding of the role of the hazardous materials branch officer.
HMBO-1.1 NFPA 9.1.2.2(1)	Describe the responsibility to analyze a hazardous materials incident to determine the magnitude of the problem by estimating the potential outcomes within the endangered area.
HMBO-1.2 NFPA 9.1.2.2(2)	Describe the responsibility to plan a response within the capabilities and competencies of available personnel, personal protective equipment, and control equipment.
HMBO-1.2.1 NFPA 9.1.2.2(2)(a)	Identify the response objectives for hazardous materials incidents.
HMBO-1.2.2 NFPA 9.1.2.2(2)(b)	Identify the potential action options (defensive, offensive, and nonintervention) available by response objective.
HMBO-1.2.3 NFPA 9.1.2.2(2)(c)	Identify the responsibility to determine the level of personal protective equipment required for a given action option.

HMBO-1.2.4
NFPA 9.1.2.2(2)(d)

Identify the responsibility to provide recommendations to the incident commander for the development of a plan of action for the hazardous materials branch consistent with the local emergency response plan and the organization's standard operating procedures and within the capability of available personnel, personal protective equipment, and control equipment.

HMBO-1.3
NFPA 9.1.2.2(3)

Describe the responsibility to implement a response to favorably change the outcomes consistent with the local emergency response plan and the organization's standard operating procedures.

HMBO-1.3.1
NFPA 9.1.2.2(3)(a)

Identify the responsibility to implement the incident management system as it directly relates to the specified procedures for hazardous materials branch operations.

HMBO-1.3.2
NFPA 9.1.2.2(3)(b)

Identify the responsibility to direct hazardous materials branch resources (private, governmental, and others) with expected task assignments and on-scene activities and provide management overviews, technical review, and logistical support to hazardous materials branch resources.

HMBO-1.4
NFPA 9.1.2.2(4)

Describe the responsibility to evaluate the progress of the planned response to ensure that the response objectives are being met safely, effectively, and efficiently and adjust the plan of action accordingly by evaluating the progress of the plan of action.

HMBO-1.5
NFPA 9.1.2.2(5)

Describe the responsibility to terminate the incident.

HMBO-1.5.1
NFPA 9.1.2.2(5)(a)

Identify the responsibility to conduct a debriefing for hazardous materials branch personnel.

HMBO-1.5.2
NFPA 9.1.2.2(5)(b)

Identify the responsibility to conduct a critique for hazardous materials branch personnel.

HMBO-1.5.3
NFPA 9.1.2.2(5)(b)

Identify the responsibility to report and document the hazardous materials branch operations.

Analyzing the Incident
Estimating Potential Outcomes

HMBO-2
NFPA 9.2.1

Given simulated facility or transportation incidents involving hazardous materials, the surrounding conditions, and the predicted behavior of the container and its contents, estimate the potential outcomes within the endangered area.

Planning the Response
Selecting the Level of Personal Protective Equipment

HMBO-3
NFPA 9.3.1

Given situations with known and unknown hazardous materials, select the appropriate personal protective equipment for the action options specified in the plan of action in each situation.

Planning the Response
Developing a Plan of Action

HMBO-4
NFPA 9.3.2

Given simulated facility and transportation hazardous materials incidents, develop a plan of action consistent with the local emergency response plan and the organization's standard operating procedures that is within the capability of the available personnel, personal protective equipment, and control equipment.

HMBO-4.1
NFPA 9.3.2 (1)

Identify the order of the steps for developing a plan of action.

HMBO-4.2
NFPA 9.3.2 (2)

Identify the factors to be evaluated in selecting public protective actions, including evacuation and shelter in-place.

HMBO-4.3
NFPA 9.3.2 ()3

Given the local emergency response plan or the organization's standard operating procedure, identify procedures to accomplish the following tasks:

(a) Make ongoing assessments of the situation
(b) Command on-scene personnel (incident management system) assigned to the hazardous materials branch
(c) Coordinate hazardous materials support and mutual aid
(d) Provide resources for public protection action (evacuation or shelter in-place)
(e) Coordinate with fire suppression services as it relates to hazardous materials incidents
(f) Coordinate hazardous materials branch control, containment, or confinement operations
(g) Coordinate with the medical branch to ensure proper medical assistance (ambulance) and medical treatment (hospital)
(h) Coordinate on-scene decontamination when appropriate
(i) Coordinate activities with those of the environmental remedial action ("cleanup") services

HMBO-4.4
NFPA 9.3.2 (4)

Identify the process for determining the effectiveness of an action option on the potential outcomes.

HMBO-4.5
NFPA 9.3.2 (5)

Identify the procedures for presenting a safety briefing prior to allowing personnel to work on a hazardous materials incident.

Implementing the Planned Response
Implementing the Incident Management System

HMBO-5
NFPA 9.4.1

Given a copy of the local emergency response plan, identify the requirements of the plan, including the required procedures for notification and utilization of nonlocal resources (private, state, and federal government personnel), and be able to do the following:

HMBO-5.1
NFPA 9.4.1 (1)

Identify the process and procedures for obtaining cleanup and restoration services in the local emergency response plan or organization's standard operating procedures.

HMBO-5.2
NFPA 9.4.1 (2)

Identify the steps for implementing the local and related emergency response plans as required under SARA Title III Section 303 of the federal regulations or other local emergency response planning legislation.

HMBO-5.3
NFPA 9.4.1 (3)

Given the local emergency planning documents, identify the elements of each of the documents.

HMBO-5.4
NFPA 9.4.1 (4)

Identify the elements of the incident management system necessary to coordinate response activities at hazardous materials incidents.

HMBO-5.5
NFPA 9.4.1 (5)

Identify the primary local, state, regional, and federal government agencies and identify the scope of their regulatory authority (including the regulations) pertaining to the production, transportation, storage, and use of hazardous materials and the disposal of hazardous wastes.

HMBO-5.6
NFPA 9.4.1 (6)

Identify the governmental agencies and private sector resources offering assistance to the hazardous materials branch during a hazardous materials incident and identify their role and type of assistance or resources available.

Implementing the Planned Response
Directing Resources (Private and Governmental)

HMBO-6
NFPA 9.4.2

Given a simulated hazardous materials incident and the necessary resources to implement the planned response, demonstrate the ability to direct the hazardous materials branch resources in a safe and efficient manner consistent with the capabilities of those resources.

Implementing the Planned Response
Providing a Focal Point for Information Transfer to Media and Elected Officials

HMBO-7
NFPA 9.4.3

Given a simulated hazardous materials incident, demonstrate the ability to act as a resource to provide information to the incident commander or the public information officer for distribution to the media and local, state, and federal officials.

HMBO-7.1
NFPA 9.4.3 (1)

Identify the local policy for providing information to the media.

HMBO-7.2
NFPA 9.4.3 (2)

Identify the responsibilities of the public information officer at a hazardous materials incident.

Evaluating Progress
Evaluating Progress of the Plan of Action

HMBO-8
NFPA 9.5.1

Given simulated facility and transportation hazardous materials incidents, evaluate the progress of the plan of action to determine whether the efforts are accomplishing the response objectives.

HMBO-8.1
NFPA 9.5.1 (1)

Identify the procedures for evaluating whether the action options are effective in accomplishing the objectives.

HMBO-8.2
NFPA 9.5.1 (2)

Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.

HMBO-8.3
NFPA 9.5.1 (3)

Determine the effectiveness of the following:
(a)Hazardous materials response personnel being used
(b)Personal protective equipment
(c)Established control zones
(d)Control, containment, or confinement operations
(e)Decontamination process

Terminating the Incident
Terminating the Emergency Phase of the Hazardous Materials Incident

HMBO-9
NFPA 9.6.1

Given a simulated hazardous materials incident, demonstrate the ability to terminate the emergency phase of the incident consistent with the local emergency response plan and the organization's standard operating procedures.

HMBO-9.1
NFPA 9.6.1 (1)

Identify the steps required in terminating the emergency phase of a hazardous materials incident.

HMBO-9.2
NFPA 9.6.1 (2)

Identify the procedures for conducting incident debriefings at a hazardous materials incident.

HMBO-9.3
NFPA 9.6.1 (3)

Identify the steps in transferring authority as prescribed in the local emergency response plan or the organization's standard operating procedures.

Terminating the Incident
Conducting a Debriefing

HMBO-10
NFPA 9.6.2

Given the details of a simulated hazardous materials incident, demonstrate the ability to conduct a debriefing of the incident for all units assigned to the hazardous materials branch.

HMBO-10.1
NFPA 9.6.2 (1)

Describe three components of an effective debriefing.

HMBO-10.2
NFPA 9.6.2 (2)

Describe the key topics in an effective debriefing.

HMBO-10.3
NFPA 9.6.2 (3)

Describe when a debriefing should take place.

HMBO-10.4
NFPA 9.6.2 (4)

Describe who should be involved in a debriefing.

HMBO-10.5
NFPA 9.6.2 (5)

Identify the procedures for conducting incident debriefings at a hazardous materials incident.

Terminating the Incident
Conducting a Critique

HMBO-11 NFPA 9.6.3	Given the details of a simulated hazardous materials incident, demonstrate the ability to conduct a critique of the incident for all units assigned to the hazardous materials branch.
HMBO-11.1 NFPA 9.6.3 (1)	Describe three components of an effective critique.
HMBO-11.2 NFPA 9.6.3 (2)	Describe who should be involved in a critique.
HMBO-11.3 NFPA 9.6.3 (3)	Describe why an effective critique is necessary after a hazardous materials incident.
HMBO-11.4 NFPA 9.6.3 (4)	Describe what written documents should be prepared as a result of the critique.
HMBO-11.5 NFPA 9.6.3 (5)	Identify the procedure for conducting a critique of the incident.
HMBO-11.6 NFPA 9.6.3 (6)	Identify the requirements for conducting a post-incident analysis as defined in the local emergency response plan, the organization's standard operating procedures, or federal, state, and local regulations.

Terminating the Incident
Reporting and Documenting the Hazardous Materials Incident

HMBO-12 NFPA 9.6.4	Given a simulated hazardous materials incident, demonstrate the ability to report and document the incident consistent with the local, state, and federal requirements.
HMBO-12.1 NFPA 9.6.4 (1)	Identify the reporting requirements of federal, state, and local agencies.
HMBO-12.2 NFPA 9.6.4 (2)	Identify the importance of documentation for a hazardous materials incident, including training records, exposure records, incident reports, and critique reports.
HMBO-12.3 NFPA 9.6.4 (3)	Identify the steps in keeping an activity log and exposure records for hazardous materials incidents.
HMBO-12.4 NFPA 9.6.4 (4)	Identify the requirements found in the local emergency response plan and the organization's standard operating procedures for compiling hazardous materials incident reports.
HMBO-12.5 NFPA 9.6.4 (5)	Identify the requirements for filing documents and maintaining records as defined in the local emergency response plan and the organization's standard operating procedures.

Hazardous Materials
and Terrorism Incident
Response
Training Guidelines

Safety Officer at Hazardous Materials Incidents

General Training Considerations

Introduction

There are two training categories combined in this section. The first is the safety officer at hazardous materials incidents, as defined by OSHA and the second is the hazardous materials branch safety officer, as defined by NFPA.

The safety officer at hazardous materials incidents, as defined by OSHA, shall be trained to meet appropriate OSHA regulatory requirements to identify and evaluate hazards and provide direction to the safety of operations for emergency response sites.

The hazardous materials branch safety officer, as defined by NFPA, shall be trained to meet all competencies for the first responder at the awareness, operational, and technician levels and the competencies in this section. They also shall receive any additional training to meet applicable U.S. D.O.T., U.S.E.P.A., O.S.H.A. and other appropriate state, local or provincial occupational health and safety regulatory requirements.

Definition

The safety officer at hazardous materials incidents (OSHA) and the hazardous materials branch safety officer (NFPA) are those persons who work within an incident command system (also called an incident management system) to ensure that recognized safe practices are followed within the hazardous materials branch.

The safety officer at hazardous materials incidents (OSHA) has the authority to alter, suspend or terminate activities that involve dangerous conditions. The safety officer at hazardous materials incidents advises the incident commander of actions that need to take place in order to correct the hazards.

The hazardous materials branch safety officer (NFPA) will be called upon to provide technical advice or assistance regarding safety issues to the hazardous materials branch officer and incident safety officer at a hazardous materials incident.

Audience

The training audience for both the safety officer at hazardous materials incidents (OSHA) and the hazardous materials branch safety officer (NFPA) is relatively small in number and is technically advanced. The safety officer at hazardous materials incidents (OSHA) are persons with the potential to be qualified at the incident commander level with sufficient hazardous materials knowledge to identify risks and needed interventions. The training audience should include existing members of hazardous materials response teams who have experience and training at the technician level and who have also demonstrated sufficient potential to warrant training and subsequent assignment at the hazardous materials branch safety officer level.

Methodology Recommendations

The safety officer at hazardous materials incidents (OSHA) and the hazardous materials branch safety officer (NFPA) training is best conducted with a combination of classroom instruction using traditional lecture and small-group activities and field exercises involving group practice in simulated emergencies. There should be a strong emphasis on field training to include incident operations, safety evaluation and problem solving, to include real time practice identifying and implementing safety interventions during the incident scene operations of the hazardous materials team. Content instruction should be synthesized in student activities requiring analysis of incident information to determine safe plans of action and requiring assessment of the performance of hazardous materials team members during operations to determine needed safety interventions. Training should include instructor modeling, student walk-throughs, and student practice under stress until competency is achieved. Proper critiques and corrective instruction are essential.

Refresher training should include (1) technical information updates, (2) critique of the ability to analyze an incident and assist in planning a safe response, and (3) critique of incident scene safety evaluation and intervention skills using simulated emergencies.

Federal Requirements

For Safety Officer at Hazardous Materials Incidents

There are no federally specified training requirements for hazardous materials branch safety officers, but OSHA 29 CFR 1910.120 (q) (3)(vii-viii) specifies certain performance and competency requirements for safety officer at hazardous materials incidents, and employers are required to ensure that employees demonstrate competency in the skills defined. Although the safety officer was initially defined in OSHA as advising the incident commander only, subsequent OSHA interpretations acknowledge that there may be multiple safety officers at the incident scene, advising to several levels of command.

OSHA 29 CFR 1910.120 (q) (3)(vii-viii)

(vii) The individual in charge of the ICS shall designate a safety officer, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibilities to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.

(viii) When activities are judged by the safety officer to be an IDLH and/or to involve an imminent danger condition, the safety officer shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene.

Required training can be translated directly into the following three sample objectives.

OSHA SO-A	Given a simulated incident involving hazardous materials, demonstrate the ability to identify and evaluate hazards at the incident and provide direction to development of a safe response plan.
OSHA SO-B	Given a simulated response to an incident involving hazardous materials, demonstrate the ability to identify and evaluate unsafe operations, activities and/or conditions involving imminent danger.
OSHA SO-C	Given identified unsafe conditions in a simulated response to an incident involving hazardous materials, demonstrate the ability to determine appropriate interventions, including altering, suspending or terminating selected response activities, and coordinating those interventions with the individual in charge of the ICS at the incident.

SUMMARY: Safety Officer at Hazardous Materials Incidents (OSHA) and Hazardous Materials Branch Safety Officer (NFPA)

Audience	Prerequisites	Training	Refresher
Small in number.		-No specific length of training is recommended or commonly in use. Length of training should be sufficient to allow students to achieve competency. -Classroom, lab, and field exercise formats recommended, with an emphasis on real time field simulations requiring practice in developing safe response plans and identifying safety problems during the implementation of the response plan. -Competencies: - Analyzing the incident. - Assisting in developing a safe response plan. - Assisting in implementing the response plan safely. - Evaluating the response for safety problems	1.Technical information updates. 2.Using simulated emergencies, refreshing of ability to analyze incident and develop safe response plans. 3.Using simulated emergencies, refreshing of ability to evaluate the response and identify safety problems and needed interventions.
Safety Officer (OSHA) Responders at the inc. comm. level with potential for assignment as incident safety officer .	Prior training and demonstrated competency at the awareness, operational, and inc. comm. levels.		
Branch Safety Officer (NFPA) Responders at the technician level with potential for assignment at the haz mat branch safety officer level.	Prior training and demonstrated competency at the awareness, operational, and technician levels.		

Recommended Training

For Hazardous Materials Branch Safety Officer

The following training objectives are recommended for hazardous materials branch safety officer training. The primary source for this material is NFPA 472, Chapter 10: Competencies for the Hazardous Materials Branch Safety Officer. Training objectives from other sources are noted, with discussion of the rationale for their inclusion to be found in the Special Topics section at the end of the Response Guidelines.

These objectives define competencies for a hazardous materials branch safety officer response function which is not directly specified by OSHA. However, OSHA 29 CFR 1910.120 (q) (3)(vii-viii) specifies certain performance and competency requirements for the safety officer at hazardous materials incidents, and employers are required to ensure that employees demonstrate competency in the skills defined. To assist in assessing course compliance with OSHA 1910.120 (q), the relationships between these hazardous materials branch safety officer objectives and OSHA requirements for the safety officer at the incident are noted. References to OSHA are abbreviated as noted.

Note that there is also a significant relationship between NFPA 472, Chapter 8: Competencies for the Hazardous Materials Branch Safety Officer and NFPA 1521, Competencies for Safety Officers. Most of the competencies listed below which are annotated to NFPA 472 may also be found in the special operations section of NFPA 1521.

The hazardous materials branch safety officer shall be trained to meet all competencies for the first responder at the awareness, operational, and technician levels and the competencies in this section. They also shall receive any additional training to meet applicable U.S. D.O.T., U.S.E.P.A., O.S.H.A. and other appropriate state, local or provincial occupational health and safety regulatory requirements.

Objective Identification Legend

S.O.-1
NFPA 10.1.3
OSHA S.O.-A

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as S.O. - 1.1) indicate enabling objectives supporting the primary objective.

This indicates the origin of this objective. Usually it is directly from NFPA. In some cases, other sources are noted.

This indicates which OSHA requirement this objective supports. References to OSHA are abbreviated as follows:

OSHA 29 CFR 1910.120 (q) (3) (vii-viii) = OSHA S.O. - A to C

Identification	***Recommended** Training Objectives*
S.O.-1 NFPA 10.1.2.2 *OSHA S.O.-A,B,C*	Given a hazardous materials incident scenario, demonstrate an understanding of the role of the hazardous materials branch safety officer.
S.O.-1.1 NFPA 10.1.2.2(1) *OSHA S.O.-B*	Describe the responsibility to analyze a hazardous materials incident to determine the magnitude of the problem in terms of safety by observing a scene and reviewing and evaluating hazard and response information as it pertains to the safety of all persons within the hazardous materials branch.
S.O.-1.2 NFPA 10.1.2.2(2) *OSHA S.O.-A*	Describe the responsibility to assist in planning a safe response within the capabilities of available response personnel, personal protective equipment, and control equipment, and be able to do the following:

S.O.-1.2.1
NFPA 10.1.2.2(2)a
OSHA S.O.-A

Identify the importance of safety precautions for potential action options.

S.O.-1.2.2
NFPA 10.1.2.2(2)b
OSHA S.O.-A

Identify the responsibility to provide recommendations regarding safety considerations.

S.O.-1.2.3
NFPA 10.1.2.2(2)c
OSHA S.O.-A

Identify the responsibility to assist in the development of a plan of action.

S.O.-1.2.4
NFPA 10.1.2.2(2)d
OSHA S.O.-A

Identify the responsibility to review the plan of action and provide recommendations regarding safety.

S.O.-1.2.5
NFPA 10.1.2.2(2)e
OSHA S.O.-A

Identify the responsibility to review the selection of personal protective equipment required for a given action option.

S.O.-1.2.6
NFPA 10.1.2.2(2)f
OSHA S.O.-A

Identify the responsibility to review the decontamination operations.

S.O.-1.2.7
NFPA 10.1.2.2(2)g
OSHA S.O.-A

Identify the responsibility to ensure that the proper emergency medical services are provided.

S.O.-1.3
NFPA 10.1.2.2(3)
OSHA S.O.-A,B

Describe the responsibility to ensure the implementation of a safe planned response consistent with the local emergency response plan, the organization's standard operating procedures, and safety considerations, and be able to do the following:

S.O.-1.3.1
NFPA 10.1.2.2(3)a
OSHA S.O.-A,B,C

Identify the responsibility to perform the duties of the hazardous materials branch safety officer within the local incident management system (IMS).

S.O.-1.3.2
NFPA 10.1.2.2(3)b
OSHA S.O.-A

Identify safety considerations for personnel performing the control functions identified in the plan of action.

S.O.-1.3.3
NFPA 10.1.2.2(3)c
OSHA S.O.-A,B,C

Identify the responsibility to conduct safety briefings for personnel performing the control functions identified in the plan of action.

S.O.-1.3.4
NFPA 10.1.2.2(3)d
OSHA S.O.-A,B

Identify the responsibility to assist in the implementation and enforcement of safety considerations.

S.O.-1.3.5
NFPA 10.1.2.2(3)e
OSHA S.O.-A,C

Identify the responsibility to maintain communications within the incident command structure during the incident.

S.O.-1.3.6
NFPA 10.1.2.2(3)f
OSHA S.O.-A,B

Identify the responsibility to monitor status reports of activities in the hot and warm zones.

S.O.-1.3.7
NFPA 10.1.2.2(3)g
OSHA S.O.-A,B

Identify the responsibility to ensure the implementation of exposure monitoring (personnel and environment).

S.O.-1.4
NFPA 10.1.2.2(4)
OSHA S.O.-A,B

Describe the responsibility to evaluate the progress of the planned response to ensure that the response objectives are being met safely, and be able to do the following:

S.O.-1.4.1
NFPA 10.1.2.2(4)a
OSHA S.O.-B

Identify deviations from safety considerations and any dangerous situations.

S.O.-1.4.2
NFPA 10.1.2.2(4)b
OSHA S.O.-B,C

Identify the responsibility to alter, suspend, or terminate any activity that can be judged to be unsafe.

S.O.-1.5
NFPA 10.1.2.2(5)
OSHA S.O.-A

Describe the responsibility to assist in terminating the incident, and be able to do the following:

S.O.-1.5.1
NFPA 10.1.2.2(5)a
OSHA S.O.-A,C

Identify the responsibility to perform the reporting, documentation and follow-up required of the hazardous materials branch safety officer.

S.O.-1.5.2
NFPA 10.1.2.2(5)b
OSHA S.O.-A,B

Identify the responsibility to assist in the debriefing of hazardous materials branch personnel.

S.O.-1.5.3
NFPA 10.1.2.2(5)c
OSHA S.O.-A,B

Identify the responsibility to assist in the incident critique.

Analyzing the Incident
Determining the Magnitude of the Problem in Terms of Safety

S.O.-2
NFPA 10.2.1
OSHA S.O.-A

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, observe a scene and review and evaluate hazard and response information as it pertains to the safety of all persons within the hazardous materials branch.

S.O.-2.1
NFPA 10.2.1(A)
OSHA S.O.-A

Describe the following radioactive materials terms and explain their significance in predicting the extent of health hazards and environmental impact in a hazardous materials incident:

(a) Types
(b) Measurement
(c) Protection

S.O.-2.2
NFPA 10.2.1(B)
OSHA S.O.-A

Describe the following toxicological terms and exposure values and explain their significance in the risk assessment process:
(1) Parts per million (ppm)
(2) Parts per billion (ppb)
(3) Lethal dose (LD_{50})
(4) Lethal concentrations (LC_{50})
(5) Permissible exposure limit (PEL)
(6) Threshold limit value time-weighted average (TLV-TWA)
(7) Threshold limit value short-term exposure limit (TLV-STEL)
(8) Threshold limit value ceiling (TLV-C)
(9) Immediately dangerous to life and health value (IDLH)
(10) Rad
(11) Roentgen equivalent Man; Millirem
(12) Roentgent

S.O.-2.3
NFPA 10.2.1(C)
OSHA S.O.-A

Explain the basic toxicological principles relative to assessment and treatment of personnel exposed to hazardous materials, including the following:
(1) Acute and delayed toxicity
(2) Dose-response
(3) Local and systemic effects
(4) Routes of exposure to toxic materials
(5) Synergistic effects

S.O.-2.4
NFPA 10.2.1(D)
OSHA S.O.-A

Identify five conditions where the hazards from flammability would require chemical-protective clothing with thermal protection.

S.O.-2.5
NFPA 10.2.1(E)
OSHA S.O.-A

Identify five conditions where personnel would not be allowed to enter the hot zone.

S.O.-2.6
NFPA 10.2.1(F)
OSHA S.O.-A

Given the names of five hazardous materials and at least three reference sources, identify the physical and chemical properties and their potential impact on the safety of personnel at an incident involving each of the materials.

S.O.-2.7
NFPA 10.2.1(G)
OSHA S.O.-A

Given the names of five hazardous materials and at least three reference sources, identify the health concerns and their potential impact on the safety and health of personnel at an incident involving each of the materials.

S.O.-2.8
NFPA 10.2.1(H)
OSHA S.O.-A

Given the names of five hazardous materials and a description of their containers, identify five hazards or physical conditions that would impact the safety of personnel at an incident involving each of the materials.

S.O.-2.9
NFPA 10.2.1(I)
OSHA S.O.-A

Given at least three unknown materials, one of which is a solid, one a liquid, and one a gas, identify or classify by hazard each unknown material, and be able to:

S.O.-2.9.1
NFPA 10.2.1(I)(1)
OSHA S.O.-A

Identify steps in an analysis process for identifying unknown solid and liquid materials.

S.O.-2.9.2
NFPA 10.2.1(I)(2)
OSHA S.O.-A

Identify steps in an analysis process for identifying an unknown atmosphere.

S.O.-2.9.3
NFPA 10.2.1(I)(3)
OSHA S.O.-A

Identify the type(s) of monitoring equipment, test strips, and reagents used to determine the following hazards:
(a) Corrosivity (pH)
(b) Flammability
(c) Oxidation potential
(d) Oxygen deficiency
(e) Radioactivity
(f) Toxic levels

S.O.-2.9.4
NFPA 10.2.1(I)(4)
OSHA S.O.-A

Identify the capabilities and limiting factors associated with the selection and use of the following monitoring equipment, test strips, and reagents:
(a) Carbon monoxide meter
(b) Colorimetric tubes
(c) Combustible gas indicator
(d) Oxygen meter
(e) Passive dosimeter
(f) Photoionization detectors
(g) pH indicators and/or pH meters
(h) Radiation detection instruments
(i) Reagents
(j) Test strips

S.O.-2.9.5
NFPA 10.2.1(I)(5)
OSHA S.O.-A

Given three hazardous materials, one of which is a solid, one a liquid, and one a gas, and the following monitoring equipment, select and demonstrate the appropriate equipment to identify and quantify the materials:
(a) Carbon monoxide meter
(b) Colorimetric tubes
(c) Combustible gas indicator
(d) Oxygen meter
(e) pH papers and/or pH meters
(f) Radiation detection instruments
(g) Reagents
(h) Test strips

S.O.-2.9.6
NFPA 10.2.1(I)(6)
OSHA S.O.-A

Demonstrate the field maintenance and testing procedures for the monitoring equipment, test strips and reagents provided by the authority having jurisdiction.

Planning the Response
Identifying the Safety Precautions for Potential Action Options

S.O.-3
NFPA 10.3.1
OSHA S.O.-A

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, assist in planning a safe response within the capabilities of available response personnel, personal protective equipment, and control equipment, and be able to do the following:

S.O.-3.1
NFPA 10.3.1(1)
OSHA S.O.-A

Identify five specific safety precautions to observe while mitigating each of the hazards or conditions identified in 8-2.1.8.

S.O.-3.2
NFPA 10.3.1(2)
OSHA S.O.-A

Identify five safety precautions associated with search and rescue missions at hazardous materials incidents.

Planning the Response
Providing Recommendations Regarding Safety Considerations

S.O.-4.1
NFPA 10.3.2.1
OSHA S.O.-A,C

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, provide the incident safety officer, hazardous materials branch officer, and incident commander with observation-based recommendations regarding considerations for the safety of on-site personnel.

S.O.-4.2
NFPA 10.3.2.2
OSHA S.O.-A,C

Be able to identify five recommendations to the incident commander regarding safety considerations on the hazards or conditions for each of the hazardous materials and containers identified in 10.2.1(H).

Planning the Response
Assisting in the Development of a Plan of Action

S.O.-5
NFPA 10.3.3
OSHA S.O.-A

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, assist the incident safety officer and hazardous materials branch officer in the development of a safe plan of action.

S.O.-5.1
NFPA 10.3.3(1)
OSHA S.O.-A

Identify the importance and list five benefits of pre-emergency planning relating to specific sites.

S.O.-5.2
NFPA 10.3.3(2)
OSHA S.O.-A

Identify and name five hazards and precautions to be observed when approaching a hazardous materials incident.

S.O.-5.3
NFPA 10.3.3(3)
OSHA S.O.-A

List the elements of safety considerations.

S.O.-5.4
NFPA 10.3.3(4)
OSHA S.O.-A

Given an organizations pre-incident plan and a simulated hazardous materials incident involving one of the hazardous materials and containers described in 10.2.1(H), develop safety considerations for the incident.

Planning the Response
Providing Recommendations Regarding Safety and Reviewing the Plan of Action

S.O.-6
NFPA 10.3.4
OSHA S.O.-A

Given a proposed plan of action for an incident involving one of the hazardous materials and containers described in 10.2.1(H), identify to the incident safety officer, hazardous materials branch officer, and incident commander the safety precautions for the plan of action.

S.O.-6.1
NFPA 10.3.4(1)
OSHA S.O.-A

Ensure that the safety considerations in the proposed plan of action are consistent with the local emergency response plan and the organization's standard operating procedures.

S.O.-6.2
NFPA 10.3.4(2)
OSHA S.O.-A

Make recommendations to the incident commander on the safety considerations in the proposed plan of action.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Planning the Response
Reviewing Selection of Personal Protective Equipment

S.O.-7
NFPA 10.3.5
OSHA S.O.-A

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, demonstrate the ability to review the selection of personal protective equipment required for a given action option, and be able to do the following:

S.O.-7.1
NFPA 10.3.5(1)
OSHA S.O.-A

Identify the four levels of chemical protection (EPA/NIOSH) and describe the equipment required for each level and the conditions under which each level is used.

S.O.-7.2
NFPA 10.3.5(2)
OSHA S.O.-A

Identify five safety considerations for personnel wearing vapor-protective, liquid splash-protective, and high temperature-protective clothing.

S.O.-7.3
NFPA 10.3.5(3)
OSHA S.O.-A

Given the names of five different hazardous materials and a chemical compatibility chart for chemical-protective clothing, identify the chemical-protective clothing that would provide the appropriate protection to the wearer for each of the five substances.

S.O.-7.4
NFPA 10.3.5(4)
OSHA S.O.-A

Given the names of five different hazardous materials, identify chemical-protective clothing levels for typical action options.

S.O.-7.5
NFPA 10.3.5(5)
OSHA S.O.-A

Demonstrate proper methods for donning, doffing, and using all personal protective equipment provided by the authority having jurisdiction for use in hazardous materials response activities.

Planning the Response
Reviewing the Proposed Decontamination Plan

S.O.-8
NFPA 10.3.6
OSHA S.O.-A

Given a site-specific decontamination plan by the hazardous materials branch officer or incident commander for a simulated hazardous materials incident, review the plan to identify safety considerations prior to plan implementation, and be able to do the following:

S.O.-8.1
NFPA 10.3.6(1)
OSHA S.O.-A

Identify the advantages and limitations and describe an example where each of the following decontamination methods would be used:

(a) Absorption
(b) Adsorption
(c) Chemical degradation
(d) Dilution
(e) Disposal
(f) Evaporation
(g) Neutralization
(h) Solidification
(i) Vacuuming
(j) Washing

S.O.-8.2
NFPA 10.3.6(2)
OSHA S.O.-A

Identify how personnel, personal protective equipment, apparatus, tools, and equipment become contaminated, as well as the importance and limitations of decontamination procedures.

S.O.-8.3
NFPA 10.3.6(3)
OSHA S.O.-A

Explain the need for decontamination procedures at hazardous materials incidents.

S.O.-8.4
NFPA 10.3.6(4)
OSHA S.O.-A

Identify three sources of technical information for selecting appropriate decontamination procedures and identify how to contact those sources in an emergency.

S.O.-8.5
NFPA 10.3.6(5)
OSHA S.O.-A

Identify the considerations associated with the placement, location, and setup of the decontamination corridor.

S.O.-8.6
NFPA 10.3.6(6)
OSHA S.O.-A

Identify the decontamination procedures as defined by the authority having jurisdiction for personnel and personal protective equipment at hazardous materials incidents.

S.O.-8.7
NFPA 10.3.6(7)
OSHA S.O.-A

Given three reference sources and a simulated hazardous materials incident involving two or more different chemicals, develop a site-specific personnel decontamination plan that is consistent with the local emergency response plan and the organization's standard operating guidelines.

Planning the Response
Ensuring Provision of Proper Emergency Medical Services

S.O.-9
NFPA 10.3.7
OSHA S.O.-A

Given a simulated hazardous materials incident, review the emergency medical services plan to ensure that response personnel are provided medical care, and be able to do the following:

S.O.-9.1
NFPA 10.3.7(1)
OSHA S.O.-A

Identify the elements required in an emergency medical services plan.

S.O.-9.2
NFPA 10.3.7(2)
OSHA S.O.-A

Identify the importance of an on-site medical monitoring program.

S.O.-9.3
NFPA 10.3.7(3)
OSHA S.O.-A

Identify three resources for the transportation and care of the injured persons exposed to hazardous materials.

Implementing the Planned Response
Performing the Duties of the Hazardous Materials Branch Safety Officer

S.O.-10
NFPA 10.4.1
OSHA S.O.-A,B,C

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, perform the duties of their position in a manner consistent with the local emergency response plan, the organization's standard operating procedures, and safety considerations, and be able to do the following:

S.O.-10.1
NFPA 10.4.1(1)
OSHA S.O.-A,B,C

Identify the duties of the hazardous materials branch safety officer as defined in the organization's standard operating procedures.

S.O.-10.2
NFPA 10.4.1(2)
OSHA S.O.-A,B,C

Demonstrate proper performance of the duties of the hazardous materials branch safety officer as defined in the organization's standard operating procedures.

Implementing the Planned Response
Monitoring Safety of Response Personnel

S.O.-11
NFPA 10.4.2
OSHA S.O.-A,B

Given a simulated hazardous materials incident and safety considerations, ensure that personnel perform their tasks in a safe manner by identifying the safety considerations for the control functions identified in the plan of action, and be able to do the following:

S.O.-11.1
NFPA 10.4.2 (1)
OSHA S.O.-A,B

Identify the safe operating practices that are required to be followed at a hazardous materials incident as stated in the local emergency response plan and the organization's standard operating procedures.

S.O.-11.2
NFPA 10.4.2 (2)
OSHA S.O.-A,B

Identify how the following factors influence heat and cold stress for hazardous materials response personnel:

(a) Activity levels
(b) Duration of entry
(c) Environmental factors
(d) Hydration
(e) Level of PPE
(f) Physical fitness

S.O.-11.3
NFPA 10.4.2 (3)
OSHA S.O.-A,B

Identify the methods that will minimize the potential harm from heat and cold stress.

S.O.-11.4
NFPA 10.4.2 (4)
OSHA S.O.-A,B

Identify the safety considerations that will minimize the psychological and physical stresses on personnel wearing vapor-protective, liquid splash-protective, and high temperature-protective clothing.

S.O.-11.5
NFPA 10.4.2 (5)
OSHA S.O.-A,B

Describe five conditions where it would be prudent to withdraw from a hazardous materials incident.

Implementing the Planned Response
Conducting Safety Briefings

S.O.-12.1
NFPA 10.4.3.1
OSHA S.O.-B,C

Given a simulated hazardous materials incident and safety considerations, conduct safety briefings for personnel performing the control functions identified in the plan of action.

S.O.-12.2
NFPA 10.4.3.1
OSHA S.O.-B,C

Demonstrate the proper procedure for conducting a safety briefing to personnel for an incident involving one of the hazardous materials and its container identified in S.O.-2.8(NFPA 8-2.1.8), as specified by the organization's standard operating procedures.

Implementing the Planned Response
Implementing and Enforcing Safety Considerations

S.O.-13
NFPA 10.4.4
OSHA S.O.-B,C

Given a simulated hazardous materials incident and safety considerations, assist the incident commander, the incident safety officer, and the hazardous materials branch officer in implementing and enforcing the safety considerations, and be able to do the following:

S.O.-13.1
NFPA 10.4.4(1)
OSHA S.O.-B,C

Identify whether the boundaries of the established control zones are clearly marked, consistent with the safety considerations, and are being maintained.

S.O.-13.2
NFPA 10.4.4(2)
OSHA S.O.-B,C

Identify whether the on-site medical monitoring that are required by the authority having jurisdiction is being performed.

S.O.-13.3
NFPA 10.4.4(3)
OSHA S.O.-B,C

Given an entry team, a backup team, and a decontamination team wearing personal protective clothing and equipment, identify that each team is properly protected and prepared to safely perform its assigned tasks.

S.O.-13.3.1
NFPA 10.4.4(3)(a)
OSHA S.O.-B,C

Identify whether the selection of clothing and equipment is consistent with safety considerations.

S.O.-13.3.2
NFPA 10.4.4(3)(b)
OSHA S.O.-B,C

Identify whether each team has examined the clothing for barrier integrity and the equipment to ensure proper working order.

S.O.-13.3.3
NFPA 10.4.4(3)(c)
OSHA S.O.-B,C

Identify whether protective clothing and equipment have been donned in accordance with the organization's standard operating procedures and the manufacturer's recommendations.

S.O.-13.4
NFPA 10.4.4(4)
OSHA S.O.-B,C

Identify whether each person entering the hot zone has a specific task assignment, understands the assignment, is properly trained to perform the assigned task(s), and is working with a designated partner at all times during the assignment.

S.O.-13.5
NFPA 10.4.4(5)
OSHA S.O.-B,C

Identify whether a backup team with the appropriate level of personal protective equipment is prepared at all times for immediate entry into the hot zone during entry team operations.

S.O.-13.6
NFPA 10.4.4(6)
OSHA S.O.-B,C

Identify whether the decontamination process specified in the safety considerations is in place before any entry into the hot zone.

S.O.-13.7
NFPA 10.4.4(7)
OSHA S.O.-B,C

Identify that each person exiting the hot zone and each tool or piece of equipment is decontaminated in accordance with the safety considerations and the degree of hazardous materials exposure.

S.O.-13.8
NFPA 10.4.4(8)
OSHA S.O.-B,C

Demonstrate the proper procedure for recording the names of the individuals exiting the hot zone, as specified in the local emergency response plan and the organization's standard operating procedures.

S.O.-13.9
NFPA 10.4.4(9)
OSHA S.O.-B,C

Identify three safety considerations that can minimize secondary contamination.

Implementing the Planned Response
Maintaining Communications

S.O.-14
NFPA 10.4.5
OSHA S.O.-B,C

Given a simulated hazardous materials incident and the safety considerations, maintain routine and emergency communications within the incident command structure at all times during the incident, and be able to do the following:

S.O.-14.1
NFPA 10.4.5(1)
OSHA S.O.-B,C

Identify three types of communications systems used at hazardous materials incident sites.

S.O.-14.2
NFPA 10.4.5(2)
OSHA S.O.-B,C

Identify whether each person assigned to work in the hot zone understands the emergency alerting and response procedures specified in the safety considerations prior to entry into the hot zone.

Implementing the Planned Response
Monitoring Status Reports

S.O.-15.1
NFPA 10.4.6.1
OSHA S.O.-B,C

Given a simulated hazardous materials incident and the safety considerations, monitor routine and emergency communications within the incident command structure at all times during the incident.

S.O.-15.2
NFPA 10.4.6.2
OSHA S.O.-B,C

Identify whether entry team members regularly communicate the status of their work assignment to the hazardous materials branch officer.

Implementing the Planned Response
Implementing Exposure Monitoring

S.O.-16
NFPA 10.4.7
OSHA S.O.-B,C

Given a simulated hazardous materials incident and the safety considerations, assist the incident commander, the incident safety officer, and the hazardous materials branch officer in implementing exposure monitoring.

Implementing the Planned Response
Verifying Exposure Monitoring

S.O.-17
NFPA 10.4.8
OSHA S.O.-B,C

Identify that exposure monitoring (personnel and environment) as specified in the organization’s standard operating procedures and safety considerations is performed.

Evaluating Progress
Identifying Deviations from Safety Considerations and Any Dangerous Situations

S.O.-18
NFPA 10.5.1
OSHA S.O.-B

Given simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, and given simulated deviations from the safety considerations for activities in both the hot and warm zones and simulated dangerous conditions, evaluate the progress of the planned response to ensure that the response objectives are being met safely.

S.O.-18.1
NFPA 10.5.1 (1)
OSHA S.O.-B

Identify those actions that deviate from the safety considerations or otherwise violate generally accepted safe operating practices, organizational policies, or applicable occupational safety and health laws, regulations, codes, standards, or guidelines.

S.O.-18.2
NFPA 10.5.1 (2)
OSHA S.O.-B

Identify dangerous conditions that develop or are identified during work in the hot or warm zones that threaten the safety or health of persons in those zones.

S.O.-18.3
NFPA 10.5.1 (3)
OSHA S.O.-B

Identify the signs and symptoms of psychological and physical stresses on personnel wearing vapor-protective, liquid splash-protective, and high temperature-protective clothing.

Evaluating Progress
Taking Corrective Actions

S.O.-19
NFPA 10.5.2
OSHA S.O.-B

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, and given simulated deviations from the safety considerations for activities in both the hot and warm zones and simulated dangerous conditions, take such corrective actions as are necessary to ensure the safety and health of persons in the hot and warm zones, and be able to do the following:

S.O.-19.1
NFPA 10.5.2(1)
OSHA S.O.-B

Send emergency communications to, and receive emergency communications from, the incident safety officer, entry team personnel, the hazardous materials branch officer, and others as appropriate regarding safe working practices and conditions

S.O.-19.1.1
NFPA 10.5.2(1)(a)
OSHA S.O.-B

Given a hazardous situation or condition that has developed or been identified following initial hot zone entry, demonstrate the application of the emergency alerting procedures specified in the safety considerations to communicate the hazard and emergency response information to the affected personnel.

S.O.-19.1.2
NFPA 10.5.2(1)(b)
OSHA S.O.-B

Given a demonstrated emergency alert via hand signal by a member of the entry team operating within the hot zone, identify the meaning of that signal as specified in the safety considerations.

S.O.-19.2
NFPA 10.5.2(2)
OSHA S.O.-B

Identify the procedures to alter, suspend, or terminate any activity that can be judged to be unsafe, as specified in the local emergency response plan and the organization's standard operating procedures.

S.O.-19.3
NFPA 10.5.2(3)
OSHA S.O.-B

Demonstrate the procedure for notifying the appropriate individual of the unsafe action and for directing alternative safe actions, in accordance with the safety considerations and the organization's standard operating procedures.

S.O.-19.4
NFPA 10.5.2(4)
OSHA S.O.-B

Demonstrate the procedure for suspending or terminating an action that could result in an imminent hazard condition, in accordance with the safety considerations and the organization's standard operating procedures.

Terminating the Incident
Providing Reports and Documentation

S.O.-20
NFPA 10.6.1
OSHA S.O.-C

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, complete and submit the reports, documentation, and follow-up required of the hazardous materials branch safety officer, and be able to do the following:

S.O.-20.1
NFPA 10.6.1 (1)
OSHA S.O.-C

Identify the safety reports and supporting documentation required by the local emergency response plan and the organization's standard operating procedures.

S.O.-20.2
NFPA 10.6.1 (2)
OSHA S.O.-C

Demonstrate the proper completion of the safety reports required by the local emergency response plan and the organization's standard operating procedures.

S.O.-20.3
NFPA 10.6.1 (3)
OSHA S.O.-C

Describe the importance of personnel exposure records.

Terminating the Incident
Debriefing of Hazardous Materials Branch Personnel

S.O.-21
NFPA 10.6.2
OSHA S.O.-C

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, debrief hazardous materials branch personnel regarding site-specific occupational safety and health issues.

S.O.-21.1
NFPA 10.6.2 (1)
OSHA S.O.-C

Identify five health and safety topics to be addressed in an incident debriefing.

S.O.-21.2
NFPA 10.6.2 (2)
OSHA S.O.-C

Demonstrate the proper procedure for debriefing hazardous materials branch personnel regarding site-specific occupational safety and health areas of concern, as specified in the safety considerations, local emergency response plan, and the organization's standard operating procedures.

Terminating the Incident
Assisting in the Incident Critique

S.O.-22
NFPA 10.6.3
OSHA S.O.-B,C

Given various simulated facility and transportation hazardous materials incidents involving nonbulk and bulk packaging, provide safety and health-related critical observations of the activities that were performed in the hot and warm zones during the incident.

Terminating the Incident
Information to be Presented

S.O.-22.1
NFPA 10.6.4
OSHA S.O.-B,C

Given the safety considerations and hazardous materials branch safety officer's report for a simulated incident, demonstrate the proper procedure for verbally presenting the following in accordance with the local emergency response plan and the organization's standard operating procedures:

(1) Safety and health-related critical observations of the activities that were performed in the hot and warm zones during the incident
(2) Recorded violations of the safety considerations or generally accepted safe operating practices, organizational policies, or applicable occupational safety and health laws, regulations, codes, standards, or guidelines
(3) Injuries or deaths that occurred as a result of reasonably unforeseen dangerous conditions that developed during the incident
(4) Injuries or deaths that occurred as a result of violations of the safety considerations or generally accepted safe operating practices, organizational policies, or applicable occupational safety and health laws, regulations, codes, standards, or guidelines
(5) The proper course of action(s) that would likely have prevented the injuries or deaths that occurred as a result of the safety violations identified in (d)
(6) Deficiencies or weaknesses in the safety considerations, local emergency response plan, and organizational standard operating procedures that were noted during or following the incident

Hazardous Materials
and Terrorist Incident
Response
Training Guidelines

OSHA: Specialist and NFPA: Specialist Employee A, and Technician Specialties

General Training Considerations

Introduction

Hazardous materials specialist is a defined response competency in OSHA 29 CFR 1910.120 (q)(6)(iv) but is not a defined competency category in NFPA 472, 1997 edition. However, there is a relationship between the OSHA Specialist competency and the competencies in NFPA 472, 1997 edition, for Private Sector Specialist Employee A and for the Technician Specialties: Tank Car, Cargo Tank, and Intermodal Tank. For this reason, these competencies are grouped together in this section.

Hazardous materials specialists (OSHA) shall be trained to meet all the requirements for the first responder at the awareness level, the first responder at the operations level, and the technician level. In addition, specialists must meet those competencies identified in this section. They also shall meet the training requirements and be provided medical surveillance in accordance with requirements of OSHA, local occupational health and safety regulatory agencies, or the U.S. Environmental Protection Agency (EPA), as appropriate for their jurisdiction.

Definition

Specialists respond to hazardous materials operations and provide support to the incident commander and/or the technician. The duties of specialists, although paralleling those of technicians, require more specific knowledge of hazards common to their area of specialization. They may act as site liaisons with Federal, State, local, and other government authorities, or they may serve as hazardous materials team leader, operations officer or advisor to the incident commander. The specialist's responsibilities may include having to work within the hot zone, and may include performing incident command functions in certain types of incidents.

Audience

Specialists may be members of hazardous material response teams, individual consultants, certain site specialist employees, as defined in Title 29 of the Code of Federal Regulations (CFR), or representatives from organizations that provide technical support to the team. Specialists may be broadly titled as hazardous materials specialists (using OSHA 29 CFR 1910.120 nomenclature) or off-site specialists A (using NFPA 472 nomenclature). They may be called something less generic such as product, container, process, or transportation specialists (such as NFPA 472 Technician with a Tank Car Specialty), or they may have a title referring to a very specific function, such as counter-terrorism explosives specialist or ICBM nuclear warhead specialist.

Under the OSHA and EPA rule, hazardous materials specialists initially shall receive at least 24 hours of training equal to the technician level, training equal to the hazardous materials specialist level competencies for the areas of specialty, and annually thereafter receive refresher training of sufficient content and duration and/or demonstrate continued competency in their area of specialization to the level of their expected involvement.

Methodology Recommendations

Training for hazardous materials specialists is best conducted with a varied mix of classroom instruction using traditional lecture and small activity approaches, field exercises involving group practice in simulated emergencies, and hands-on skill training in doing actual control, confinement, and containment evolutions. Content instruction should be synthesized in student activities requiring analysis of incident information to determine plans of action.

Skill training should be performed on actual containers with simulated releases, using full protective equipment and proper response tools. Skill training should include instructor modeling, student walk-throughs, and student practice under stress until competency is achieved. Proper critiques and corrective instruction are essential. For hazardous materials specialists who may be required to command the incident response, field exercises or large group incident scene simulations are optimal for overall command structure practice, to develop effective incident management skills.

Refresher training should focus on practice in the warm and hot zones of a simulated emergency and should include (1) competency retesting of all response skills; (2) technical information updates; (3) critique of operational decision-making using simulated emergencies; and (4) critique of ICS performance and communication skills using simulated emergencies.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Federal Requirements

For Hazardous Materials Specialist Training

OSHA establishes the following training requirements for hazardous materials specialists. Length of training and method of testing are not specified, but hazardous materials specialists must have received training at the awareness, operations, and technician levels as well as at the specialist level. Employers are required to ensure that employees demonstrate competency in the skills defined.

OSHA 29 CFR 1910.120(q)(6)(iv)
HAZARDOUS MATERIALS SPECIALIST

(iv) Hazardous materials specialist. Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have competency in the following areas and the employer shall so certify:

- *(A) Know how to implement the local emergency response plan*
- *(B) Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment*
- *(C) Know the state emergency response plan*
- *(D) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist*
- *(E) Understand in-depth hazard and risk assessment techniques*
- *(F) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available*
- *(G) Be able to determine and implement decontamination procedures.*
- *(H) Have the ability to develop a site safety and control plan*
- *(I) Understand chemical, radiological and toxicological terminology and behavior*

For hazardous materials specialists, required training can be translated directly into the following sample objectives:

Identification	*Sample **Required** Training Objectives*
OSHA HMSPEC-A	Given a simulated incident involving hazardous materials within the specialist's area of technical expertise, describe the steps to implement the local emergency response plan.
OSHA HMSPEC-B	Given a simulated incident involving hazardous materials within the specialist's area of technical expertise, demonstrate an understanding of the classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.
OSHA HMSPEC-C	Given a simulated incident involving hazardous materials within the specialist's area of technical expertise, describe the State emergency response plan.
OSHA HMSPEC-D	Given a simulated incident involving hazardous materials, select and demonstrate use of proper specialized chemical personal protective equipment.

Required Training

OSHA HMSPEC-E	Given a simulated incident involving hazardous materials within the specialist's area of technical expertise, demonstrate an understanding of in-depth hazard and risk assessment techniques, and demonstrate providing technical advice or assistance regarding the hazards of the substance present and potential magnitude of the incident.
OSHA HMSPEC-F	Given a simulated incident involving hazardous materials, containers, and releases within the specialist's area of expertise, demonstrate specialized control, containment, and/or confinement operations.
OSHA HMSPEC-G	Given a simulated incident involving hazardous materials within the specialist's area of technical expertise, demonstrate the ability to determine and implement decontamination procedures.
OSHA HMSPEC-H	Demonstrate the ability to develop a site safety and control plan.
OSHA HMSPEC-I	Define chemical, radiological and toxicological terms and describe chemical, radiological and toxicological materials behavior.

SUMMARY: Hazardous Materials Specialist

OSHA minimum requirement= 24 hours Technician training + Specialist training

Audience	Prerequisites	Training	Refresher
Very narrow. Prospective hazardous materials team leaders or personnel who are designated in response plans as the definitive response resource for specific products or types of hazardous materials emergencies.	1.1st Responder Awareness Training 2. 1st Responder Operations Training 3. Hazardous Materials Technician Training 4 Advanced technical expertise in specific area(s) of hazardous materials.	- Classroom and simulator/field instruction, with emphasis on hands-on training - Competencies: - Knowledge of role of specialist within incident command system and responsibilities within employer's emergency response plan and the State emergency response plan. - Knowledge of hazardous materials terminology and behavior, and ability to perform in depth hazard and risk assessment - Ability to perform specialized control, contain ment and/or confinement techniques - Ability to select and use specialized personal protective equipment - Ability to implement decontamination procedures. - Ability to develop a site safety and control plan.	1. Competency retesting of all response skills 2. Technical information updates. 3. Incident scene decision-making using simulated emergencies.

Recommended Training
For Hazardous Materials Specialist

The following training objectives are recommended for Hazardous Materials Specialist training. The sources for this material are:
1) NFPA 472, Chapter 8: Competencies for Private Sector Specialist Employees, Section 8.4: Private Sector Specialist Employee A;
2) NFPA 472, Chapter 10: Competencies for the Technician with a Tank Car Specialty;
3) NFPA 472, Chapter 11: Competencies for the Technician with a Cargo Tank Specialty; and
4) NFPA 472, Chapter 12: Competencies for the Technician with an Intermodal Tank Specialty.

In order to retain the integrity of the NFPA 472 citations, the following identifications are used for the recommended objectives:

Objective ID	*Source*
SPEC(A)	Private Sector Specialist Employee A
TANK	Technician with a Tank Car Specialty
CARGO	Technician with a Cargo Tank Specialty
INTML	Technician with an Intermodal Tank Specialty

Hazardous materials specialist is a defined response competency in OSHA 29 CFR 1910.120 (q)(6)(iv) but is not a defined competency category in NFPA 472, 2002 edition. However, there is a relationship between the OSHA Specialist competency and the competencies in NFPA 472, 2002 edition, for Private Sector Specialist Employee A and for the Technician Specialties: Tank Car, Cargo Tank, and Intermodal Tank. To assist in assessing course compliance with OSHA 1910.120, the relationships between these objectives and the OSHA requirements are noted. References to OSHA are abbreviated as noted.

In general, these recommended objectives do not constitute an increased level of training from that minimally required by OSHA for Haz Mat Specialist. Rather, these recommended objectives provide greater depth of definition of student competency for specific hazards, containers, and/or specific responder roles. To assist in assessing course compliance with OSHA 1910.120(q)(6)(iv), the relationships between these objectives and the OSHA requirements are noted. References to OSHA are abbreviated as noted.

Objective Identification Legend

SPEC(A)-1
NFPA 8.4.1.3
OSHA HMSPEC-A

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as SPEC(A)-1.1) indicate enabling objectives that support the primary objective.

This indicates the origin of this objective. Usually it is directly from NFPA. In some cases, other sources are noted.

This indicates which OSHA requirement this objective supports. References to OSHA 29 CFR 1910.120 (q) (6) (iv) are abbreviated as OSHA HMSPEC A to I.

Private Sector Specialist Employee A
(Reference: NFPA 472, Chapter 8)

Those persons who are specifically trained to handle incidents involving chemicals or containers for chemicals used in their organization's area of specialization. Consistent with the organization's emergency response plan and standard operating procedures, the private sector specialist employee A shall be able to analyze an incident involving chemicals within their organization's area of specialization, plan a response to that incident, implement the planned response within the capabilities of the resources available, and evaluate the progress of the planned response.

In addition to being competent at the private sector specialist employee C level and the hazardous materials technician level, the private sector specialist employee A shall be able to achieve the following objectives:

Identification	***Recommended** Training Objectives*
SPEC(A)-1 NFPA 8.4.1.2.2 *OSHA HMSPEC-A to I*	Given a hazardous materials incident scenario, define the role and responsibilities of private sector specialist employee A.
SPEC(A)-2 NFPA 8.4.1.2.2(1) *OSHA HMSPEC-B,E,I*	Given a simulated incident involving hazardous materials within the individual area of specialization, analyze an incident involving chemicals and containers for chemicals used in their organization's area of specialization to determine the magnitude of the incident.
SPEC(A)-2.1 NFPA 8.4.1.2.2(1)a *OSHA HMSPEC-B,E,I*	Demonstrate the ability to survey an incident involving chemicals and containers for chemicals used in his or her organization's area of specialization to: (i) Identify the containers involved (ii) Identify or classify unknown materials (iii) Verify the identity of the chemicals
SPEC(A)-2.2 NFPA 8.4.1.2.2(1)b *OSHA HMSPEC-B,E,I*	Demonstrate the ability to collect and interpret hazard and response information from printed resources, technical resources, computer data bases, and monitoring equipment for chemicals used in his or her organization's area of specialization.
SPEC(A)-2.3 NFPA 8.4.1.2.2(1)c *OSHA HMSPEC-E*	Demonstrate the ability to determine the extent of damage to containers of chemicals used in his or her organization's area of specialization.
SPEC(A)-2.4 NFPA 8.4.1.2.2(1)d *OSHA HMSPEC-B,E,I*	Demonstrate the ability to predict the likely behavior of the chemicals and containers for chemicals used in his or her organization's area of specialization.
SPEC(A)-2.5 NFPA 8.4.1.2.2(1)e *OSHA HMSPEC-B,E,I*	Demonstrate the ability to estimate the potential outcomes of an incident involving chemicals and containers for chemicals used in his or her organization's area of specialization.
SPEC(A)-3 NFPA 8.4.1.2.2(2) *OSHA HMSPEC-A,F,H*	Given a simulated incident involving hazardous materials within the individual area of specialization, plan a response (within the capabilities of available resources) to an incident involving chemicals and containers for chemicals used in their organization's area of specialization.
SPEC(A)-3.1 NFPA 8.4.1.2.2(2)a *OSHA HMSPEC-A,F,H*	Demonstrate the ability to identify the response objectives for an incident involving chemicals and containers for chemicals used in his or her organization's area of specialization.

SPEC(A)-3.2 NFPA 8.4.1.2.2(2)b *OSHA HMSPEC-A,F,H*	Demonstrate the ability to identify the potential action options for each response objective for an incident involving chemicals and containers for chemicals used in his or her organization's area of specialization.
SPEC(A)-3.3 NFPA 8.4.1.2.2(2)c *OSHA HMSPEC-D*	Demonstrate the ability to select the personal protective equipment required for a given response option for an incident involving chemicals and containers for chemicals used in his or her organization's area of specialization.
SPEC(A)-3.4 NFPA 8.4.1.2.2(2)d *OSHA HMSPEC-G*	Demonstrate the ability to select the appropriate decontamination procedures, as necessary, for an incident involving chemicals and containers for chemicals used in his or her organization's area of specialization.
SPEC(A)-3.5 NFPA 8.4.1.2.2(2)e *OSHA HMSPEC-A,F,H*	Demonstrate the ability to develop a plan of action (within the capabilities of the available resources), including safety considerations, for handling an incident involving chemicals and containers for chemicals used in his or her organization's area of specialization consistent with their organization's emergency response plan and standard operating procedures.
SPEC(A)-4 NFPA 8.4.1.2.2(3) *OSHA HMSPEC-F*	Given a simulated incident involving hazardous materials within the individual area of specialization, implement the planned response (as developed with the incident commander) to an incident involving chemicals and containers for chemicals used in their organization's area of specialization consistent with their organization's emergency response plan and standard operating procedures.
SPEC(A)-4.1 NFPA 8.4.1.2.2(3)a *OSHA HMSPEC-D*	Demonstrate the ability to don, work in, and doff appropriate personal protective equipment provided by their organization for use with chemicals used in their organization's area of specialization consistent with their organization's emergency response plan and standard operating procedures.
SPEC(A)-4.2 NFPA 8.4.1.2.2(3)b *OSHA HMSPEC-F*	Demonstrate the ability to perform control functions, as agreed upon with the incident commander, for chemicals and containers for chemicals used in their organization's area of specialization consistent with their organization's emergency response plan and standard operating procedures.
SPEC(A)-5 NFPA 8.4.1.2.2(4) *OSHA HMSPEC-A,F,H*	Given a simulated incident involving hazardous materials within the individual area of specialization, to evaluate the results of implementing the planned response to an incident involving chemicals and containers for chemicals used in their organization's area of specialization.

Technician with a Tank Car Specialty
(Reference: NFPA 472, Chapter 11)

Those persons who provide support to the hazardous materials technician, provide oversight for product removal and movement of damaged tank cars, and act as a liaison between technicians and other outside resources. These technicians are expected to use specialized chemical-protective clothing and specialized control equipment.

Note that NFPA 472, Chapter 11, is **not** intended as a mandate that hazardous materials response teams must include technicians with a tank car specialty in order to perform operations at such incidents. Technicians operating within the bounds of their training as listed in NFPA 472, Chapter 6, are able to intervene at railroad incidents. However, the following additional competencies are provided for those jurisdictions or hazardous materials response teams who desire that some or all of their technicians have more complete and in-depth knowledge of tank cars.

In addition to being competent at the hazardous materials technician level, the technician with a tank car specialty shall be able to achieve the following objectives:

Identification	***Recommended** Training Objectives*
TANK-1 NFPA 11.1.2.2 *OSHA HMSPEC-A-I*	Given a hazardous materials incident scenario, demonstrate an understanding of the role of technician with a tank car specialty, and be able to:
TANK-1.1 NFPA 11.1.2.2(1) *OSHA HMSPEC-E*	Describe the responsibility to analyze a hazardous materials incident involving tank cars to determine the magnitude of the problem in terms of outcomes.
TANK-1.1.1 NFPA11.1.2.2(1)a *OSHA HMSPEC-E*	Identify the responsibility to determine the type and extent of damage to tank cars.
TANK-1.1.2 NFPA11.1.2.2(1)b *OSHA HMSPEC-E*	Identify the responsibility to predict the likely behavior of tank cars and their contents in an emergency.
TANK-1.2 NFPA 11.1.2.2(2) *OSHA HMSPEC-A,C,D,E,F*	Describe the responsibility to plan a response for an emergency involving tank cars within the capabilities and competencies of available personnel, personal protective equipment, and control equipment.
TANK-1.2.1 NFPA11.1.2.2(2)a *OSHA HMSPEC-A,C,D,E,F*	Identify the responsibility to determine the response options (offensive, defensive, and nonintervention) for a hazardous materials emergency involving tank cars.
TANK-1.2.2 NFPA11.1.2.2(2)b *OSHA HMSPEC-A,C,D,E,F*	Identify the responsibility to ensure that the options are within the capabilities and competencies of available personnel, personal protective equipment, and control equipment.
TANK-1.3 NFPA11.1.2.2(3) *OSHA HMSPEC-F*	Describe the responsibility to implement the planned response to a hazardous materials incident involving tank cars.

Analyzing the Incident
Determining the Type and Extent of Damage to Tank Cars

TANK-2
NFPA 11.2.1
OSHA HMSPEC-B,E

Given examples of damaged tank cars, describe the type and extent of damage to each tank car and its fittings.

TANK-2.1
NFPA 11.2.1(1)
OSHA HMSPEC-B,E

Given the specification mark for a tank car and the appropriate reference materials, describe the car's basic construction and features.

TANK-2.2
NFPA 11.2.1(2)
OSHA HMSPEC-B,E

Point out the "B" end of the car.

TANK-2.3
NFPA 11.2.1(3)
OSHA HMSPEC-B,E

Given examples of various tank cars, point out and explain the design and purpose of each of the following tank car components, when present.

(a) Tank, including shell, and head
(b) Head shield
(c) Jacket
(d) Lining/cladding
(e) Heater coils – interior vs. exterior
(f) Underframe – continuous vs. stub sill
(g) Shelf couplers
(h) Body bolster
(i) Trucks (pin and bowl)

TANK-2.4
NFPA 11.2.1(4)
OSHA HMSPEC-B,E

Given examples of tank cars (some jacketed; some not jacketed), point out the jacketed tank cars.

TANK-2.5
NFPA 11.2.1(5)
OSHA HMSPEC-B,E

Describe the difference between "insulation" and "thermal protection" on tank cars.

TANK-2.6
NFPA 11.2.1(6)
OSHA HMSPEC-B,E

Describe the difference between "jacketed" and "sprayed-on" thermal protection on tank cars.

TANK-2.7
NFPA 11.2.1(7)
OSHA HMSPEC-B,E

Describe the difference between "interior" and "exterior" heater coils on tank cars.

TANK-2.8
NFPA 11.2.1(8)
OSHA HMSPEC-B,E

Given examples of various fittings arrangements for pressure, nonpressure, cryogenic, and CO_2 tank cars (including examples of each of the following fittings), point out and explain the design, construction, and operation of each of the following fittings, when present:

(a) Fittings for loading and unloading tank cars, including the following:
- i. Bottom outlet valves (top operated with stuffing box, bottom operated — internal or external ball, wafersphere)
- ii. Liquid valve/vapor valve (ball vs. plug type)
- iii. Excess flow valve
- iv. Air valve
- v. Bottom outlet nozzle
- vi. Quick fill hole cover
- vii. Flange for manway, valves, etc.
- viii. CO_2 tank car fittings
- ix. Cryogenic liquid tank car fittings

(b) Fittings for pressure relief, including the following:
- i. Safety relief devices (safety valve, safety vent, combination safety valve)
- ii. Pressure regulators on CO_2 cars and liquefied atmospheric gases i cryogenic liquid tank cars
- iii. Staged safety relief system for a CO_2 car
- iv. Vacuum relief valve (negative pressure or vacuum)

(c) Fittings for gauging, including the following:
- i. Open gauging devices, e.g., slip tube
- ii. Closed gauging devices, e.g., magnetic
- iii. Other gauging devices (T-bar, long/short pole)

(d) Miscellaneous fittings, including the following:
- i. Thermometer well
- ii. Sample line
- iii. Manway, manway cover plate, hinged and bolted manway cover, protective housing
- iv. Washout
- v. Sump

TANK-2.9
NFPA 11.2.1(9)
OSHA HMSPEC-B,E

Given examples of various fitting arrangements on tank cars (including CO_2 and cryogenic liquid tank cars) with the following fittings included, point out the location(s) where each fitting is likely to leak and a reason for the leak:

(a) Bottom outlet valve/top-operated bottom outlet valve (with stuffing box)
(b) Liquid valve/vapor valve (ball vs. plug type)
(c) Air valve
(d) Bottom outlet nozzle
(e) Quick fill hole cover
(f) Flange for manway, valves, etc.
(g) Safety relief valve
(h) Safety vent (with rupture/frangible) disk
(i) Combination safety valve
(j) Pressure regulators on CO_2 cars and liquefied atmospheric gases in cryogenic liquid tank cars
(k) Vacuum relief valve (negative pressure or vacuum)
(l) Open gauging devices, e.g., slip tube
(m) Closed gauging devices, e.g., magnetic
(n) Thermometer well
(o) Sample line
(p) Manway, manway cover plate, hinged and bolted manway cover, protective housing
(q) Washout

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

TANK-2.10
NFPA 11.2.1(10)
OSHA HMSPEC-B,E

Given examples of each of the following types of tank car damage, identify the type of damage:
(a) Crack
(b) Score, gouge, wheel burn, rail burn
(c) Puncture
(d) Flame impingement
(e) Dent
(f) Corrosion

TANK-2.11
NFPA 11.2.1(11)
OSHA HMSPEC-B,E

Given examples (actual or simulated) of scores, gouges, wheel burns, and rail burns, perform each of the following tasks:
(a) Use a depth gauge to measure the depth of each score, gouge, wheel burn, and rail burn
(b) Point out where each score, gouge, wheel burn, and rail burn crosses a weld, if that condition exists
(c) Measure the depth of the weld metal removed for any point where the score, gouge, wheel burn, and rail burn crosses a weld
(d) Given examples (actual or simulated) of where a score, gouge, wheel burn, and rail burn crosses a weld, determine if the “heat-affected zone” has been damaged

TANK-2.12
NFPA 11.2.1(12)
OSHA HMSPEC-B,E

Given examples (actual or simulated) of dents and rail burns, perform each of the following tasks:
(a) Use a dent gauge to measure the radius of curvature for each dent or rail burn
(b) Identify those examples that include cracks at the point of minimum curvature

TANK-2.13
NFPA 11.2.1(13)
OSHA HMSPEC-B,E

Given examples of damaged tank car fittings, describe the extent of damage to those fittings.

TANK-2.14
NFPA 11.2.1(14)
OSHA HMSPEC-B,E

Given examples of tank car tank damage, describe the extent of damage to the tank car tank.

TANK-2.15
NFPA11.2.1(15)
OSHA HMSPEC-B,E

Given a tank car and the appropriate equipment and reference material, determine the pressure in the tank car, using either of the following methods:
(a) A pressure gauge
(b) The temperature of the contents

TANK-2.16
NFPA 11.2.1(16)
OSHA HMSPEC-B,E

Given a tank car, use the car’s gauging device to determine the amount of lading in it.

Analyzing the Incident
Predicting the Likely Behavior of the Tank Car and its Contents

TANK-3
NFPA 11.2.2
OSHA HMSPEC-B,E

Predict the likely behavior of the tank car and its contents, and be able to do the following:

TANK-3.1
NFPA 11.2.2(1)
OSHA HMSPEC-B,E

Given the following types of tank cars, describe the likely breach/release mechanisms associated with each type.
(a) Nonpressure tank cars
(b) Pressure tank cars
(c) Cryogenic liquid tank cars
(d) High-pressure tube cars
(e) Pneumatically unloaded covered hopper cars

TANK-3.2
NFPA 11.2.2(2)
OSHA HMSPEC-B,E

Describe the difference in the following types of construction materials used in tank cars and their significance in assessing tank damage:
(a) Carbon steel
(b) Alloy steel
(c) Aluminum

TANK-3.3
NFPA 11.2.2(3)
OSHA HMSPEC-B,E

Discuss the significance of selection of lading for compatibility with tank car construction material.

TANK-3.4
NFPA 11.2.2(4)
OSHA HMSPEC-B,E

Describe the significance of “lining” and “cladding” on tank cars in assessing tank damage.

TANK-3.5
NFPA 11.2.2(5)
OSHA HMSPEC-B,E

Describe the significance of the jacket on tank cars in assessing tank damage.

TANK-3.6
NFPA 11.2.2(6)
OSHA HMSPEC-B,E

Describe the significance of “insulation” and “thermal protection” on tank cars in assessing tank damage.

TANK-3.7
NFPA 11.2.2(7)
OSHA HMSPEC-B,E

Describe the significance of “jacketed” and “sprayed-on” thermal protection on tank cars in assessing tank damage.

TANK-3.8
NFPA 11.2.2(8)
OSHA HMSPEC-B,E

Describe the significance of “interior” and “exterior” heater coils on tank cars in assessing tank damage.

TANK-3.9
NFPA 11.2.2(9)
OSHA HMSPEC-B,E

Describe the significance of each of the following types of tank car damage on different types of tank cars in assessing tank damage:
(a) Crack
(b) Score, gouge, wheel burn, rail burn
(c) Puncture
(d) Flame impingement
(e) Dent
(f) Corrosion

TANK-3.10
NFPA 11.2.2(10)
OSHA HMSPEC-B,E

Describe the significance of the depth of scores, gouges, wheel burns, and rail burns on tank cars in assessing tank damage.

TANK-3.11
NFPA 11.2.2(11)
OSHA HMSPEC-B,E

Describe the significance of scores, gouges, wheel burns, and rail burns crossing a weld on a pressure tank car in assessing tank damage.

TANK-3.12
NFPA 11.2.2(12)
OSHA HMSPEC-B,E

Describe the significance of damage to the “heat affected” zone of a weld on a tank car in assessing tank damage.

TANK-3.13
NFPA 11.2.2(13)
OSHA HMSPEC-B,E

Describe the significance of a condemning dent of a tank car in assessing tank damage.

TANK-3.14
NFPA 11.2.2(14)
OSHA HMSPEC-B,E,I

Given various types of tank cars, describe the significance of pressure increases in assessing tank damage.

TANK-3.15
NFPA 11.2.2(15)
OSHA HMSPEC-B,E,I

Given various types of tank cars, describe the significance of the amount of lading in the tank in assessing tank damage.

TANK-3.16
NFPA 11.2.2(16)
OSHA HMSPEC-B,E,I

Describe the significance of flame impingement on a tank car.

Planning the Response
Determining the Response Options

TANK-4
NFPA 11.3.1
OSHA HMSPEC-F

Given the analysis of an emergency involving tank cars, determine the response options for each tank car involved, and be able to do the following:

TANK-4.1
NFPA 11.3.1(1)
OSHA HMSPEC-D,F

Describe the purpose of, potential risks associated with, procedures for, equipment required to implement, and safety precautions for the following product removal techniques for tank cars:
(a) Transferring liquids and vapors
(b) Flaring liquids and vapors
(c) Venting
(d) Hot and cold tapping
(e) Vent and burn

TANK-4.2
NFPA 11.3.1(2)
OSHA HMSPEC-F

Describe the inherent risks associated with, procedures for, equipment required to implement, and safety precautions for leak control techniques on various tank car fittings.

TANK-4.3
NFPA 11.3.1(3)
OSHA HMSPEC-F

Describe the effect flaring or venting gas or liquid has on the pressure in the tank (flammable gas or flammable liquid product).

TANK-4.4
NFPA 11.3.1(4)
OSHA HMSPEC-F

Describe the inherent risks associated with, procedures for, equipment required to implement, and safety precautions for lifting of tank cars.

TANK-4.5
NFPA 11.3.1(5)
OSHA HMSPEC-F

Describe the inherent risks associated with, procedures for, and safety precautions for the following operations:
(a)Shutting off locomotives using the fuel shutoff and the battery disconnect
(b)Setting and releasing brakes on rail cars
(c)Uncoupling rail cars

TANK-4.6
NFPA 11.3.1(6)
OSHA HMSPEC-F

Describe the hazards associated with working on railroad property during emergencies.

Implementing the Planned Response

TANK-5 NFPA 11.4.1 *OSHA HMSPEC-F*	Given an analysis of an emergency involving tank cars and the planned response, implement or oversee the implementation of the selected response options safely and effectively, and be able to do the following:
TANK-5.1 NFPA 11.4.1 (1) *OSHA HMSPEC-F*	Given a leaking manway cover plate (loose bolts), control the leak.
TANK-5.2 NFPA 11.4.1 (2) *OSHA HMSPEC-F*	Given leaking packing on the following tank car fittings, control the leak: (a) Gauging device packing nut (b) Liquid or vapor valve packing nut (c) Top-operated bottom outlet valve packing gland
TANK-5.3 NFPA 11.4.1 (3) *OSHA HMSPEC-F*	Given an open bottom outlet valve with a defective gasket in the cap, control the leak.
TANK-5.4 NFPA 11.4.1 (4) *OSHA HMSPEC-F*	Given a leaking top-operated bottom outlet valve, close valve completely to control leak.
TANK-5.5 NFPA 11.4.1 (5) *OSHA HMSPEC-F*	Given leaking fittings on a chlorine tank car, use the Chlorine C kit, as appropriate, to control the leak.
TANK-5.6 NFPA 11.4.1 (6) *OSHA HMSPEC-F*	Given the following types of leaks on various types of tank cars, plug or patch those leaks: (a) Puncture (b) Irregular-shaped hole (c) Cracks, splits, or tears
TANK-5.7 NFPA 11.4.1 (7) *OSHA HMSPEC-F*	Given the appropriate equipment and resources, demonstrate the following: (a) Transferring of liquids and vapors (b) Flaring of liquids and vapors (c) Venting
TANK-5.8 NFPA 11.4.1 (8) *OSHA HMSPEC-F*	Given the appropriate resources, perform the following tasks: (a) Shut off locomotives using the fuel shutoff and the battery disconnect (b) Set and release brakes on rail cars (c) Uncouple rail cars
TANK-5.9 NFPA 11.4.1 (9) *OSHA HMSPEC-F*	Demonstrate bonding and grounding procedures for the transfer of flammable and combustible products from tank cars, or other products that can give off flammable gases or vapors when heated or contaminated, including the following: (a) Selection of proper equipment (b) Sequence of bonding and grounding connections (c) Proper testing of bonding and grounding connections
TANK-5.10 NFPA 11.4.1 (10) *OSHA HMSPEC-F*	Given a simulated flammable liquid spill from a tank car, describe the procedures for site safety and fire control during cleanup and removal operations.

Technician with a Cargo Tank Specialty
(Reference: NFPA 472, Chapter 12)

Those persons who provide support to the hazardous materials technician, provide oversight for product removal and movement of damaged cargo tanks, and act as a liaison between technicians and other outside resources. These technicians are expected to use specialized chemical-protective clothing and specialized control equipment.

Note that NFPA 472, Chapter 12, is **not** intended as a mandate that hazardous materials response teams must include technicians with a cargo tank specialty in order to perform operations at such incidents. Technicians operating within the bounds of their training as listed in NFPA 472, Chapter 6, are able to intervene at railroad incidents. However, the following additional competencies are provided for those jurisdictions or hazardous materials response teams who desire that some or all of their technicians have more complete and in-depth knowledge of cargo tanks.

In addition to being competent at the hazardous materials technician level, the technician with a cargo tank specialty shall be able to achieve the following objectives:

Identification	***Recommended** Training Objectives*
CARGO-1 NFPA 12.1.2.2 *OSHA HMSPEC-A-I*	Given a hazardous materials incident scenario, demonstrate an understanding of the role of Technician with a cargo tank specialty.
CARGO-1.1 NFPA 12.1.2.2(1) *OSHA HMSPEC-E*	Describe the responsibility to analyze a hazardous materials incident involving cargo tanks to determine the magnitude of the problem in terms of outcomes.
CARGO-1.1.1 NFPA12.1.2.2(1)a *OSHA HMSPEC-E*	Identify the responsibility to determine the type and extent of damage to cargo tanks.
CARGO-1.1.2 NFPA12.1.2.2(1)b *OSHA HMSPEC-E*	Identify the responsibility to predict the likely behavior of cargo tanks and their contents in an emergency.
CARGO-1.2 NFPA 12.1.2.2(2) *OSHA HMSPEC-A,C,D,E,F*	Describe the responsibility to plan a response for an emergency involving cargo tanks within the capabilities and competencies of available personnel, personal protective equipment, and control equipment by determining the response options (offensive, defensive, and nonintervention) for a hazardous materials emergency involving cargo tanks.
CARGO-1.3 NFPA 12.1.2.2(2) *OSHA HMSPEC-A,C,D,E,F*	Describe the responsibility to implement the planned response to a hazardous materials incident involving cargo tanks.

Analyzing the Incident
Determining the Type and Extent of Damage to Cargo Tanks

CARGO-2 NFPA 12.2.1 *OSHA HMSPEC-B,E*	Given examples of damaged cargo tanks, describe the type and extent of damage to each cargo tank and its fittings, and be able to do the following:
CARGO-2.1 NFPA 12.2.1(1) *OSHA HMSPEC-B,E*	Given the specification mark for a cargo tank and the appropriate reference materials, describe the tank's basic construction and features.

CARGO-2.2
NFPA 12.2.1(2)
OSHA HMSPEC-B,E

Given examples of cargo tanks (some jacketed; some not jacketed), point out the jacketed cargo tanks.

CARGO-2.3
NFPA 12.2.1(3)
OSHA HMSPEC-B,E

Given examples of the following types of cargo tank damage, identify the type of damage in each example:
(a) Crack
(b) Scrape, score, gouge, or loss of metal
(c) Puncture
(d) Dent
(e) Flame impingement
(f) Corrosion (internal/external)

CARGO-2.4
NFPA 12.2.1(4)
OSHA HMSPEC-B,E

Given simulated damage to an MC-331 cargo tank, determine the extent of damage to the heat-affected zone.

CARGO-2.5
NFPA 12.2.1(5)
OSHA HMSPEC-B,E

Given an MC-331 cargo tank containing a liquefied gas, determine the amount of liquid in the tank.

CARGO-2.6
NFPA 12.2.1(6)
OSHA HMSPEC-B,E

Given an MC-306/DOT-406, MC-307/DOT-407, and MC-312/DOT-412 cargo tank, point out and explain the design, construction, and operation of each of the following safety devices:
(a) Internal safety valve or external valve with accident protection, including method of activation (air, cable, hydraulic)
(b) Shear-type breakaway piping
(c) Emergency remote shutoff device
(d) Pressure and vacuum relief protection devices
(e) Dome cover design

CARGO-2.7
NFPA 12.2.1(7)
OSHA HMSPEC-B,E

Given an MC-331 and MC-338 cargo tank, point out and explain the design, construction, and operation of each of the following safety devices:
(a) Internal safety valve or external valve with accident protection, including method of activation (air, cable, hydraulic)
(b) Excess flow valve
(c) Fusible link and nut assemblies
(d) Emergency remote shutoff device
(e) Pressure relief protection devices

CARGO-2.8
NFPA 12.2.1(8)
OSHA HMSPEC-B,E

Given an MC-306/DOT-406 cargo tank, identify and describe the following normal methods of loading and unloading:
(a) Top loading
(b) Bottom loading
(c) Vapor recovery system

CARGO-2.9
NFPA 12.2.1(9)
OSHA HMSPEC-B,E

Given the following types of cargo tank trucks and tube trailer, identify and describe the normal methods of loading and unloading:
(a) MC-307/DOT-407
(b) MC-312/DOT-412
(c) MC-331
(d) MC-338
(e) Compressed gas tube trailer

CARGO-2.10
NFPA 12.2.1(10)
OSHA HMSPEC-B,E

Describe the normal and emergency methods of activation for the following types of cargo tank truck valve systems:
(a) Air
(b) Cable
(c) Hydraulic

CARGO-2..11
NFPA 12.2.1(11)
OSHA HMSPEC-B,E

Given a cargo tank involved in an emergency, identify the factors to be evaluated as part of the cargo tank damage assessment process, including the following:
(a) Type of cargo tank (MC or DOT specification)
(b) Pressurized or nonpressurized
(c) Number of compartments
(d) Type of tank metal (e.g., aluminum vs. stainless steel)
(e) Nature of the emergency (e.g., rollover, vehicle accident, struck by object, etc.)
(f) Container stress applied to the cargo tank
(g) Type and nature of tank damage (e.g., puncture, dome cover leak, valve failure, etc.)
(h) Amount of product both released and remaining in the cargo tank

Analyzing the Incident
Predicting the Likely Behavior of the Cargo Tank and its Contents

CARGO-3
NFPA 12.2.2
OSHA HMSPEC-B,E

Predict the likely behavior of the cargo tank and its contents, and be able to do the following:

CARGO-3.1
NFPA 12.2.2(1)
OSHA HMSPEC-B,E

Given the following types of cargo tanks (including a tube trailer), describe the likely breach/release mechanisms:
(a) MC-306/DOT-406 cargo tanks
(b) MC-307/DOT-407 cargo tanks
(c) MC-312/DOT-412 cargo tanks
(d) MC-331 cargo tanks
(e) MC-338 cargo tanks
(f) Compressed gas tube trailer

CARGO-3.2
NFPA 12.2.2(2)
OSHA HMSPEC-B,E

Describe the difference in types of construction materials used in cargo tanks and their significance in assessing tank damage.

CARGO-3.3
NFPA 12.2.2(3)
OSHA HMSPEC-B,E

Describe the significance of the jacket on cargo tanks in assessing tank damage.

CARGO-3.4
NFPA 12.2.2(4)
OSHA HMSPEC-B,E

Describe the significance of each of the following types of damage on different types of cargo tanks in assessing tank damage:
(a) Crack
(b) Scrape, score, gouge, or loss of metal
(c) Puncture
(d) Dent
(e) Flame impingement
(f) Corrosion (internal/external)

CARGO-3.5
NFPA 12.2.2(5)
OSHA HMSPEC-B,E

Given simulated damage to the heat-affected zone on a MC-331 cargo tank, describe the significance of the damage in assessing tank damage.

Planning the Response
Determining the Response Options

CARGO-4
NFPA 12.3.1
OSHA HMSPEC-F

Given the analysis of an emergency involving cargo tanks, determine the response options for each cargo tank involved, and be able to do the followng:

CARGO-4.1
NFPA 12.3.1(1)
OSHA HMSPEC-D,F

Given an incident involving a cargo tank, describe the methods, procedures, risks, safety precautions, and equipment that are required to implement spill and leak control procedures.

CARGO-4.2
NFPA 12.3.1(2)
OSHA HMSPEC-F

Given an overturned cargo tank, describe the factors to be evaluated for uprighting, including the following:
(a) Type of cargo tank and material of construction
(b) Condition and weight of the cargo tank
(c) Type and nature of stress applied to the cargo tank
(d) Preferred lifting points
(e) Selection of lifting straps and/or air bags
(f) Lifting capabilities of wreckers and cranes
(g) Site safety precautions

Implementing the Planned Response

CARGO-5
NFPA 12.4.1
OSHA HMSPEC-F

Given an analysis of an emergency involving a cargo tank and the planned response, implement or oversee the implementation of the selected response options safely and effectively.

CARGO-5.1
NFPA 12.4.1(1)
OSHA HMSPEC-F

Demonstrate the methods for containing the following leaks on liquid cargo tanks (e.g., MC-306/DOT-406, MC-307/DOT-407, and MC-312/DOT-412):
(a) Puncture
(b) Irregular-shaped hole
(c) Split or tear
(d) Dome cover leak
(e) Valves and piping
(f) Pressure relief devices (e.g., vents, burst disc, etc.)

CARGO-5.2
NFPA 12.4.1(2)
OSHA HMSPEC-F

Describe the methods for containing the following leaks in MC-331 and MC-338 cargo tanks:
(a) Crack
(b) Failure of safety relief device (e.g., relief valve, burst disc, etc.)
(c) Piping failure

CARGO-5.3
NFPA 12.4.1(3)
OSHA HMSPEC-F

Demonstrate bonding and grounding procedures for the transfer of flammable and combustible products from cargo tanks, or other products that can give off flammable gases or vapors when heated or contaminated, including the following:
(a) Selection of proper equipment
(b) Sequence of bonding and grounding connections
(c) Proper testing of bonding and grounding connections

CARGO-5.4
NFPA 12.4.1(4)
OSHA HMSPEC-F

Given the following product transfer and recovery equipment, demonstrate the safe and correct application and use of each of the following:
(a) Portable pumps (air, electrical, gasoline/diesel)
(b) Vehicles with power-take-off (PTO) driven pumps
(c) Pressure transfer
(d) Vacuum trucks

CARGO-5.5
NFPA 12.4.1(5)
OSHA HMSPEC-F

Given a simulated overturned MC-306/DOT-406 cargo tank, demonstrate the safe and proper procedures for the following methods of product removal and transfer:
(a) Drilling
(b) Unloading lines
(c) Vapor recovery lines
(d) Internal safety valve

CARGO-5.6
NFPA 12.4.1(6)
OSHA HMSPEC-F

Given a simulated overturned MC-307/DOT-407 cargo tank, demonstrate the safe and proper procedures for product removal and transfer.

CARGO-5.7
NFPA 12.4.1(7)
OSHA HMSPEC-F

Given a simulated overturned MC-331 cargo tank, demonstrate the safe and proper procedures for product removal and transfer.

CARGO-5.8
NFPA 12.4.1(8)
OSHA HMSPEC-F

Given the necessary resources, demonstrate the flaring of a MC-331 flammable gas cargo tank.

CARGO-5.9
NFPA 12.4.1(9)
OSHA HMSPEC-F

Given a simulated flammable liquid spill from a cargo tank, describe the procedures for site safety and fire control during cleanup and removal operations.

Technician with an Intermodal Tank Specialty

(Reference: NFPA 472, Chapter 13)

Those persons who provide support to the hazardous materials technician, provide oversight for product removal and movement of damaged intermodal tanks, and act as a liaison between technicians and other outside resources. These technicians are expected to use specialized chemical-protective clothing and specialized control equipment.

Note that NFPA 472, Chapter 13, is **not** intended as a mandate that hazardous materials response teams must include technicians with a intermodal tank specialty in order to perform operations at such incidents. Technicians operating within the bounds of their training as listed in NFPA 472, Chapter 6, are able to intervene at railroad incidents. However, the following additional competencies are provided for those jurisdictions or hazardous materials response teams who desire that some or all of their technicians have more complete and in-depth knowledge of intermodal tanks.

In addition to being competent at the hazardous materials technician level, the technician with an intermodal tank specialty shall be able to achieve the following objectives:

Identification	***Recommended** Training Objectives*
INTML-1 NFPA 13.1.2.2 *OSHA HMSPEC-A-I*	Given a hazardous materials incident scenario, demonstrate an understanding of the role of technician with an intermodal tank specialty, and be able to:
INTML-1.1 NFPA 13.1.2.2(1) *OSHA HMSPEC-E*	Describe the responsibility to analyze a hazardous materials incident involving an intermodal tank to determine the magnitude of the problem in terms of outcomes.
INTML-1.1.1 NFPA13.1.2.2(1)a *OSHA HMSPEC-E*	Identify the responsibility to determine the type and extent of damage to an intermodal tank.
INTML-1.1.2 NFPA13.1.2.2(1)b *OSHA HMSPEC-E*	Identify the responsibility to predict the likely behavior of an intermodal tank and its contents in an emergency.
INTML-1.2 NFPA 13.1.2.2(2) *OSHA HMSPEC-A,C,D,E,F*	Describe the responsibility to plan a response for an emergency involving an intermodal tank within the capabilities and competencies of available personnel, personal protective equipment, and control equipment by determining the response options (offensive, defensive, and nonintervention) for a hazardous materials emergency involving intermodal tanks.
INTML-1.3 NFPA 13.1.2.2(3) *OSHA HMSPEC-A,C,D,E,F*	Describe the responsibility to implement the planned response to a hazardous materials incident involving intermodal tanks.

Analyzing the Incident

Determining the Type and Extent of Damage to Intermodal Tanks

INTML-2 NFPA 13.2.1 *OSHA HMSPEC-B,E*	Given examples of damaged intermodal tanks, describe the type and extent of damage to each intermodal tank and its fittings, and be able to do the following:
INTML-2.1 NFPA 13.2.1(1) *OSHA HMSPEC-B,E*	Given the specification mark for an intermodal tank and the appropriate reference materials, describe the tank's basic construction and features.

INTML-2.2
NFPA 13.2.1(2)
OSHA HMSPEC-B,E

Given examples of intermodal tanks (some jacketed; some not jacketed), point out the jacketed intermodal tanks.

INTML-2.3
NFPA 13.2.1(3)
OSHA HMSPEC-B,E

Given examples of various intermodal tanks, point out and explain the design and purpose of each of the following intermodal tank components, when present:

(a) Supporting frame
(b) Corner casting
(c) Insulation
(d) Jacket
(e) Heater coils (steam/electric)
(f) Refrigeration unit
(g) Data plate

INTML-2.4
NFPA 13.2.1(4)
OSHA HMSPEC-B,E

Given examples of various fittings arrangements for pressure, nonpressure, and cryogenic intermodal tanks, point out and explain the design, construction, and operation of each of the following fittings, when present:

(a) Spill box
(b) Manhole cover
(c) Air line connection
(d) Top outlet
(e) Bottom outlet valve
(f) Thermometer
(g) Pressure gauge
(h) Gauging device
(i) Liquid or vapor valve
(j) Sample valve
(k) Thermometer well

INTML-2.5
NFPA 13.2.1(5)
OSHA HMSPEC-B,E

Given examples of various safety devices for pressure, nonpressure, and cryogenic intermodal tanks, point out and explain the design, construction, and operation of each of the following safety devices, when present:

(a) Safety relief valve
(b) Regulator valve
(c) Rupture disc
(d) Fusible link/nut assemblies
(e) Emergency remote shutoff device
(f) Excess flow valve

INTML-2.6
NFPA 13.2.1(6)
OSHA HMSPEC-B,E

Given the following types of intermodal tank damage, identify the type of damage in each example and explain its significance.

(a) Crack
(b) Puncture
(c) Dent
(d) Flame impingement
(e) Corrosion (internal/external)
(f) Metal loss (gouge/score)

INTML-2.7
NFPA 13.2.1(7)
OSHA HMSPEC-B,E

Given three examples of damage to the framework of intermodal tanks, describe the damage in each example and explain its significance in the risk analysis process.

INTML-2.8
NFPA 13.2.1(8)
OSHA HMSPEC-B,E

Given an intermodal tank involved in an emergency, identify the factors to be evaluated as part of the intermodal tank damage assessment process, including the following:
(a) Type of intermodal tank
(b) Pressurized or nonpressurized
(c) Number of compartments
(d) Type of tank metal
(e) Nature of the emergency
(f) Container stress applied to the intermodal tank
(g) Type and nature of tank damage
(h) Amount of product both released and remaining in the intermodal tank

INTML-2.9
NFPA 13.2.1(9)
OSHA HMSPEC-B,E

Given a pressure intermodal tank containing a liquefied gas, determine the amount of liquid in the tank.

INTML-2.10
NFPA 13.2.1(10)
OSHA HMSPEC-B,E

Given simulated damage to a pressure intermodal tank, determine the extent of damage to the heat-affected zone.

Analyzing the Incident

Predicting the Likely Behavior of the Intermodal Tank and its Contents

INTML-3
NFPA 13.2.2
OSHA HMSPEC-B,E

Predict the likely behavior of the intermodal tank and its contents, and be able to do the following:

INTML-3.1
NFPA 13.2.2(1)
OSHA HMSPEC-B,E

Given the following types of intermodal tanks, describe the likely breach/release mechanisms:
(a) IMO Type 1/IM-101
(b) IMO Type 2/IM-102
(c) IMO Type 5/DOT-51
(d) DOT-56
(e) DOT-57
(f) DOT-60
(g) Cryogenic (IMO Type 7)

INTML-3.2
NFPA 13.2.2(2)
OSHA HMSPEC-B,E

Describe the difference in types of construction materials used in intermodal tanks relative to assessing tank damage.

Planning the Response

Determining the Response Options

INTML-4
NFPA 13.3.1
OSHA HMSPEC-F

Given the analysis of an emergency involving intermodal tanks, determine the response options for each intermodal tank involved, and be able to do the following:

INTML-4.1
NFPA 13.3.1(1)
OSHA HMSPEC-F

Describe the purpose of, potential risks associated with, procedures for, equipment required to implement, and safety precautions for the following product removal techniques for intermodal tanks:
(a) Transferring liquids and vapors (pressure/pump)
(b) Hot tapping
(c) Flaring liquids and vapors

INTML-4.2
NFPA 13.3.1(2)
OSHA HMSPEC-F

Describe the purpose of, procedures for, and risks associated with controlling leaks from various fittings on intermodal tanks, including equipment needed and safety precautions.

Implementing the Planned Response

INTML-5
NFPA 13.4.1
OSHA HMSPEC-F

Given an analysis of an emergency involving intermodal tanks and the planned response, implement or oversee the implementation of the selected response options safely and effectively, and be able to do the following:

INTML-5.1
NFPA 13.4.1 (1)
OSHA HMSPEC-F

Given leaks from the following fittings on intermodal tanks, control the leaks using proper methods and procedures.
(a) Manway cover
(b) Bottom outlet
(c) Liquid/vapor valve
(d) Safety relief device
(e) Tank

INTML-5.2
NFPA 13.4.1 (2)
OSHA HMSPEC-F

Demonstrate proper procedures for the following types of emergency product removal:
(a) Gas/liquid transfer (pressure/pump)
(b) Flaring
(c) Venting

INTML-5.3
NFPA 13.4.1 (3)
OSHA HMSPEC-F

Demonstrate bonding and grounding procedures for the transfer of flammable and combustible products from an intermodal tank, or other products that can give off flammable gases or vapors when heated or contaminated, including the following:
(a) Selection of proper equipment
(b) Sequence of bonding and grounding connections
(c) Proper testing of bonding and grounding connections

INTML-5.4
NFPA 13.4.1 (4)
OSHA HMSPEC-F

Demonstrate the methods for containing the following leaks on liquid intermodal tanks (e.g., IM-101 and IM-102):
(a) Puncture
(b) Irregular-shaped hole
(c) Split or tear
(d) Dome cover leak
(e) Valves and piping
(f) Pressure relief devices (e.g., vents, burst disc, etc.)

INTML-5.5
NFPA 13.4.1 (5)
OSHA HMSPEC-F

Describe the methods for containing the following leaks in pressure intermodal tanks:
(a) Crack
(b) Failure of safety relief device (e.g., relief valve, burst disc, etc.)
(c) Piping failure

INTML-5.6
NFPA 13.4.1 (6)
OSHA HMSPEC-F

Given the following product transfer and recovery equipment, demonstrate the safe and correct application and use of the following:
(a) Portable pumps (air, electrical, gasoline/diesel)
(b) Vehicles with power-take-off (PTO) driven pumps
(c) Pressure transfer
(d) Vacuum trucks

INTML-5.7
NFPA 13.4.1 (7)
OSHA HMSPEC-F

Given a simulated overturned liquid intermodal tank, demonstrate the safe and proper procedures for product removal and transfer.

INTML-5.8
NFPA 13.4.1 (8)
OSHA HMSPEC-F

Given a simulated overturned pressure intermodal tank, demonstrate the safe and proper procedures for product removal and transfer.

INTML-5.9
NFPA 13.4.1 (9)
OSHA HMSPEC-F

Given the necessary resources, demonstrate the flaring of a pressure flammable gas intermodal tank.

INTML-5.10
NFPA 13.4.1 (10)
OSHA HMSPEC-F

Given a simulated flammable liquid spill from an intermodal tank, describe the procedures for site safety and fire control during cleanup and removal operations.

Hazardous Materials and Terrorist Incident Response Training Guidelines

OSHA: Specialist Employee and NFPA: Specialist Employee B,C

General Training Considerations

Introduction

Specialist employees shall be trained to the first responder awareness level relative to their area of specialization and shall be trained to those additional competency levels identified in this section. Furthermore, specialist employees shall receive training to meet any applicable Federal (DOT, OSHA, EPA) or local occupational health and safety regulatory agency requirements.

Definition

Specialist employees are defined by OSHA 1910.120(q)(5) as persons who, in the course of their regular job duties, work with and are trained in the handling of specific hazardous substances or chemical-carrying containers and are also prepared to provide advice or assistance within their area of expertise to an incident commander of the hazardous materials team at a hazardous materials incident. Advice and assistance may include gathering, recording, and analyzing information as well as guidance regarding hazards and response options. Assistance also may include working as a technical adviser in the warm and hot zones, if the specialist employee is qualified to do so safely. These specialist functions are addressed somewhat differently in the National Fire Protection Association Standard 472, as Private Sector Specialist Employee C and Private Sector Specialist Employee B.

Private Sector Specialist Employees C are persons having training or educationally acquired expertise in a product, a container, a chemical process, or some procedure of importance to the mitigation of a hazardous materials incident. Private Sector Specialist Employees C may be asked to gather, record, and analyze information. They may serve as consultants and technical advisers to the incident commander or the hazardous materials team, or they may arrange for the provision of such assistance as necessary and related to their area of expertise. They are not expected to work in either the hot or warm zones of an incident area.

Private Sector Specialist Employees B meet the competencies of Private Sector Specialist Employees C and in addition are qualified to assist the response in the warm and hot zones of an incident area and are qualified to provide information on personal protective equipment, decontamination methods, and response evaluation.

Audience

Persons training under this provision shall include those titled specialist employees under Title 29 of the Code of Federal Regulations and those titled Private Sector Specialist Employees C and Private Sector Specialist Employees B using NFPA 472 nomenclature. They may be individual consultants or representatives of organizations that provide technical assistance related to their area of specialization at hazardous materials operations. The knowledge these specialists possess may have been acquired through site-specific hazardous substance training programs; military; public service, or commercial facilities; or educational institutions.

Methodology Recommendations

Typically, specialist employees are responsible for maintaining current technical knowledge in their areas of expertise as part of their normal job responsibilities. Therefore, additional training should focus on applying their technical knowledge to emergency situations. Because specialist employees will have diverse job responsibilities and work schedules, much instruction should be in short, classroom modules or perhaps independent study, with an emphasis on analyzing simulated incidents using existing professional technical expertise and knowledge. For specialist employees who may work in the warm or hot zone, hands-on training to competency in using personal protective clothing is essential. To learn and practice advisory and assistance roles in the incident command system, it also is recommended that local response personnel and area hazardous materials teams work with specialist employees in periodic field exercises.

Specialist employees annually shall receive refresher training of sufficient content and duration or shall demonstrate continued competency in their area of specialization to the level of their expected involvement. Refresher training should focus on hazardous materials incident scenario analysis and practice working as a subordinate and adviser to the response command structure and hazardous materials teams in field exercises simulating emergencies. For specialist employees who will work in warm and hot zones, there should be annual retesting of response skills.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Federal Requirements

For Specialist Employee Training

OSHA establishes the following training requirements for specialist employees. Length of training and method of testing are not specified, but employers are required to ensure that employees demonstrate competency in the skills defined.

> *OSHA 29 CFR 1910.120(q)(5)*
> *SPECIALIST EMPLOYEES*
>
> *Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.*

Required training for specialist employees can be translated directly into the following sample objectives:

Identification	*Sample **Required** Training Objectives*
OSHA SpEMP-1	Given a simulated incident involving hazardous materials within the specialist employee's area of technical expertise, provide technical advice or assistance within the incident command structure regarding assessing the hazards of the substance present and potential magnitude of the incident.
OSHA SpEMP-2	Given a simulated incident involving hazardous materials within the specialist employee's area of technical expertise, provide technical advice within the incident command structure regarding potential response options.
OSHA SpEMP-3	Given a simulated incident involving hazardous materials within the specialist employee's area of technical expertise, provide technical assistance under the incident command structure for control, confinement and containment operations and for incident termination and evaluation activities.

SUMMARY: Specialist Employee

Audience	Prerequisites	Training	Refresher
Very broad. Any persons with existing job expertise in the hazards of specific chemicals or containers, who may be called upon to provide assistance during a hazmat emergency.	1. First Responder Awareness training. 2. Advanced technical expertise in specific hazardous chemicals or containers.	-Classroom, and simulator/field instruction with emphasis on participation in incident response scenarios. Hands-on where appropriate. -Competencies: - Ability to perform in depth hazard and risk assessment within area of expertise. - Ability to recommend response plan options, protective equipment and decontamination requirements, and to assist evaluation. *Additional competencies for those specialist employees whose expertise and assistance may be required in the warm or hot zone:* - Ability to perform specialized control, containment and/or confinement techniques. - Ability to select and use specialized personal protective equipment.	1. Practice providing hazard analysis and response advice during simulated emergencies. *For those specialist employees who may provide assistance in the warm or hot zone:* 2. Competency retesting of response skills and use of personal protective equipment.

Recommended Training
For Specialist Employee

The following training objectives are recommended for specialist employees. The source for this material is NFPA 472, Chapter 8: Competencies for Private Sector Specialist Employees, section 8-2 (Private Sector Specialist Employee C) and section 8-3 (Private Sector Specialist Employee B). To retain the integrity of the NFPA 472 citations, the groupings of objectives B and C levels are retained. Recommended objectives for Private Sector Specialist Employee C are referred to as SPEC(C) and recommended objectives for Private Sector Specialist Employee B are referred to as SPEC(B).

In general, these recommended objectives are comparable in scope to those minimally required by OSHA. They do not constitute an increased level of training but rather provide greater depth of definition of trainee objectives. The goal of these competencies is to ensure that the specialist employees have the knowledge and skills to safely perform the duties and responsibilities assigned in their organization's emergency response plan and SOP's. To assist in assessing course compliance with OSHA 1910.120(q), the relationships between these objectives and the OSHA requirements are noted.

Objective Identification Legend

SPEC(C)-1	This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as SPEC(C)-1.1) indicate enabling objectives supporting the primary objective.
NFPA 8.2.1.3	This indicates the origin of this objective. Usually it is directly from NFPA. In some cases, other sources are noted.
OSHA SpEMP-1	This indicates which OSHA requirement this objective supports. References to OSHA 1910.120(q)(5) are abbreviated as OSHA SpEMP 1-3.

Private Sector Specialist Employee C

In addition to being at the first responder awareness level relative to his or her organization's area of specialization, the private sector specialist employee C shall also achieve the following training objectives:

Identification	***Recommended** Training Objectives*
SPEC(C)-1 NFPA 8.2.1.2.2 *OSHA SpEMP-1,2*	Given a hazardous materials incident scenario, demonstrate an understanding of the role of the Private Sector Specialist Employee C, and be able to do the following:
SPEC(C)-1.1 NFPA 8.2.1.2.2(1) *OSHA SpEMP-1*	Describe the responsibility to assist the incident commander in analyzing the magnitude of an emergency involving chemicals or containers for chemicals.
SPEC(C)-1.1.1 NFPA8.2.1.2.2(1)a *OSHA SpEMP-1*	Identify the responsibility to provide information on the hazards and harmful effects of specific chemicals.

SPEC(C)-1.1.2
NFPA8.2.1.2.2(1)b
OSHA SpEMP-1

Identify the responsibility to provide information on the characteristics of specific containers for chemicals.

SPEC(C)-1.2
NFPA 8.2.1.2.2(2)
OSHA SpEMP-2

Describe the responsibility to assist the incident commander in planning a response to an emergency involving chemicals or containers for chemicals by providing information on the potential response options for chemicals or containers for chemicals.

Analyzing the Incident
Providing Information on the Hazards and Harmful Effects of Specific Chemicals

SPEC(C)-2
NFPA 8.2.2.1
OSHA SpEMP-1

Given a specific chemical(s) used in his or her organization's area of specialization and the appropriate material safety data sheet (MSDS) or other appropriate resource, advise the incident commander of the chemical's hazards and harmful effects, and be able to do the following:

SPEC(C)-2.1
NFPA 8.2.2.1(1)
OSHA SpEMP-1

Identify the following hazard information from the material safety data sheet (MSDS) or other appropriate resource:

(a) Physical and chemical characteristics
(b) Physical hazards of the chemical (including fire and explosion hazards)
(c) Health hazards of the chemical
(d) Signs and symptoms of exposure
(e) Routes of entry
(f) Permissible exposure limits
(g) Reactivity hazards
(h) Environmental concerns

SPEC(C)-2.2
NFPA 8.2.2.1(2)
OSHA SpEMP-1

Identify how to contact CHEMTREC/CANUTEC/SETIQ.

SPEC(C)-2.3
NFPA 8.2.2.1(3)
OSHA SpEMP-1

Identify the resources available from CHEMTREC/CANUTEC/SETIQ.

SPEC(C)-2.4
NFPA 8.2.2.1(4)
OSHA SpEMP-1

Given their organization's emergency response plan and standard operating procedures, identify additional resources of hazard information, including a method of contact.

Analyzing the Incident
Providing Information on Characteristics of Specific Containers

SPEC(C)-3
NFPA 8.2.2.2
OSHA SpEMP-1

Given examples of facility and transportation containers for chemicals in their organization's area of specialization, advise the incident commander of the characteristics of the containers, and be able to do the following:

SPEC(C)-3.1
NFPA 8.2.2.2 (1)
OSHA SpEMP-1

Given examples of various containers for chemicals used in his or her organization's area of specialization, identify each container by name.

SPEC(C)-3.2
NFPA 8.2.2.2 (2)
OSHA SpEMP-1

Given examples of facility and transportation containers for chemicals in their organization's area of specialization, identify the markings that differentiate one container from another.

SPEC(C)-3.3
NFPA 8.2.2.2 (2)
OSHA SpEMP-1

Given their organization's emergency response plan and standard operating procedures, identify the resources available that can provide information about the characteristics of the container.

Planning the Response

Providing Information on Potential Response Options for Specific Chemicals

SPEC(C)-4
NFPA 8.2.3.1
OSHA SpEMP-2

Given a specific chemical used in their organization's area of specialization and an appropriate material safety data sheet (MSDS) or other appropriate resource, advise the incident commander of the response information for that chemical, and be able to do the following:

SPEC(C)-4.1
NFPA 8.2.3.1 (1)
OSHA SpEMP-2

Given a specific chemical used in their organization's area of specialization and an appropriate (MSDS), obtain the following response information:

(a) Precautions for safe handling, including hygiene practices, protective measures, and procedures for cleanup of spills/leaks
(b) Applicable control measures, including personal protective equipment
(c) Emergency and first aid procedures

SPEC(C)-4.2
NFPA 8.2.3.1 (2)
OSHA SpEMP-2

Given his or her organization's emergency response plan and SOP's, identify additional resources for obtaining response information.

Private Sector Specialist Employee B

SPEC(B)-1
NFPA 8.3.1.2.2
OSHA SpEMP-1,2,3

Given a simulated incident involving hazardous materials within the individual area of specialization, define the roles and responsibilities of the private sector specialist employee B.

SPEC(B)-1.1
NFPA 8.3.1.2.2(1)
OSHA SpEMP-1

Describe the responsibility to assist the incident commander in analyzing the magnitude of an incident involving chemicals or containers for chemicals.

SPEC(B)-1.1.1
NFPA8.3.1.2.2(1)a
OSHA SpEMP-1

Identify the responsibility to provide and interpret information on the hazards and harmful effects.

SPEC(B)-1.1.2
NFPA8.3.1.2.2(1)b
OSHA SpEMP-1

Identify the responsibility to provide and interpret information on the characteristics of specific containers.

SPEC(B)-1.1.3
NFPA 8.3.1.2.2(1)c
OSHA SpEMP-1

Identify the responsibility to provide information on concentrations of chemicals from exposure monitoring, dispersion modeling, or any other predictive method.

SPEC(B)-1.2
NFPA 8.3.1.2.2(2)
OSHA SpEMP-2

Describe the responsibility to assist the incident commander in planning a response to an incident involving chemicals or containers for chemicals.

SPEC(B)-1.2.1
NFPA8.3.1.2.2(2)a
OSHA SpEMP-2

Identify the responsibility to provide information on the potential response options and their consequences for specific chemicals or containers for chemicals.

SPEC(B)-1.2.2
NFPA8.3.1.2.2(2)b
OSHA SpEMP-2

Identify the responsibility to provide information on the personal protective equipment requirements for a specific chemical.

SPEC(B)-1.2.3
NFPA8.3.1.2.2(2)c
OSHA SpEMP-2

Identify the responsibility to provide information on the decontamination methods for a specific chemical.

SPEC(B)-1.2.4
NFPA8.3.1.2.2(2)d
OSHA SpEMP-1,2,3

Identify the responsibility to provide information on the federal/provincial regulations that relate to the handling and disposal of a specific chemical.

SPEC(B)-1.2.5
NFPA8.3.1.2.2(2)e
OSHA SpEMP-2,3

Identify the responsibility to develop a plan of action (within the capabilities of the available resources), including safety considerations, for handling chemicals or containers for chemicals consistent with their organization's emergency response plan and standard operating procedures.

SPEC(B)-1.3
NFPA 8.3.1.2.2(3)
OSHA SpEMP-3

Describe the responsibility to implement the planned response, as developed with the incident commander, for chemicals or containers for chemicals, consistent with their organization's emergency response plan and standard operating procedures and within the capabilities of the available resources, and be able to do the following:

SPEC(B)-1.3.1
NFPA 8.3.1.2.2(3)a
OSHA SpEMP-3

Identify the responsibility to perform response options specified in the plan of action, as agreed upon with the incident commander and consistent with their organization's emergency response plan and standard operating procedures (within the capabilities of the available resources).

SPEC(B)-1.3.2
NFPA 8.3.1.2.2(3)b
OSHA SpEMP-3

Identify the responsibility to don, work in, and doff personal protective equipment needed to implement the response options.

SPEC(B)-1.4
NFPA 8.3.1.2.2(4)
OSHA SpEMP-2,3

Describe the responsibility to assist the incident commander to evaluate the results of implementing the planned response.

SPEC(B)-1.4.1
NFPA 8.3.1.2.2(4)a
OSHA SpEMP-2,3

Identify the responsibility to provide feedback on the effectiveness of the response options taken.

SPEC(B)-1.4.2
NFPA 8.3.1.2.2(4)b
OSHA SpEMP-2,3

Identify the responsibility to provide reporting and subsequent documentation of the incident involving chemicals as required.

Analyzing the Incident

Providing and Interpreting Information on Hazards of Specific Chemicals

SPEC(B)-2
NFPA 8.3.2.1
OSHA SpEMP-1

Given a specific chemical within their individual area of specialization and an appropriate material safety data sheet (MSDS) or other appropriate resource, advise the incident commander of the chemical's hazards and harmful effects and the potential consequences based on the incident, and be able to do the following:

SPEC(B)-2.1
NFPA 8.3.2.1 (1)
OSHA SpEMP-1

Given a specific chemical, identify and interpret the following hazard information:

(a) Physical and chemical characteristics
(b) Physical hazards of the chemical (including fire and explosion hazards)
(c) Health hazards of the chemical
(d) Signs and symptoms of exposure
(e) Routes of entry
(f) Permissible exposure limits
(g) Reactivity hazards
(h) Environmental concerns

SPEC(B)-2.2
NFPA 8.3.2.1 (2)
OSHA SpEMP-1

Given examples of specific chemicals and the appropriate resources (as identified in their organization's emergency response plan and standard operating procedures), predict the potential behavior of the chemicals based on the damage found, including the consequences of that behavior.

SPEC(B)-2.3
NFPA 8.3.2.1 (3)
OSHA SpEMP-1

Identify the general types of hazard information available from the other resources identified in their organization's emergency response plan and standard operating procedures.

Analyzing the Incident
Providing Information on Characteristics of Specific Containers

SPEC(B)-3
NFPA 8.3.2.2
OSHA SpEMP-1

Given a container for specific chemicals, advise the incident commander of the characteristics and potential behavior of that container, and be able to do the following:

SPEC(B)-3.1
NFPA 8.3.2.2 (1)
OSHA SpEMP-1

Given examples of containers for specific chemicals, identify the purpose and operation of the closures found on those containers.

SPEC(B)-3.2
NFPA 8.3.2.2 (2)
OSHA SpEMP-1

Given a chemical container, list the types of damage that could occur.

SPEC(B)-3.3
NFPA 8.3.2.2 (3)
OSHA SpEMP-1

Given examples of containers for specific chemicals and the appropriate resources (as identified in their organization's emergency response plan and standard operating procedures), predict the potential behavior of the containers and the consequences, based on the damage found.

SPEC(B)-3.4
NFPA 8.3.2.2 (4)
OSHA SpEMP-1

Given their organization's emergency response plan and standard operating procedures, identify resources (including a method of contact) knowledgeable in the design, construction, and damage assessment of containers for chemicals.

Analyzing the Incident
Providing Information on Concentrations of Chemicals

SPEC(B)-4
NFPA 8.3.2.3
OSHA SpEMP-1

Given a chemical and the applicable monitoring equipment provided by their organization for that chemical or the available predictive capabilities (e.g., dispersion modeling, exposure modeling), advise the incident commander of the concentrations of the released chemical and the implications of that information to the incident, and be able to do the following:

SPEC(B)-4.1
NFPA 8.3.2.3 (1)
OSHA SpEMP-1

Identify the appropriate monitoring equipment for a chemical used in his or her individual area of specialization.

SPEC(B)-4.2
NFPA 8.3.2.3 (2)
OSHA SpEMP-1

Use the appropriate monitoring equipment provided by their organization to determine the actual concentrations of a specific chemical.

SPEC(B)-4.3
NFPA 8.3.2.3 (3)
OSHA SpEMP-1

Given information on the concentrations of a chemical used in their organization, interpret the significance of that concentration information to the incident relative to the hazards and harmful effects of the chemical.

SPEC(B)-4.4
NFPA 8.3.2.3 (4)
OSHA SpEMP-1

Demonstrate field calibration and testing procedures, as necessary, for the monitoring equipment provided by their organization.

SPEC(B)-4.5
NFPA 8.3.2.3 (5)
OSHA SpEMP-1

Given their organization's emergency response plan and standard operating procedures, identify the resources (including a method of contact) capable of providing monitoring equipment, dispersion modeling, or monitoring services.

Planning the Response
Providing Information on Potential Response Options and Consequences for Specific Chemicals

SPEC(B)-5
NFPA 8.3.3.1
OSHA SpEMP-2

Given specific chemicals or containers within their individual area of specialization and the appropriate resources, advise the incident commander of the potential response options and their consequences, and be able to do the following:

SPEC(B)-5.1
NFPA 8. 3.3.1 (1)
OSHA SpEMP-2

Given a specific chemical and an appropriate material safety data sheet (MSDS), identify and interpret the following response information:
(a) Precautions for safe handling, including hygiene practices, protective measures, and procedures for cleanup of spills or leaks
(b) Applicable control measures, including personal protective equipment
(c) Emergency and first aid procedures

SPEC(B)-5.2
NFPA 8. 3.3.1 (2)
OSHA SpEMP-2

Given their organization's emergency response plan and standard operating procedures, identify additional resources for interpreting response information for a chemical.

SPEC(B)-5.3
NFPA 8. 3.3.1 (3)
OSHA SpEMP-2

Describe the advantages and limitations of the potential response options for a specific chemical.

SPEC(B)-5.4
NFPA 8. 3.3.1 (4)
OSHA SpEMP-2

Given their organization's emergency response plan and standard operating procedures, identify resources (including a method of contact) capable of:
(a) Repairing containers for chemicals
(b) Removing the contents of containers for chemicals
(c) Cleanup and disposal of chemicals or containers for chemicals

Planning the Response
Providing Information on Personal Protective Equipment Requirements

SPEC(B)-6
NFPA 8.3.3.2
OSHA SpEMP-3

Given specific chemicals or containers for chemicals within their individual area of specialization and the appropriate resources, advise the incident commander of the appropriate personal protective equipment necessary for various response options, and be able to do the following:

SPEC(B)-6.1
NFPA 8.3.3.2 (1)
OSHA SpEMP-3

Given a specific chemical and an appropriate material safety data sheet (MSDS), identify personal protective equipment, including the materials of construction, that will be compatible with that chemical.

SPEC(B)-6.2
NFPA 8.3.3.2 (2)
OSHA SpEMP-3

Given their organization's emergency response plan and standard operating procedures, identify other appropriate resources (including a method of contact) capable of identifying the personal protective equipment that is compatible with a specific chemical.

SPEC(B)-6.3
NFPA 8.3.3.2 (3)
OSHA SpEMP-3

Given an incident involving a specific chemical and the response options for that problem, determine whether the personal protective equipment provided by the organization is appropriate for the options presented.

Planning the Response
Providing Information on Decontamination Methods

SPEC(B)-7
NFPA 6-3.3.3
OSHA SpEMP-3

Given a specific chemical within their individual area of specialization and the available resources, identify appropriate decontamination methods for various response options.

SPEC(B)-7.1
NFPA 6-3.3.3.1
OSHA SpEMP-3

Given a specific chemical and a material safety data sheet (MSDS) or other resource, obtain the potential methods for removing or neutralizing that chemical.

SPEC(B)-7.2
NFPA 6-3.3.3.2
OSHA SpEMP-3

Given a specific chemical and a material safety data sheet (MSDS) or other resource, identify the circumstances under which disposal of contaminated equipment would be necessary.

SPEC(B)-7.3
NFPA 6-3.3.3.3
OSHA SpEMP-3

Given their organization's emergency response plan and standard operating procedures, identify resources (including a method of contact) capable of identifying potential decontamination methods.

Planning the Response
Providing Information on Handling and Disposal Regulations

SPEC(B)-8
NFPA 6-3.3.4
OSHA SpEMP-2

Given a specific chemical within their area of specialization and the available resources, advise the incident commander of the federal or provincial regulations that relate to the handling, transportation, and disposal of that chemical.

SPEC(B)-8.1
NFPA 6-3.3.4.1
OSHA SpEMP-2

Given a specific chemical and a material safety data sheet (MSDS) or other resource, identify federal or provincial regulations that apply to the handling, transportation, and disposal of that chemical.

SPEC(B)-8.2
NFPA 6-3.3.4.2
OSHA SpEMP-2

Given a specific chemical and a material safety data sheet (MSDS) or other resource, identify the agencies (including a method of contact) responsible for compliance with the federal or provincial regulations that apply to the handling, transportation, and disposal of a specific chemical.

SPEC(B)-8.3
NFPA 6-3.3.4.3
OSHA SpEMP-2

Given their organization's emergency response plan and standard operating procedures, identify resources for information pertaining to federal or provincial regulations relative to the handling and disposal of a specific chemical.

Planning the Response
Developing a Plan of Action

SPEC(B)-9
NFPA 6-3.3.5
OSHA SpEMP-2

Given a simulated incident involving chemicals or containers used in their individual area of specialization, develop a plan of action (in conjunction with the incident commander), consistent with their organization's emergency response plan and standard operating procedures, for handling chemicals or containers in that incident. The plan of action developed shall be within the capabilities of the available resources and shall include safety considerations.

SPEC(B)-9.1
NFPA 6-3.3.5.1
OSHA SpEMP-2

Given the organization's emergency response plan and standard operating procedures, identify the process for development of a plan of action, including safety considerations.

Implementing the Planned Response
Performing Response Options Specified in the Plan of Action

SPEC(B)-10
NFPA 8.3.4.1
OSHA SpEMP-3

Given an assignment by the incident commander in their individual area of specialization, perform the assigned actions consistent with their organization's emergency response plan and standard operating procedures, and be able to do the following:

SPEC(B)-10.1
NFPA 8.3.4.1 (1)
OSHA SpEMP-3

Perform assigned tasks consistent with their organization's emergency response plan and standard operating procedures and the available personnel, tools, and equipment (including personal protective equipment), including the following:
- (a) Confinement activities
- (b) Containment activities
- (c) Product removal activities

SPEC(B)-10.2
NFPA 8.3.4.1 (2)
OSHA SpEMP-1

Identify factors that can affect an individual's ability to perform the assigned tasks.

Implementing the Planned Response
Using Personal Protective Equipment

SPEC(B)-11
NFPA 8.3.4.2
OSHA SpEMP-3

Given an assignment within their individual area of specialization, don, work in, and doff the appropriate personal protective equipment needed to implement the assigned response options, consistent with their organization's emergency response plan and standard operating procedures, and be able to do the following:

SPEC(B)-11.1
NFPA 8.3.4.2 (1)
OSHA SpEMP-3

Don, work in, and doff the appropriate respiratory protection and protective clothing for the assigned tasks.

SPEC(B)-11.2
NFPA 8.3.4.2 (2)
OSHA SpEMP-3

Identify the safety considerations for personnel wearing personal protective equipment, including:
- (a) Buddy system
- (b) Backup personnel
- (c) Symptoms of heat and cold stress
- (d) Limitations of personnel working in personal protective equipment
- (e) Indications of material degradation of chemical-protective clothing
- (f) Physical and psychological stresses on the wearer
- (g) Emergency procedures and hand signals

SPEC(B)-11.3
NFPA 8.3.4.2 (3)
OSHA SpEMP-3

Identify the procedures for cleaning, sanitizing, and inspecting personal protective equipment provided by the organization.

Evaluating Progress
Providing an Evaluation of the Effectiveness of Selected Response Options

SPEC(B)-12
NFPA 8.3.5.1
OSHA SpEMP-3

Given an incident involving specific chemicals or containers for chemicals within their individual area of specialization, advise the incident commander of the effectiveness of the selected response options.

SPEC(B)-12.1
NFPA 8.3.5.1 (1)
OSHA SpEMP-3

Identify the criteria for evaluating whether or not the selected response options are effective in accomplishing the objectives.

SPEC(B)-12.2
NFPA 8.3.5.1 (2)
OSHA SpEMP-3

Identify the circumstances when it would be prudent to withdraw from a chemical incident.

Evaluating Progress
Reporting and Documenting the Incident

SPEC(B)-13
NFPA 8.3.5.2
OSHA SpEMP-1,2,3

Given a simulated incident involving chemicals or containers for chemicals used in their individual area of specialization, complete the reporting and subsequent documentation requirements consistent with their organization's emergency response plan and standard operating procedures, and be able to do the following:

SPEC(B)-13.1
NFPA 8.3.5.2 (1)
OSHA SpEMP-1.2

Identify the importance of documentation (including training records, exposure records, incident reports, and critique reports) for an incident involving chemicals.

SPEC(B)-13.2
NFPA 8.3.5.2 (2)
OSHA SpEMP-1,2

Identify the steps used in keeping an activity log and exposure records.

SPEC(B)-13.3
NFPA 8.3.5.2 (3)
OSHA SpEMP-1,2

Identify the requirements for compiling incident reports.

SPEC(B)-13.4
NFPA 8.3.5.2 (4)
OSHA SpEMP-2,3

Identify the requirements for compiling hot zone entry and exit logs.

SPEC(B)-13.5
NFPA 8.3.5.2 (5)
OSHA SpEMP-2,3

Identify the requirements for compiling personal protective equipment logs.

SPEC(B)-13.6
NFPA 8.3.5.2 (6)
OSHA SpEMP-2,3

Identify the requirements for filing documents and maintaining records.

**Hazardous Materials
and Terrorist Incident
Response
Training Guidelines**

Emergency Medical Service/ Hazardous Materials Level 1 Responder

General Training Considerations

Introduction

Emergency medical service (EMS) personnel at EMS/HM Level 1, in addition to their BLS or ALS certificatino, shall be trained to meet the requirements of the first responder at the awareness level, as defined in OSHA 1910.120(q)(6)(i) andor as defined in NFPA 472, Chapter 4, and all the competencies recommended in this section. In addition, EMS/HM Level 1 responders shall meet the training requirements of local occupational health and safety regulatory agencies or EPA, as appropriate for their jurisdiction.

In addition to being trained to the first responder awareness level, emergency medical service personnel who respond to hazardous materials incidents should be trained and receive regular continuing education to maintain competence in three areas: emergency medical technology, hazardous materials, and specialized topics such as hazardous materials toxicology, as approved by the authority having jurisdiction. The training program should be a comprehensive competency-based presentation of the required subject material with applicable hands-on sessions that demonstrate the newly acquired skills.

Definition

Emergency medical service/hazardous materials Level 1 responders are persons who, in the course of their normal duties, may be called on to perform patient care activities in the cold zone at a hazardous materials incident. EMS/HM Level 1 responders shall provide prehospital care *only* to those individuals who no longer pose a significant risk of secondary contamination, such as decontaminated patients in the cold zone.

Audience

EMS/HM Level 1 training is appropriate for all emergency medical technicians, paramedics, and other health professionals who, in the course of their normal duties, may respond to hazardous materials emergencies either as a first responder or as on-site cold zone support to the incident command structure at an incident scene.

Related Health, Safety, and Performance Standards

OSHA 29 CFR 1910.120
EPA 40 CFR 311
NFPA 472
NFPA 473
NFPA 1561 Standards on Fire Department Incident Management System, 1995 Edition
U.S. Fire Administration Emergency Incident Rehabilitation Guide, FA-114

Recognized U.S. Department of Transportation, State, regional, or local training curricula should constitute the entry-level EMS preparation for continuing hazardous materials training. When a hazardous materials incident occurs, all EMS basic life-support-provider personnel responding should have been trained to the emergency medical technician A level or equivalent.

Appropriate Methodologies

EMS/HM Level 1 Responder training should include a combination of traditional classroom lecture with small-group activities, field exercises involving working with the incident command structure in simulated emergencies, and hands-on psychomotor skill training. Content instruction should focus on contamination hazards, treatment procedures, and incident scene roles and responsibilities. Trainee activities should focus on assessment and analysis of hazards and determination of appropriate procedures. Skill training should focus on implementing procedures. Written and practical examinations are highly recommended to measure achievement in initial training and refresher programs and to support the employer's responsibility that all EMS personnel are trained to competency before being called on to perform at emergencies. Table-top and field exercises should focus on acting out incident scene roles and on implementing procedures in a field environment. Refresher training should be conducted on a yearly basis and focus on technical updates

to changes in response protocols, SOP's, and renewal of individual response skills.
The following resources are recommended to supplement the training process:

- Local Emergency Response Plan
- Standard Operating Procedures
- Hawley's Condensed Chemical Dictionary, 11th Edition
- OSHA 29 CFR 1910.120
- Hazardous Chemical Data (U.S. Government)
- National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards (U.S. Government)
- Emergency Action Guides (Association of American Railroads)
- NFPA 471, 472, and 473
- Handbook of Toxic and Hazardous Chemicals and Carcinogens
- Toxic Gases: First Aid and Medical Treatment
- Haz/Mat Injuries (Bradford/Stutz)

SUMMARY: Emergency Medical Services/Haz Mat Level 1 Responder

Audience	Prerequisites	Training	Refresher
Large training audience. All paramedics and emergency medical technicians who respond to emergencies, including all transportation accidents, that may involve hazmat.	First Responder Awareness training. BLS or ALS certification	- Classroom, physical skills lab, and simulator/field instruction, with emphasis on decision making and treatment. - Competencies: - Assessing incident scene hazards and risks of patient secondary contamination. - Incident scene response planning, including determining personal protective equipment needs and defining roles and responsibilities of EMS Level 1 responder. - Ability to perform EMS/HM Level 1 patient preparation, care, preparation for transport, and patient transport as appropriate. -Ability to perform medical support of HM incident response personnel. - Ability to perform post-incident EMS reporting, documentation, and follow-up.	1. Technical updates. 2. Changes in response protocols and incident command system SOP's. 3. Renewal and retesting of incident scene decision making and cold zone treatment skills.

Recommended Training

For EMS/HM Level 1 Responder Training

The following training objectives are recommended for emergency medical service/hazardous meterials Level 1 responder. The primary source for this material is NFPA 473: Standard for Competencies for EMS Personnel Responding to Hazardous Materials Incidents, Chapter 4 Competencies for EMS/HM Level 1 Responders.

In general, these recommended objectives are comparable in scope and concept to the general requirements of OSHA that all responding personnel be properly trained to perform their assigned roles in a hazardous materials emergency.

Objective Identification Legend

EMS(1)-1.3 — This is the identification of the objective used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as EMS(1)-1.1) indicate enabling objectives supporting the primary objective.

NFPA 2-1.3 — This indicates the origin of this objective. Usually it is directly from NFPA 473, Chapter 4.

Identification	***Recommended** Training Objectives*
EMS(1)-1 NFPA 4.1.2	Given a hazardous materials incident scenario, demonstrate an understanding of the role of the EMS/HM Level 1 Responder, and be able to do the following.
EMS(1)-1.1 NFPA 4.1.2(1)	....Describe the responsibility of the EMS/HM Level 1 Responder to analyze a hazardous materials emergency to determine what risks are present to the provider and the patient.
EMS(1)-1.2 NFPA 4.1.2(2)	....Describe the responsibility of the EMS/HM Level 1 Responder to plan a response to provide emergency medical care to persons involved in hazardous materials incidents.
EMS(1)-1.3 NFPA 4.1.2(3)	....Describe the responsibility of the EMS/HM Level 1 Responder to implement the planned response.
EMS(1)-1.4 NFPA 4.1.2(4)	....Describe the responsibility of the EMS/HM Level 1 Responder to terminate the incident

Analyzing the Hazardous Materials Incident

EMS(1)-2 NFPA 4.2.1	Given an emergency involving hazardous materials, determine the hazards to the responder and the patient in that situation, and be able to do the following:

EMS(1)-2.1
NFPA 4.2.1(1)

....Assess the nature and severity of the incident (size-up) as they pertain to EMS responsibilities at a hazardous materials incident with evaluation of available resources and a request for any needed assistance.

EMS(1)-2.2
NFPA 4.2.1(2)

....Evaluate the environmental factors as they affect patient care.

EMS(1)-2.3
NFPA 4.2.1(3)

....Identify the information resources available and how to access them, including the following:

(1) Poison Control Center
(2) Medical control
(3) Material safety data sheets
(4) Reference guidebooks
(5) Hazardous materials data bases
(6) Technical information centers (CHEMTREC, NRC, etc.)
(7) Technical specialists
(8) Agency for Toxic Substances and Disease Registry (ATSDR)

EMS(1)-3
NFPA 4.2.2

Given a hazardous materials incident with a patient(s), determine the risk of secondary contamination, and be able to do the following...

EMS(1)-3.1
NFPA 4.2.2(1)

....Explain the basic toxicological principles relative to assessment and treatment of victims exposed to hazardous materials, including the following:

(a) Acute and delayed toxicity
(b) Routes of exposure to toxic materials
(c) Local and systemic effects
(d) Dose response as it relates to risk assessment
(e) Synergistic effects
(f) Health hazard as determined by assessing toxicity, exposure, and dose

EMS(1)-3.2
NFPA 4.2.2(2)

....Describe how the chemical contamination of patients alters the principles of triage in hazardous materials incidents.

EMS(1)-3.3
NFPA 4.2.2(3)

....Describe how priorities for care of chemically contaminated patients differ from those of radiological contamination

EMS(1)-3.4
NFPA 4.2.2(4)

....Explain the need for patient decontamination procedures at hazardous materials incidents.

EMS(1)-3.5
NFPA 4.2.2(5)

....Describe how the potential for secondary contamination determines the extent of patient decontamination required.

EMS(1)-3.6
NFPA 4.2.2(6)

...Describe the way that personnel, personal protective clothing, apparatus, tools, and equipment become contaminated and the importance and limitations of decontamination procedures.

EMS(1)-3.7
NFPA 4.2.2(7)

....Explain the decontamination procedures as defined by the authority having jurisdiction for patients, personnel, personal protective equipment, and apparatus at hazardous materials incidents.

EMS(1)-4
NFPA 4.2.3

Given a description of a typical community, the EMS/HM Level 1 responder shall identify at least four types of locations that could become targets for criminal or terrorist activity using hazardous materials.

EMS(1)-5
NFPA 4.2.4

The Level 1 responder shall describe the difference between a chemical and a biological incident.

EMS(1)-6
NFPA 4.2.5

The Level 1 responder shall identify at least four indicators of possible criminal or terrorist activity involving chemical agents.

EMS(1)-7
NFPA 4.2.6

The Level 1 responder shall identify at least four indicators of possible criminal or terrorist activity involving biological agents.

Planning the Response

EMS(1)-8
NFPA 4.3.1

Given a plan of action by the incident commander, describe the EMS/HM Level 1 responder role in a hazardous materials incident as identified in the local emergency response plan or organization's standard operating procedures, and be able to do the following...

EMS(1)-8.1
NFPA 4.3.1(1)

....Given specific scenarios, describe the emergency medical component for the hazardous materials incident response plan as developed by the authority having jurisdiction.

EMS(1)-8.2
NFPA 4.3.1(2)

....State the Level I responder's role within the hazardous materials response plan as developed by the authority having jurisdiction.

EMS(1)-8.3
NFPA 4.3.1(3)

....State the Level I responder's role within the hazardous materials incident management system.

EMS(1)-9
NFPA 4.3.2

Given a hazardous materials incident, be able to plan a response to provide emergency medical care, including the standard operating procedures for the medical management of persons exposed to hazardous materials, as specified by the authority having jurisdiction.

EMS(1)-10
NFPA 4.3.3

Given the name of the hazardous material and the type, duration, and extent of exposure and decontamination process, determine if available personal protective clothing and equipment are appropriate to implement the planned response.

EMS(1)-11
NFPA 4.3.4

Describe the application, use, and limitations of the following:

(1) Street clothing and work uniforms
(2) Structural fire fighting protective clothing
(3) Respiratory protective equipment
(4) Chemical-protective clothing
(5) Body substance isolation protective clothing

EMS(1)-12
NFPA 4.3.5

Given a simulated hazardous materials incident, determine if available equipment and supplies are appropriate to implement the planned response.

EMS(1)-13
NFPA 4.3.6

Describe the equipment and supplies available to the Level I responder for the care and transportation of the hazardous materials incident patient.

Implementing the Planned Response

EMS(1)-14
NFPA 4.4.1

Given a plan for providing patient care at a hazardous materials incident, be able to perform the preparations necessary to receive the patient for treatment and transport, and be able to do the following...

EMS(1)-14.1
NFPA 4.4.1(1)

....List the information that needs to be communicated to the Medical Control/ Receiving facility regarding the hazardous materials incident, including the following:

(a) Type and nature of the incident
(b) Name of the material involved with correct spelling, and its physical state
(c) Number of potential patients
(d) Extent of decontaminatino accomplished

EMS(1)-14.2
NFPA 4.4.1(2)

....Describe the procedure for preparing the vehicle and equipment for the patient.

EMS(1)-14.3
NFPA 4.4.1(3)

....Demonstrate the proper donning, doffing, usage, and describe the limitations of all personal protective equipment provided to the Level I responder by the authority having jurisdiction for use in his/her hazardous materials response activities.

EMS(1)-14.4
NFPA 4.4.1(4)

....Describe the concept of patient transfer from the incident site to the decontamination area and then to the treatment area.

EMS(1)-15
NFPA 4.4.2

Given a patient from a hazardous materials incident, provide patient care consistent with the planned response and the organization's standard operating procedures, adn be able to do the following...

EMS(1)-15.1
NFPA 4.4.2(1)

....Describe how chemical contamination alters the assessment and care of the hazardous materials patient.

EMS(1)-15.2
NFPA 4.4.2(2)

....List the common signs and symptoms and describe the EMS treatment protocols for the following:

(a) Corrosives (e.g., acid, alkali)
(b) Pesticides (e.g., organophosphates, carbamates)
(c) Chemical asphyxiants (e.g., cyanide, carbon monoxide)
(d) Hydrocarbon solvents (e.g., xylene, methylene chloride)
(e) Never agents (e.g. tabun, sarin, soman, V agent)
(f) Vesicants (blister agents, e.g., mustard, distilled mustard)
(g) Blood agents (e.g. hydrogen cyanide, cyanogen chloride)
(h) Choking agents (pulmonary agents, e.g., ammonia, chlorine, diphosgene phos gene)
(i) Irritants [riot control agents, e.g., CS (orthochlorobenzalmalononitrile), CN (chloroacetophenone), CR (dibenzoxazepine), MACE (phenylchloromethylketone), OC (pepper spray)
(j) Bilogical agents and toxins (e.g., anthrax, mycotoxin, plague, viral hemorraghic fevers, smallpox, and ricin)
(k) Incapacitating agents (e.g., BZ, LSD)
(l) Radiological materials (e.g., uranium, plutonium, cesium, iridium, technetium)

EMS(1)-15.3
NFPA 4.4.2(3)

....Explain the potential risk with invasive procedures for hazardous materials patients.

EMS(1)-15.4
NFPA 4.4.2(4)

....Demonstrate the following EMS functions within the incident management system during incidents involving multiple hazardous materials patients:

(a) EMS control
(b) Triage
(c) Treatment
(d) Disposition and transportation

EMS(1)-16
NFPA 4.4.3

Given a patient from a hazardous materials incident, transport the patient as specified in the local emergency response plan and the organization's standard operating procedures, and be able to do the following....

EMS(1)-16.1
NFPA 4.4.3(1)

....Identify the capabilities of the medical facilities available in the local area to receive hazardous materials patients.

EMS(1)-16.2
NFPA 4.4.3(2)

....Identify the vehicles available to transport hazardous materials patients from the treatment area to a receiving facility.

EMS(1)-16.3
NFPA 4.4.3(3)

....List the pertinent information that needs to be communicated to the receiving facility, including the following:

(a) Estimated time of arrival
(b) Age/sex
(c) Patient condition/chief complaint
(d) Associated injuries
(e) Routes, extent, and duration of chemical exposure
(f) Pertinent medical history
(g) Signs and symptoms
(h) Vital signs
(i) Treatment, including decontamination and patient response
(j) Pertinent chemical characteristics

EMS(1)-16.4
NFPA 4.4.3(4)

....Describe the actions necessary for the coordinated delivery of hazardous materials incidents patients to a receiving facility.

EMS(1)-16.5
NFPA 4.4.3(5)

....Explain the special hazards associated with air transportation of patients exposed to hazardous materials

EMS(1)-17
NFPA 4.4.4

Given a simulated hazardous materials incident, perform medical support of hazardous materials incident response personnel, and be able to do the following...

EMS(1)-17.1
NFPA 4.4.4(1)

....Explain the components of pre-entry and post-entry assessment, including the following:

(a) Vital signs
(b) Body weight
(c) General health
(d) Neurological status
(e) Electrocardiographic rhythm strip, if available

EMS(1)-17.2
NFPA 4.4.4 (2)

....Explain the following factors and how they influence heat stress for hazardous materials response personnel:

(a) Hydration
(b) Physical fitness
(c) Environmental factors
(d) Activity levels
(e) Level of PPE
(f) Duration of entry

EMS(1)-17.3
NFPA 4.4.4(3)

....Explain the medical monitoring protocols and demonstrate medical monitoring procedures for personnel at the scene of a hazardous materials incident.

EMS(1)-17.4
NFPA 4.4.4(4)

....Describe the criteria for site selection of a medical monitoring station.

EMS(1)-17.5
NFPA 4.4.4(5)

....Demonstrate the ability to set up and operate a medical monitoring station.

EMS(1)-17.6
NFPA 4.4.4(6)

....Demonstrate the ability to interpret and analyze data obtained from medical monitoring of hazardous materials response personnel.

EMS(1)-17.7
NFPA 4.4.4(7)

....Given a simulated hazardous materials incident, demonstrate documentation of medical monitoring.

EMS(1)-18
NFPA 4.4.5

Identify at leats four specific actions necessary when an incident is suspected to involve criminal or terrorist activity.

EMS(1)-19
NFPA 4.4.6

Given either a facility or transportatino scenario of hazardous materials, with or without criminal or terrorist activities, identify the approriate initial notificatinos to be made andhow to make them, consistent with the local emergency response plan or the organization's standard operating procedures.

EMS(1)-20
NFPA 4.4.7

Given an incident involving the suspicion of a biological warfare agent, identify each of the following:

(1) Correct body substance isolation procedures to be followed.
(2) Proper decontaminatin procedures in accordance with standard operating procedures or guidelines.
(3) Necessary post-exposure reporting.

Terminating the Incident

EMS(1)-21
NFPA 4.5.1

Upon termination of the hazardous materials incident, complete the reporting, documentation, and EMS termination activities as required by the local emergency response plan or the organization's standard operating procedures, and be able to do the following:

EMS(1)-21.1
NFPA 4.5.1(1)

....List the information to be gathered regarding the exposure of the patient and the EMS provider and describe the proper reporting procedures, including the following:

(a) Product information
(b) Routes, extent, and duration of exposure
(c) Actions taken to limit exposure and contamination
(d) Treatment rendered
(e) Patient condition and disposition

EMS(1)-21.2
NFPA 4.5.1(2)

....Identify situations that can necessitate critical incident stress debriefing intervention.

EMS(1)-21.3
NFPA 4.5.1(3)

....Describe the EMS provider's role in the post-incident critique.

**Hazardous Materials
and Terrorist Incident
Response
Training Guidelines**

Emergency Medical Service/ Hazardous Materials Level 2 Responder

General Training Considerations

Introduction

Emergency medical service hazardous materials Level 2 responders shall be certified at the EMT-B level or higher, shall meet all the competencies for EMS/Haz Mat Level 1 responder as defined in NFPA 473 and in these guidelines, and shall meet all the competencies recommended in NFPA 473 and in this section for EMS/HM Level 2 Responder. In addition, EMS/HM Level 2 responders shall meet the training requirements of local occupational health and safety agencies, OSHA, and EPA, and emergency medical technician A certification standards, as appropriate for or required by their jurisdiction.

Decontamination of patients or rescue personnel is a critical task. These individuals have come in contact with a foreign agent that will cause either short- or long-term medical problems. Whether the ramifications of contact with the foreign agent are long-term, chronic or acute, the need to have medically trained personnel, emergency medical technicians, and paramedics conducting decontamination procedures is imperative and self-explanatory. Using certified emergency medical technicians and paramedics trained in hazardous materials to conduct the decontamination operation will result in a higher level of care and the ability to provide effective and efficient patient assessment and prehospital care that will benefit all who are involved with these types of operations.

EMS/HM Level 2 Responders are expected to be able to analyze and determine the magnitude of problem areas at hazardous materials incidents and at criminal and terrorist incidents involving hazardous materials or related weapons of mass destruction. They also are expected to plan a response and provide the appropriate level of emergency medical care and decontamination to persons involved in such incidents, provide medical support to hazardous materials response personnel, and implement and terminate the response.

Definition

EMS/HM Level 2 Responders are persons who, in the course of their normal activities, may be called on to perform patient care and decontamination activities in the warm zone (the area where personnel and equipment decontamination and hot zone support take place) at hazardous materials incidents or at criminal and terrorist incidents involving hazardous materials or related weapons of mass destruction. EMS/HM Level 2 Responders are called on to provide care to individuals who still pose a significant risk of secondary contamination. In addition, personnel at this level shall be able to coordinate EMS activities at a hazardous materials incident and provide medical support to and decontamination of hazardous materials response personnel.

Audience

EMS/HM Level 2 Responders may be public-sector or private-sector individuals charged with the responsibility of providing and coordinating EMS services at the scene of a hazardous materials incident or at the scene of a criminal or terrorist incident involving hazardous materials or related weapons of mass destruction. They include selected emergency medical technicians and paramedics as well as members of industrial fire brigades who are assigned patient care responsibility at such incidents on-site or off-site.

Related Health, Safety, and Performance Standards

OSHA 29 CFR 1910.120
EPA 40 CFR 311
NFPA 472
NFPA 473
NFPA 1561 Standard on Fire Department Incident Management System
U.S. Fire Administration Emergency Incident Rehabilitation Guide, FA-114

Recognized DOT, State, regional, or local training curricula should constitute the entry-level EMS preparation for continuing hazardous materials training. When a hazardous materials incident or a hazardous

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

materials-related criminal or terrorist occurs, all EMS basic life-support-provider personnel responding should have been trained to the emergency medical technician B level or equivalent.

Appropriate Methodologies

EMS/HM Level 2 Responder training should include a combination of traditional classroom lecture with small-group activities, field exercises involving working with the incident command structure in simulated emergencies, and hands-on psychomotor skill training. Content instruction should focus on contamination hazards, decontamination procedures, health monitoring treatment procedures, and incident scene roles and responsibilities. Trainee activities should focus on assessment and analysis of hazards and determination of appropriate procedures. Skill training should focus on implementing decontamination and patient care procedures and the use of appropriate personal protective equipment. Written and practical examinations are highly recommended to measure achievement in initial training and refresher programs and to support the employer's responsibility that all EMS/HM Level 2 Responder personnel be trained to competency before being called on to perform EMS/HM Level 2 functions at emergencies. Table-top and field exercises should focus on acting out incident scene roles and on implementing procedures in a field environment. Refresher training should be conducted on a yearly basis and should focus on technical updates, updates on changes in response protocols and SOP's, and renewal of individual skills in decontamination, patient treatment, and use of personal protective equipment.

SUMMARY: Emergency Medical Services/Hazardous Materials Level 2 Responder

Audience	Prerequisites	Training	Refresher
Moderate size audience. Paramedics and emergency medical technicians who may be called upon to conduct decontamination and patient care in the warm and hot zone of a haz mat incident or a haz mat-related criminal or terrorist incident scene.	1. First Responder Awareness training. 2. EMS/HM Level 1 Responder training. 3. EMT-B certification	- Classroom, physical skills lab, and simulator/field instruction, with emphasis on decision making and treatment skills. - Competencies: - Assessing incident scene hazards and risks of patient secondary contamination. - Incident scene response planning, including determining personal protective equipment needs and defining roles and responsibilities of the EMS/HM Level 2 responder. - Ability to perform EMS/HM Level 2 patient decontamination and treatment in the warm zone at an incident scene. - Ability to perform post-incident EMS reporting, documentation, and follow-up.	1. Technical updates. 2. Changes in response protocols and incident command system SOP's. 3. Renewal and retesting of incident scene decision making and warm zone decontamination and treatment skills.

Recommended Training

For EMS/HM Level 2 Responder Training

The following training objectives are recommended for emergency medical service/hazardous materials Level 2 responder. The primary source for this material is NFPA 473: Standard for Competencies for EMS Personnel Responding to Hazardous Materials Incidents, Chapter 5: Competencies for EMS/HM Level 2 Responders.

In general, these recommended objectives compare in scope and concept to the general requirements of OSHA that all responding personnel be properly trained to perform their assigned roles in a hazardous materials emergency.

EMS(2)-1
NFPA 5.1.3

Objective Identification Legend

This is the identification used in this document. It matches the identification code used in course assessment references. Decimal numbers (such as EMS(2)-1.1) indicate enabling objectives supporting the primary objective.

This indicates the origin of this objective. Usually it is directly from NFPA 473, Chapter 5.

Identification	***Recommended** Training Objectives*
EMS(2)-1 NFPA 5.1.2.1	Given a hazardous materials incident scenario, demonstrate an understanding of the role of the emergency medical service/hazardous materials Level 2 responder, and be able to do the following:
EMS(2)-1.1 NFPA 5.1.2.2(1)	....Describe the responsibility of the EMS/HM Level 2 responder to analyze a hazardous materials incident to determine the magnitude of the problem in terms of outcomes, determine the hazards present, and assess patient care needs and the risk of secondary contamination.
EMS(2)-1.2 NFPA 5.1.2.2(2)	....Describe the responsibility of the EMS/HM Level 2 responder to plan a response to provide the appropriate level of emergency medical care to persons involved in hazardous materials incidents and to provide medical support to hazardous materials response personnel.
EMS(2)-1.3 NFPA 5.1.2.2(3)	....Describe the responsibility of the EMS/HM Level 2 responder to implement the planned response, including performing preparations for receiving the patient, providing treatment to the hazardous materials patient, and coordinating and managing the EMS component of the hazardous materials incident.
EMS(2)-1.4 NFPA 5.1.2.2(4)	....Identify the responsibility of the EMS/HM Level 2 responder to terminate the incident.

Analyzing the Hazardous Materials Incident

EMS(2)-2 NFPA 5.2.1	Given an emergency involving hazardous materials, determine the hazards to the responders and the patient in that situation, and be able to do the following:

EMS(2)-2.1
NFPA 5.2.1(1)

....Define the following chemical and physical properties and describe their importance in the risk assessment process:

(a) Boiling point
(b) Flammable (explosive) limits
(c) Flash point
(d) Ignition temperature
(e) Specific gravity
(f) Vapor density
(g) Vapor pressure
(h) Water solubility

EMS(2)-2.2
NFPA 5.2.1(2)

....Define the following radiological terms and explain their use in the risk assessment process:

(a) Alpha radiation
(b) Beta radiation
(c) Gamma radiation
(d) Radiological measurement units

EMS(2)-2.3
NFPA 5.2.1(3)

....Define the following toxicological terms and explain their use in the risk assessment process:

(a) Threshold limit value (TLV-TWA)
(b) Lethal concentration and doses ($LD_{50/100}$)
(c) Parts per million/billion (ppm/ppb)
(d) Immediately dangerous to life and health (IDLH)
(e) Permissible exposure limit (PEL)
(f) Short-term exposure limit (TLV-STEL)
(g) Ceiling level (TLV-C)

EMS(2)-2.4
NFPA 5.2.1(4)

....Given a specific hazardous material and using the information sources available to the Level II responder, demonstrate extracting appropriate information about the physical characteristics and chemical properties, hazards, and suggested medical response considerations for that material.

EMS(2)-3
NFPA 5.2.2

Given a hazardous materials incident with a patient(s), assess the patient and conditions to determine the risk of secondary contamination, and be able to do the following:

EMS(2)-3.1
NFPA 5.2.2(1)

....Identify sources of technical information for the performance of patient decontamination.

EMS(2)-3.2
NFPA 5.2.2(2)

....Identify the factors that influence the decision of when and where to treat the patient and the extent of patient care, including the following:

(a) Hazardous material toxicity
(b) Patient condition
(c) Availability of decontamination

EMS(2)-4
NFPA 5.2.3

Given an emergency scenario involving potential criminal or terrorist activity, identify the basic tools for identification of the substance, detection devices appropriate to the substance, and where tehse detection devices are available locally.

EMS(2)-5
NFPA 5.2.4

Given an emergency scenario involving potential criminal or terrorist activity, descrbe procedures, such as those listed in the local emergency response plan or the organization's standard operating procedures, to preserve evidence at haz mat incidents involving suspected criminal or terrorist acts.

Planning the Response

EMS(2)-6
NFPA 5.3.1

Given a plan of action by the incident commander, describe the role of the Level II responder in a hazardous materials incident as identified in the local emergency response plan or the organization's standard operating procedures.

EMS(2)-7
NFPA 5.3.2

Describe the importance of coordination between various agencies at the scene of hazardous materials incidents.

EMS(2)-8
NFPA 5.3.3

Given a hazardous materials incident, plan a response to provide emergency medical care to persons involved in hazardous materials incidents and to provide medical support to hazardous materials response personnel, and be able to do the following:

EMS(2)-8.1
NFPA 5.3.3(1)

....Given a simulated hazardous materials incident, assess the problem and formulate and implement a plan including the following:

(a) EMS control activities
(b) EMS component of an incident management system
(c) Medical monitoring of personnel utilizing chemical-protective and high tempera ture-protective clothing
(d) Triage of hazardous materials victims
(e) Medical treatment for chemically contaminated individuals
(f) Product and exposure information gathering and documentation

EMS(2)-8.2
NFPA 5.3.3(2)

....Describe the importance of pre-emergency planning relating to specific sites.

EMS(2)-8.3
NFPA 5.3.3(3)

....Describe the hazards and precautions to be observed when approaching a hazardous materials incident.

EMS(2)-8.4
NFPA 5.3.3(4)

....Describe the considerations associated with the placement, location, and setup of the patient decontamination site.

EMS(2)-8.5
NFPA 5.3.3(5)

....Explain the advantages and limitations of the following techniques of decontamination and how they are or are not applicable to patient decontamination:

(a) Absorption
(b) Chemical degradation
(c) Dilution
(d) Isolation

EMS(2)-8.6
NFPA 5.3.3(6)

....Describe when it would be prudent to pull back from a hazardous materials incident.

EMS(2)-8.7
NFPA 5.3.3(7)

....Describe the impact that time, distance, and shielding have on exposure to radioactive materials specific to the expected dose rate.

EMS(2)-8.8
NFPA 5.3.3(8)

....Describe the prioritization of emergency medical care and removal of victimes from the hazard area relative to exposure and contaminatino concerns.

EMS(2)-9
NFPA 5.3.4

Given the name of the hazardous material and the type, duration, and extent of exposure, determine if the protective clothing and equipment available to EMS personnel is appropriate to implement the planned response, and be able to do the following:

EMS(2)-9.1
NFPA 5.3.4(1)

....Identify the advantages and dangers of search and rescue missions at hazardous materials incidents.

EMS(2)-9.2
NFPA 5.3.4(2)

....Identify the advantages and hazards associated with the rescue, extrication, and removal of a victim from a hazardous materials incident.

EMS(2)-9.3
NFPA 5.3.4(3)

....Describe the types, application, use, and limitations of protective clothing used by EMS personnel at hazardous materials incidents.

EMS(2)-9.4
NFPA 5.3.4(4)

....Demonstrate how to interpret a chemical compatibility chart for chemical-protective clothing.

Implementing the Planned Response

EMS(2)-10
NFPA 5.4.1

Given a plan for providing patient care at a hazardous materials incident, perform the preparations necessary to receive the patient for treatment and transport.

EMS(2)-11
NFPA 5.4.2

Demonstrate the proper donning, doffing, and usage of all personal protective equipment provided to the Level II responder by the authority having jurisdiction.

EMS(2)-12
NFPA 5.4.3

At the scene of a hazardous materials incident, provide or coordinate the patient care, and be able to do the following:

EMS(2)-12.1
NFPA 5.4.3(1)

....Given a simulated hazardous materials incident and using local available re-sources, demonstrate the implementation of the patient decontamination procedure.

EMS(2)-12.2
NFPA 5.4.3(2)

....Explain the principles of emergency decontamination and its application for critically ill patients.

EMS(2)-12.3
NFPA 5.4.3(3)

....Demonstrate the ability to coordinate patient care activities, including treatment, disposition, and transportation of patients.

EMS(2)-13
NFPA 5.4.4

Given a simulated hazardous materials incident, demonstrate the ability to establish and manage the EMS component of an incident management system.

Terminating the Incident

EMS(2)-14
NFPA 3-5.1

Upon termination of the hazardous materials incident, complete the reporting, documentation, and EMS termination activities as required by the local emergency response plan or the organization's standard operating procedures, and be able to do the following:

EMS(2)-14.1
NFPA 5.5.1(1)

....Describe the information regarding incident EMS activities that needs to be relayed through the chain of command to the incident commander.

EMS(2)-14.2
NFPA 5.5.1(2)

....Describe the activities required in terminating the EMS component of a hazardous materials incident.

EMS(2)-14.3
NFPA 5.5.1(3)

....Describe the process and demonstrate the ability to conduct the EMS portion of an incident critique

EMS(2)-11.4
NFPA 5.5.1(4)

....Explain the process of making revisions to EMS operating procedures and response capabilities as a result of information learned

Hazardous Materials
and Terrorist Incident
Response
Training Giudelines

Hospital
Personnel

Introduction

Hospital Emergency Department Personnel face a difficult task when dealing with contaminated patients. Contaminated patients may arrive at the hospital by their own means or be transported by Emergency Medical Services providers when field decontamination is impractical. It is essential that all emergency departments have the capability to recognize, assess, and begin the treatment of hazardous material patients, including those who are contaminated with a hazardous substance. Furthermore, the hospital emergency department must assure the protection of their own medical staff and the continued well being of hospital residents. The hospital is an integral emergency responder when dealing with a chemical emergency or disaster and training programs must address the unique and valuable role played by the communities acute residential care system.

At a minimum, hospital personnel must be able to analyze the situation, assess patient conditions and problems, take the necessary steps to assure medical provider safety, attempt identification of the offending chemical substance, and initiate the decontamination and medical care process.

Definition

Hospital emergency department personnel are persons who, in the course of their normal work activities, may be called upon to perform patient care and decontamination within the confines of the hospital. These personnel in the performance of their duties may be exposed to a significant risk of secondary contamination from the patients for which they are charged to provide care. In addition these personnel may be called upon to assist pre-hospital personnel requiring technical assistance in the area of patient decontamination.

Audience

Hospital emergency department personnel may be public or private-sector individuals charged with the responsibility of coordinating and providing medical treatment of patients who have been exposed to or contaminated by hazardous materials. They include selected emergency department staff including physicians, nurses at all levels, aids, support staff as well as any other individual assigned to care for patients received from a hazardous materials emergency on or off site.

Related Health, Safety, and Performance Standards

OSHA 29 CFR 1910.120
OSHA 29 CFR 1910.134
OSHA 29 CFR 1910.1030
EPA 40 CFR 311
Joint Commission for the Accreditation of Healthcare Organizations (JCAHO)

Recognized DOT, State, regional, or local training curricula should be a basis for hospital personnel preparation and continuing hazardous materials training and education. The Joint Commission for the Accreditation of Healthcare Organizations has requirements which hospitals must meet to receive accreditation.

Hospital accreditation in most states is a necessary requirement for the facility to receive a hospital license and insurance reimbursements. The JCAHO requirements relating to hazardous materials and hospital community planning are reflected in the following training objectives.

Appropriate Methodologies

Hospital Emergency Department personnel training should include a combination of traditional classroom lecture with small-group activities, field exercises involving working in simulated emergencies, and hands-on psychomotor skill training. Content instruction should focus on contamination hazard, decontamination procedures, patient flow within the hospital, health treatment procedures and roles and responsibilities. Trainee activities should focus on assessment and analysis of hazards and determination of appropriate procedures. Skill training should focus on implementing decontamination and patient care procedures, use of reference materials and the use of appropriate personal protective equipment. Written and practical examinations are highly recommended to measure achievement in initial training and refresher programs and to support the employer's responsibility that all emergency department personnel be trained to competency before being called upon to perform at emergencies. Exercises should focus on acting out the assigned roles and on implementing procedures in the hospital environment. Refresher training should be conducted on a yearly basis and should focus on technical updates, updates on changes in hospital protocol and procedures, and renewal of individual skills in decontamination, patient treatment, and use of personnel protective equipment.

SUMMARY:Hospital Personnel

Audience	Prerequisites	Training	Refresher
Moderate in size. Hospital emergency department personnel who may coordinate or provide treatment to patients who have been exposed to or contaminated by hazardous materials.	None, beyond professional competencies associated with role in hospital emergency department.	- Classroom, lab instruction with simulated emergencies, hands-on psychomotor skill training. - Competencies: - Knowledge of contamination hazards, decontamination procedures, patient flow, health treatment procedures, roles and responsibilities. - Ability to implement decontamination, use of reference materials, and use of personal protective equipment.	1. Technical updates. 2. Updates on changes in hospital protocols and procedures. 3. Renewal of skills in decontamination, patient treatment, and use of personal protective equipment.

Recommended Training

For Hospital Emergency Department Personnel

The following training objectives are recommended for hospital emergency department personnel. The primary source for this material is the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) standards for handling contaminated patients. The following training material is not only recommended for emergency department physicians and nursing staff but for all hospital personnel who may have a role in the hospital response.

In general, these recommended objectives compare in scope and concept to the general requirements of OSHA that all personnel which may be required to respond to hazardous material releases be properly trained to perform their assigned roles in times of emergencies.

Objective Identification Legend

HOSP-1
JCAHO
PE.1.1

This is the identification objective used in this document. It matches the identification code used in course assessment references.

This indicates which components of the JCAHO standards are addressed by this objective.

Identification	***Recommended** Training Objectives*
HOSP-1	Describe the ways in which a medical center or hospital can become involved in a hazardous material event or response effort.
	Decontamination of Patients
HOSP-2	Describe some of the key issues involved in the reception of a patient contaminated by or exposed to a chemical substance.
HOSP-2.1 JCAHO *PE.1.1*	Presented with a contaminated patient(s), determine the initial screening or assessment of the patient(s) physical, psychological, and social status to determine the need for care, the type of care to be provided, and the need for any further assessment.
HOSP-2.2 JCAHO *PE.1.2, PE.1.2.1, PE.1.2.2*	Determine the scope and intensity of any further patient assessment which is determined by: (a) The patient's diagnosis; (b) The care setting
HOSP-2.3 JCAHO *PE.1.4*	Given a contaminated patient(s), identify the diagnostic testing, including laboratory and other invasive and noninvasive diagnostic and imaging procedures, relevant to the determination of the patient(s) health care or treatment needs and to the actual care or treatment of the patient(s) to be performed.

HOSP-2.4
JCAHO
IM.9, IM.9.1, IM.9.2, IM.10.1

List and describe the hospital's hazardous materials information resources and assure that they are authoritative and up to date.

HOSP-2.5

Define the following toxicological terms as they relate to the treatment of a contaminated patient in the hospital setting:

(a) Threshold Limit Value - TLV
(b) Threshold Limit Value - Time Weighted Average -TLV-TWA
(c) Threshold Limit Value - Short-term Exposure Limit - TLV-STEL
(d) Threshold Limit Value - Ceiling - TLV-C
(e) Immediately Dangerous to Life and Health - IDLH
(f) Lethal Dose 50 - LD50
(g) Lethal Concentration 50 - LC50

HOSP-2.6

Define the effect chemicals may have on a contaminated patient using the method of Dose-Response Relationship.

HOSP-2.7

Describe the routes by which chemicals may enter the body.

HOSP-2.8

List the target organ systems which may be effected in the contaminated patient.

HOSP-2.9

List the areas of the body that are most likely to have greater route of chemical absorption into the body.

HOSP-2.10
JCAHO
PE.1.1, PE.2.1, PE.2.2, PE.2.3, PE.2.4

Demonstrate that each patient is reassessed at regularly specified times related to the patient's course of treatment to determine the patient's response to treatment;

(a) When a significant change occurs in the patient's condition; and
(b) When a significant change occurs in the patient's diagnosis.

HOSP-2.11
JCAHO
PE.3.1, PE.4.2

Demonstrate that patient care decisions are based on the identified patient needs and on care priorities.

HOSP-2.12
JCAHO
PE.4.3

Describe the need for nursing personnel to assess the patient's need for nursing care in all settings where nursing care is to be provided.

HOSP-2.13
JCAHO
IM.9.2, IM.10.1

Describe the methods used to assure the pharmacy, medical, and nursing staff have access to poison control information.

HOSP-2.14

List at least four resources available to hospital providers to assist with the treatment of a contaminated patient.

HOSP-2.15

List the equipment needed in the emergency department to provide for effective decontamination of a patient.

HOSP-2.16

List and describe the proper usage of Personnel Protective Equipment (PPE) used by emergency department staff during patient decontamination procedures.

HOSP-2.17

Demonstrate the ability to determine the need for, and if required, the use of special respiratory protection for the emergency department staff and the patient during decontamination procedures.

Planning For The Response

HOSP-3
JCAHO
LD.1.1, EC.1.6

Describe the need for the hospital to develop emergency response plans.

HOSP-3.1
JCAHO
LD.1.2

Identify the necessity for the hospital administrators to communicate the hospitals plan(s) throughout the organization.

HOSP-3.2
JCAHO
LD.1.3

Identify the areas in the hospital plan(s) that include patient care services in response to identified patient needs and is consistent with the organization's mission and ability to provide service.

HOSP-3.3
JCAHO
LD.1.3.1

Identify the hospital personnel, and, as appropriate, community leaders and organizations which need to collaborate to design services to be provided by the hospital.

HOSP-3.4
JCAHO
LD.1.3.2

Identify the need to design into the plan patient care services to be provided throughout the hospital organization that are appropriate to the scope and level of care required by the patients that may be served.

HOSP-3.5
JCAHO
LD.1.4

Describe the setting in the planning process for performance-improvement priorities and identify how the hospital adjusts priorities in response to unusual or urgent events.

HOSP-3.6
JCAHO
LD.1.7

Identify the need for the scope of service provided by each department as defined in writing and is approved by the hospitals administration, medical staff, or both, as appropriate.

Implementing The Planned Response

HOSP-4
JCAHO
EC.1.2

Describe the hospitals documented management plan(s) for the environment of care to be provided during a hazardous materials emergency that considers all factors of the emergency response.

HOSP-4.1

Describe the safety factors outlined in the plan as listed below:

(a) Ensuring that emergency service areas are clearly identified;
(b) Establishing a risk-assessment program that proactively evaluates the impact on patient and public safety of the buildings, grounds, equipment, occupants, and internal physical systems;
(c) Requiring an annual evaluation of the objectives, scope, performance, and effectiveness of the documented safety management plan.

HOSP-4.2
JCAHO
EC.1.4

Describe the security factors outlined in the plan listed below:
(a) Providing access control, as appropriate, to sensitive areas;
(b) Provide vehicular access to emergency service areas;
(c) Providing traffic control for emergency service areas.

HOSP-4.3
JCAHO
EC.1.6

Describe the factors outlined in the plan related to Hazardous Wastes within the hospital listed below:
(a) Monitor and disposing of hazardous wastes
(b) Reporting and investigating all hazardous materials or waste spills and exposures or other incidents that involve patients, visitors, personnel, or property.

HOSP-4.4
JCAHO
EC.1.6

List and describe the factors outlined in the hospital's emergency preparedness program.

HOSP-4.4.1
JCAHO
EC.1.6

Describe the procedure for establishing, supporting and maintaining an emergency preparedness program.

HOSP-4.4.2
JCAHO
EC.1.6.a

Describe the steps for implementing specific procedures in response to a variety of disasters and/or emergencies, internal and external of the hospital.

HOSP-4.4.3
JCAHO
EC.1.6.b

Describe the ways of defining and, when appropriate, integrating the hospital's role with community-wide emergency preparedness efforts.

HOSP-4.4.4
JCAHO
EC.1.6.c

Describe the procedure for notifying the proper authorities outside the hospital in an emergency.

HOSP-4.4.5
JCAHO
EC.1.6.d

Describe the procedure for notifying hospital personnel of an implementation of the emergency preparedness plan.

HOSP-4.4.6
JCAHO
EC.1.6.m

Describe the ways of defining, where appropriate, alternate roles and responsibilities of hospital personnel during disasters and/or emergencies.

HOSP-4.4.7
JCAHO
EC.1.6.e

Describe the procedure for assigning available personnel to reflect current staffing patterns within the hospital during times of disaster and/or emergency.

HOSP-4.4.8
JCAHO
EC.1.6.f

Describe the procedures for the management of space, supplies and security during disasters and/or emergencies.

HOSP-4.5
JCAHO
EC.1.6.g

Describe the procedures for evacuating the entire facility if the organization's environment cannot continue to support adequate patient care and treatment.

HOSP-4.5.1
JCAHO
EC.1.6.h

Describe the procedures for establishing an alternate care site if the hospital environment cannot continue to support adequate patient care and treatment.

HOSP-4.5.2
JCAHO
EC.1.6.l

Describe the ability to identify, where appropriate, available facilities for radioactive or chemical isolation and decontamination if additional resources are needed.

HOSP-4.5.3
JCAHO
EC.1.6.i

Describe the procedures for managing patients during disasters or emergencies, including the scheduling, modification, or discontinuation of services, control of patient information, and admission, transfer and discharge of patients.

HOSP-4.5.4
JCAHO
EC.1.6.n

Describe the requirements for an annual evaluation of the objectives, scope, performance, and effectiveness of the hospital's documented emergency preparedness management plan.

HOSP-4.6

List the specialized medical equipment needed for treating patients and/or responding to hazardous materials emergencies including selecting and acquiring the medical equipment.

Hazardous Materials
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Issues in Hazardous Materials Incident Recovery/Cleanup

The addition of objectives that address tactical considerations for minimizing the recovery/cleanup process has merit for several reasons.

Improved Handling of the Incident

The fundamental priorities for all emergency responders who respond to hazardous materials incidents are first, protecting life, second, protecting the environment, and last, protecting property and equipment.

Because protection of the environment is second only to the protection of life, the tactical considerations used to handle a hazardous materials emergency must be selected based on the overall effect those tactics will have on the environment.

In formulating tactical considerations aimed at minimizing impact to the environment, in many situations the emergency responders are simultaneously improving the recovery potential and minimizing the cleanup that is required. For example, an incident commander or hazardous materials group supervisor may choose to erect a portable sump to catch a leaking flammable liquid. This particular tactical action will:

- Prevent the spread of the flammable liquid into the environment, thus increasing the level of protection to the environment and minimizing the amount of environmental cleanup required;

- Reduce the hazards of the incident by allowing pooling of the material, thereby reducing the surface area that can evolve flammable vapors;

- Facilitate an improved recovery of the product by having a vacuum truck recover the spilled flammable liquid directly from the portable sump; and

- Allow for recycling of the recovered product, thus reducing the costs to the spiller.

The tactical decisions of the incident commanders and hazardous material group supervisors can negatively affect both the environment and the recovery and cleanup process. The failure of an incident commander or hazardous materials group supervisor to make the correct decision is usually the result of lack of experience in alternative methods. It is common for incident commanders and hazardous materials group supervisors to use techniques based on their structural fire-fighting or flammable liquid and gas fire-fighting methods. These generally involves using water or foam, each of which provides a medium for increasing the size of the spill, spreading the spill, and increasing the damage on both the environment and the recovery/cleanup process.

Unless terminal objectives are identified, incident commanders and hazardous materials group supervisors will make tactical decisions that negatively affect both the environment and the recovery and cleanup process. Instructional materials used to increase the skills of incident commanders and hazardous materials group supervisors should provide the basis for identifying and using the proper tactical decisions.
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Emerging Legal Trends

Another significant reason for using tactical considerations that minimize the impact on the recovery/cleanup process is the legal trend occurring in cost recovery litigation. Because the costs involved in handling a hazardous materials incident are routinely assessed against the spiller, lawyers defending spillers has developed tactics to provide relief to the spiller. This relief attempts to have some of the recovery and cleanup costs transferred from the spiller to the emergency responders when it can be demonstrated that the tactics used by the emergency responders resulted in increased costs.

For example, an incident commander or hazardous materials group supervisor might choose to allow a leaking hazardous material to enter a storm drain instead of attempting to dike the product to keep the product above ground. As a result, the spiller now must have a cleanup company remove the product from the storm drain at a considerable cost. In the ensuing litigation, the attorney for the spiller demonstrates the difference between the actual costs incurred as a result of the actions taken by the emergency responders and those that would have been incurred had the emergency responders kept the product from entering the storm drain. In scenarios of this type, the courts are ruling, with increasing frequency, that the spiller is only responsible for the costs of the recovery/cleanup resulting from the emergency responders used nationally recognized practices. The difference between the actual cost and the costs assessed against the spiller are then transferred to the emergency response agency.

Although this type of litigation action is occurring primarily in bellwether States like California, it is gaining recognition as a litigation technique that can be used effectively for defending and reducing the recovery and cleanup costs assessed against spillers. In addition, this type of litigation is resulting in the actions taken by emergency responders coming under increasing scrutiny to attempt to find errors and omissions that may be used to obtain relief for spillers.

Emergency responders are no longer exempt and protected from legal action when it can be shown that the negative outcomes resulting from their actions can be defined as contributory negligence.

Increasing Enforcement of EPA Regulations

Another purpose for identifying response/recovery terminal objectives that will lead to the development of training in this area is the increasing enforcement by EPA of the Resource Conservation and Recovery Act (RCRA). RCRA clearly states that, after an emergency ends and the recovery and cleanup process begins, emergency responders are no longer exempt from compliance with the requirements of RCRA. As a result, after the emergency has ended, emergency responders must comply with RCRA or face a potential of a fine for noncompliance. An example is a situation where the emergency responders elect to sweep up an absorbed hazardous material that should be disposed of in a proper waste disposal site. Instead, the emergency responders choose to take the absorbent containing the regulated hazardous material and dispose of it in a common landfill dumpster.

The recovery/cleanup objectives have been defined to:

- Identify tactical considerations that minimize the effect of hazardous materials spills on the environment;
- Identify tactical considerations that minimize the financial impact on the recovery and cleanup process;
- Provide training that will protect emergency responders from litigation resulting from using improper tactics, based on past practices, in situations in which using more proactive techniques would have greatly reduced the cost of the recovery and cleanup; and
- Provide training that will protect emergency responders from litigation resulting from their engaging in practices that are not in compliance with RCRA.

How Recovery and Cleanup Tactical Considerations Are Driven by the Risk/Benefit Analysis Process

In addressing the tactical considerations that affect recovery and cleanup, the initial size-up and risk/benefit analysis of the tactical considerations identified early in an incident can have a major impact on the recovery/cleanup process later in the incident.

A quality risk/benefit analysis begins by assessing what the outcomes would be if the emergency responders did absolutely nothing and allowed the incident to go through natural stabilization. The emergency responders must ask themselves at this time, “If I do nothing, what are the outcomes?” In time, the incident will stabilize, and the outcomes will possibly include the loss of life, negative impact on the environment, and damage or loss of property and equipment.

After the emergency responders have identified the outcomes of natural stabilization, the next question they should ask themselves is, “Can I change the outcomes of natural stabilization?” If the answer to this question is “No,” the emergency responders should only isolate the hazard area, deny entry, and protect people, the environment, and adjacent property and equipment from exposure.

If the answer is “Yes,” then the next question to ask is, “What is the cost of my intervention?” At this time the emergency responders must clearly identify the cost of their intervention in terms of potential loss of life and negative effect on the environment and weigh that cost against the possible benefits of intervention.

If the risk/benefit analysis is conducted correctly, the tactical considerations used in tactical application should have a minimal effect on the recovery and cleanup process. If the risk/benefit analysis is either not conducted or is not conducted properly, the outcomes will have a major negative impact on life, the environment, property and equipment, and the recovery and cleanup process.

Trainees shall identify the negative effect on the recovery and cleanup process resulting from the following:

- Failure to catch a leaking hazardous material to prevent it from spreading into the environment.
- Failure to dike a leaking hazardous material to prevent it from spreading into the environment.
- Failure to dam a hazardous material that has entered a waterway to prevent it from spreading downstream into the environment.
- Failure to a redirect a leaking hazardous material away from a waterway to prevent it from entering the waterway and spreading downstream and affecting the environment.
- Failure to a redirect a leaking hazardous material away from an environmentally sensitive area to prevent it from entering the environmentally sensitive area and negatively impacting the environmentally sensitive area, e.g., a wetland.
- Failure to use absorbent materials to control a leaking hazardous material to prevent it from spreading into the environment.
- Engaging in foam application operations that result in spreading the spill when the product should have been allowed to continue to burn or fuel should have been added to the fire to increase the fire’s temperature, e.g., pesticide fires.
- Engaging in fire extinguishing operations that allow water to become a vehicle that spreads the spill before having confinement operations in place.
- Engaging in fire extinguishing operations that allow water to become a vehicle that spreads the spill when the product should have been allowed to continue to burn, such as a burning material that cannot be extinguished by water.
- Engaging in dilution operations, in an attempt to neutralize a corrosive, and allowing the water to become a vehicle that spreads the corrosive before having confinement operations in place.

Recovery/Cleanup Training Issues

- Engaging in dilution operations, in an attempt to neutralize a corrosive, and allowing the water to become a vehicle that spreads the spill without recognizing that the volume of water needed to truly dilute the spill cannot be managed by the emergency responders (e.g., to dilute one gallon of a corrosive with pH of 1 to a pH of 6 requires 111,110 gallons of water).
- Failure to protect the environment, by using salvage covers or visqueen to cover exposed soil, when redirecting a spilled material into a ditch or other area being used as a catch basin or holding pond.
- Failure to segregate spilled oxidizers from spilled fuels, such as diesel fuel, to prevent a chemical reaction that results in an ignition and subsequent negative impact on the environment from the intensity of the fire or the spattering that may occur.
- Failure to segregate spilled materials that have oxidizing characteristics from spilled fuels, such as diesel fuel, to prevent a chemical reaction that results in an ignition and subsequent negative impact on the environment from the intensity of the fire.

Terrorism and Illicit Use of Hazardous Materials: First Responder Training Issues and Ramifications

Introduction

Terrorism is defined as the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, or social objectives. Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of the United States government or population without foreign direction. International terrorism involves terrorist activities committed by groups or individuals who are foreign-based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries.

In the aftermath of the attacks of September 11, the nation's emergency response community has been increasingly concerned about the risks posed to responders by hazardous materials-related weapons of mass destruction. The basic principles of safe response to incidents involving chemical, biological and radiological agents are generally the same as for any dangerous hazardous materials incident. However, the health risks to responders, the unique criminal dimensions to the incident that must be accomodated in the response, and the nature of some of the more esoteric chemicals and biological agents that might be involved in such an incident all require special attention to ensure a safe and effective response.

The challenge to emergency responders of being ready to respond to incidents stemming from terrorist attacks has been present for many years, well pre-dating the dramatic events of September 11 and the more recent national Antrax incidents. For example, between the years 1980 and 1995, Federal Bureau of Investigation (FBI) statistics report a total of 249 terrorist incidents that occurred in the United States. The February 20, 1993, bombing of the World Trade Center in New York City and the April 19, 1995, bombing of the Alfred P. Murrah Federal Building in Oklahoma City, Oklahoma, illustrated several years ago that terrorism can occur any where within the United States. On March 20, 1995, the nerve agent sarin was released into the Tokyo, Japan subway system by a Japanese cult. This terrorist incident resulted in 12 fatalities and at least 5,510 injuries. One hundred thirty-five of the responders were injured after direct and indirect exposure to the nerve agent. Within the United States, incidents involving biological agents have been documented in major metropolitan areas as well as rural locations. These incidents have occurred on both the east and west coasts as well as central parts of the United States.

In addition to terrorist acts, other criminal uses of hazardous materials - such as clandestine drug labs or illegal dumping of hazardous materials- pose an equally challenging theat to emergency responders and to the communities they serve. For example, incidents involving hazardous materials and hazardous wastes have threatened public health and the environment resulting in efforts to enhance control of these materials. Federal, state and local governments have adopted standards and legislation in an attempt to reduce the risks to the public and the environment. The controls adopted have increased the complexities and costs of storage, transportation and disposal of these materials.

The Challenge to Public Sector Responders

Intentional releases of hazardous materials due to acts of terrorism or other criminal activities pose a unique challenge to public sector responders who respond to hazardous materials emergencies. Such intentional releases include, but are not limited to, illegal manufacture of drugs, improper disposal of hazardous materials and wastes, improvised explosive devices, manufacture and release of chemical agents and toxins, culture and dissemination of biological agents, and secondary events targeting public sector responders.

Responders to such incidents who are trained to traditional hazardous materials response competencies may encounter unique exposure risks, emergency control challenges, unusual materials, and complex mass casualty situations that are beyond their experience and current training. For example, public sector responders have been trained traditionally to identify hazardous materials based on outward warning signs and detection clues. However, at incidents involving terrorism or other criminal use of hazardous materials where there is attempted deception about the materials involved, clues such as occupancy location, container shapes, markings, and colors may not be consistent with traditional hazardous materials training. Consequently, rapid identification of the materials and type of problem may be difficult.

Responders to incidents involving terrorism may encounter unusual chemicals or biological agents or unusual uses of those hazardous materials that have not been addressed thoroughly in current hazardous materials training. For example, nuclear response training for first responders has traditionally been for major catastrophes (i.e., nuclear war and power plant emergencies), and not for small isolated terrorist events. As a second example, the high risk chemical and biological agents that might be involved in terrorist incidents may require unusual protocols and procedures for patient decontamination and treatment that are not addressed in current EMS training. As an additional example, some of the materials that may be involved have unusual dispersal characteristics that responders may not be trained to accommodate when determining of safe perimeters and public protection/evacuation requirements at the incident.

Current training for community emergency planning and preparedness strategies and existing response plans use risk predictions based upon known vulnerabilities and hazard identifications, such as commodity flow studies, fixed facility storage of material, etc. This allows responders to plan for the response prior to an emergency and to assess whether the response capability and resources in the area are sufficient to meet potential emergencies. However, terrorist and other illicit acts involving hazardous materials may occur in untraditional locations that are not normally thought of as high risk hazardous materials locations, such as public gathering places or remote transportation areas. As a result, current protocols for allocating response resources and preparing for hazardous materials emergencies may not allow sufficient response capability for terrorist-related hazardous materials emergencies.

Finally, hazardous materials emergencies involving terrorism or other illicit use of hazardous materials may involve additional and unusual risks to responders beyond those presented by the hazardous materials themselves. Public sector responders may be at additional risk due to secondary releases targeted at responders, primary releases that intentionally create extremely high risk rescue situations, and even to primary releases targeted at public response facilities.

The Challenge to Public Sector Response and Planning Organizations

Public sector response and planning organizations should examine all facets of their response system to ensure preparedness for response to incidents of terrorism and illicit use of hazardous materials. This review should include existing plans, operating procedures, equipment, training and exercises.

Plans should include:

- Consistency and interface with plans from all levels of government, specifically the Federal Response Plan (FRP) and the FRP Terrorism Annex;
- Presidential Decision Directive 39, specifically examining responsibility for crisis management and consequence management in their community;
- Unified command operations with all levels of government; and
- Thorough, in-depth plans for response to mass casualty chemical incidents.

Operating procedures should include:

- Command post operations including command post security, responder accountability, and on-site responder identification;
- Protection against secondary explosive devices and other secondary events;

- Responsibility for and support to crime scene operations, evidence collection and chain of custody; and
- Emergency decontamination at mass casualty chemical incidents.

Equipment should be evaluated to ensure appropriate protection and detection of nuclear, chemical and biological agents (NBC). Existing training, including annual refresher training, for all responders should be enhanced to include competencies for response to incidents involving terrorism or other illicit use of hazardous materials. Finally, agencies should identify a person or persons within their organization as their point of contact for issues regarding terrorism and the illicit use of hazardous materials. These persons should interface with appropriate response agencies to include EMS, fire, haz mat, and law enforcement.

Training Strategies

Training for public sector employees who respond to hazardous materials emergencies at the Awareness, Operations, Technician, EMS, and Incident Commander levels should include thorough instruction to prepare those responders to safely and efficiently respond to hazardous materials emergencies involving terrorism or other illicit use of hazardous materials.

This additional hazardous materials response training can be accomplished either through additional courses or through enhancement of current hazardous materials courses. Extensive grants are being provided by the Department of Homeland Security to state and local organizations to support the training of responders. In addition, The Department of Homeland Security, the Department of Defense, the Department of Justice, and the United States Public Health Service provide in depth training and logistical support to assist public sector response organizations in preparing local responders to better prepare for terrorist-related hazardous materials emergencies.

The National Fire Protection Association has released standards for the integration of terrorist-related response as part of the national competency requirements for hazardous materials response, and this integrated approach is also reflected in the U. S. Fire Administration's curriculum strategies for terrorist-related training. As an alternative approach, the Office of Domestic Preparedness in DHS has issued draft guidelines for terrorist-related training for responders that treats WMD response training as separate from hazardous materials training, to be taken by responders in addition to taking hazardous materials training. The ODP Consortium of training schools provide a full set of stand-alone courses and curriculum materials supporting this approach.

For many training providers, insufficient resources and limited access to responder training time may render impractical the use of additional, supplemental responder training courses addressing terrorism competencies. In that case, training providers may wish to consider addressing the needed training through modification to and enhancement of existing courses within their curriculums. As training providers develop updated modules and training resource materials for use in updating existing courses, information on these materials will be provided to HMEP grantees when available.

Hazards to Responders

The following is a brief review of the various biological and chemical agents and the hazards they present to responders, which should be addressed in responder training to better ensure the safety of responders to terrorist-related incidents. The reader is encouraged to also access the many, more detailed references that have become available in print and on the internet regarding these hazards. One such site is: http://www.nbc-med.org/ie40/Default.html which allows downloading three military medical manuals (biological, chemical and radiological) and has an informative news review at the bottom its home page.

The possible routes of entry into the human body are potentially the same for both biological and chemical agents: inhalation, ingestion, injection, and absorption. The general rule for mass decontamination for both biological and chemical weapons is to use plain water, or if available, soap and water. Always check your protocols since they could contain more updated information.

Biological Weapons

These weapons or agents are of special concern because while many responders have had at least a hazardous materials awareness training program, few have had equivalent training in biological agents. Another reason for concern is the delay in recognizing exposure to biological agents – they usually have an incubation period of days to weeks and the responding public safety personnel might not know that they have come in contact with infected victims or with biological weapons substances for some time.

The Centers for Disease Control and Prevention organizes the most hazardous of these agents, which include bacteria, rickettsia, viruses, and toxins, according to a three-category system with Category A being of the most concern. <u>Most</u> of the biological agents manifest themselves in their early phases as flu-like symptoms – which makes them difficult to diagnose, especially <u>during</u> flu season.

<u>Category A Agents</u>

These agents include organisms that are hazardous to responders because they have high mortality rates, can be easily disseminated or transmitted from person to person; and have the potential for major public health impact. In addition, since these agents could possibly cause fear and panic in the American public we will cover them in much greater detail compared to the Category B and C ones.

Anthrax: This is a disease that uses a bacteria to infect humans via their skin, respiratory system, or digestive system. If it is weaponized properly so that the natural static charge is removed and the individual spores are 1 to 5 microns in size this biological agent can be aerosolized quite easily – as was, unfortunately, apparent in the various incidents in 2001-2002 (the U.S. Congress, Postal Service, and American Media, etc.). Prior to these incidents it was believed that the case fatality rate for inhaled anthrax was 90%, even with treatment. The actual case fatality rate was considerably lower. Nonetheless, this agent remains a major concern. Treatment with antibiotics, if started early enough, is often effective. There is a vaccine available as a six inoculation series, but it is generally most effective <u>before</u> exposure.

Botulism: Actually a group of related neuro-toxins this is the most poisonous naturally occurring substance known. It can be disbursed as an aerosol. However, since in its liquid form it is odorless, colorless, and tasteless probably it would be used to intentionally contaminate food or drinks. If your community has a dermatologist's office you probably have a medically pure version of botulinum toxin, known as Botox®, in your community already. The substance is used as a temporary "wrinkle remover." There is an antitoxin to treat botulism, but the antitoxin is not widely available.

Plague: Historically it was the bubonic plague, carried by infected fleas on rodents, which decimated Europe. The more deadly version is pneumonic plague, which results from inhaling these bacteria. While difficult to intentionally produce in this form (as a weaponized agent that can be aerosolized), the resulting pneumonic plague has a very high mortality rate. Treatment with antibiotics, again if begun early enough, can be quite effective.

Smallpox: Declared eradicated by the World Health Organization in 1980 the last case in the United States is variously reported as occurring in 1947 or 1949. Regardless, it has been a <u>long</u> time since we have dealt with this disease. Routine vaccination of American civilians stopped in 1972; while the U.S. military ended vaccinations in the late 1980's. The research indicates that most vaccinated people have a high degree of protection for three years after vaccination, followed by another 7 years of diminishing protection. Based on that data, the current American population has virtually no immunity to smallpox, since most people have not had a vaccination for over 30 years. Ongoing efforts are directed at a multi-phased approach: Phase I consists of vaccinating health and hospital personnel, and Phase II of first responders. Although the President originally announced that voluntary vaccinations of the public would be done it appears that in the absence of an actual smallpox outbreak that will not happen soon. Further comments about smallpox are included in the action planning steps below.

Tularemia: While not nearly as deadly as plague, botulism, or smallpox the reason tularemia is in Category A is its high infectivity. It takes but one of its bacterium to cause infection. While the relative mortality rate of tularemia, compared to smallpox or plague, is low this biological agent could be used to “overwhelm” our pre-hospital and in-hospital health care system with many extremely sick patients. Antibiotics are used in treating tularemia, and work is underway to develop an improved vaccine.

Viral hemorrhagic fevers, such as Ebola: This is actually of grouping of four “families” – arenaviruses, bunyaviruses, filoviruses, and flaviruses. Of these the most troublesome are the filoviruses (which include Ebola and Marburg) and have high mortality rates, high infectivity rates, and no known effective treatments or vaccines.

Category B Agents

The next group of agents include those that have low to moderate mortality rates, are somewhat easy to disseminate; and require improvements to the Centers for Disease Control and Prevention’s diagnostic capacity and enhanced disease surveillance. These agents include Brucellosis, E. Coli, Ricin (the castor bean extract), and Q Fever.

Category C Agents

The final group of agents includes emerging pathogens, such as hantavirus respiratory syndrome. These could be used for mass dissemination in the future because of their availability and their ease of production. Although the recent cases of Severe Acute Respiratory Syndrome (SARS) and West Nile Virus seem to be natural occurrences the incidents point out our vulnerability to new viruses.

Chemical Weapons

In the following brief discussion about chemical weapons agents, the reader should bear in mind that to some extent most hazardous materials responders already know a great deal about chemical weapons. That is because historically many of these agents were developed for industrial use. Responders will immediately recognize them because of the industrial chemicals which are their civilian counterparts (the blood agents are cyanides, the nerve agents are organophosphates, etc.). In addition, unlike the biological warfare agents, the chemical ones usually cause signs and symptoms quickly: when you “roll up” to a scene you will often know immediately that you have a serious problem.

The military has organized chemical weapons into five groups of agents: nerve, blister, blood, choking, and irritants. These names were originally believed to indicate the way the particular agent affected the human body. Blood agents were carried by and harmed the blood system, nerve agents were carried by and harmed the nerves, etc. We now know that a sufficient dose of any of these agents will produce a systemic result, but the old names persist. Another misnomer is the use of the term “gases” when discussing these agents. In their natural state they are usually liquids or solids.

Also, note that there are other military agents that are infrequently seen, such as incapacitating agents like BZ (which causes mental disorientation), and vomiting agents like DA, DM, and DC.

Nerve Agents

The organophosphates are common ingredients in pesticides. Their military equivalents, which include Sarin, Soman, Tabun and VX; cause a recognizable set of signs and symptoms which can be remembered by using the acronym SLUDGEM: **S**alivation (excessive oral and nasal secretions), **L**acrimation (tearing of the eyes), **U**rination, **D**efecation, **G**astrointestinal irritation (nausea and stomach cramps), **E**mesis (vomiting), **M**iosis (pinpointing of the pupils). Add "twitching, seizures, and convulsions" to that list and you have the classic signs of high dose contamination via nerve agents. Medical treatment after decontamination includes atropine, diazepam, and pralidoxime chloride (2-PAM).

Blister Agents

These chemical agents include Mustard, Distilled Mustard, Nitrogen Mustard, and Lewisite. The eyes are most susceptible to mustard vapor. The characteristic sign of vessicants or blisters on the skin takes from 2 to 24 hours to develop. Medical treatment after decontamination includes topical antibiotics, fluid replacement, and pain medications.

Blood Agents

These cyanides include Hydrogen Cyanide and Cyanogen Chloride. They cause extremely rapid respiratory and cardiac arrest, in seconds to minutes. Signs and symptoms include dyspnea (difficulty breathing), headache, confusion, decreased vision, convulsions, and coma. Medical treatment after decontamination includes sodium nitrite, amyl nitrite, and sodium thiosulfate (these are all contained in a pre-packaged pharmaceutical group known as the "Pasadena Cyanide Antidote Kit.")

Choking Agents

These agents include chlorine and phosgene. An indicator of inhalation is a heavy sensation in the chest and difficulty breathing – the beginning of pulmonary edema or fluid in the lungs. Medical treatment after decontamination includes removing the victim to outside of the contaminated area, administering oxygen, and in the case of phosgene diuretics may be given to reduce fluid retention.

Irritant Agents

These agents, including Mace, CS, CN, and OC; are often employed by law enforcement agencies in crowd control situations. Signs and symptoms include a burning sensation on the skin, tearing and pain in the eyes, nausea, and occasionally vomiting. These agents generally do not cause serious short-term or long-term effects. However, a victim with pre-existing severe respiratory disease (such as emphysema) may experience life-threatening results upon exposure. Medical treatment for most other victims after decontamination may include a further decontamination with soap and water, or a baby shampoo and water solution. No other treatment is usually needed.

Alternative Fuels

Background:

Since the oil embargo of the 1970's, alternative fuel development for vehicles has gained a greater portion of the market share. In addition, many cities are faced with EPA clean-air standards, expressing the need to convert vehicles to alternative cleaner burning fuels. As legislation , such as the Clean Air Act, starts to become fully implemented and states such as New York and California implement their vehicle emission standards the demand for motor vehicles that operate on fuels other than gasoline and diesel fuel will significantly increase.

Many vehicles today are operating on Liquefied Petroleum Gas (propane), Compressed Natural Gas (CNG), and Methanol or Ethanol fuels. The next major materials in the propulsion market will be electric power and Liquefied Natural Gas (LNG). Personal cars and fleets of all types ranging from taxi cabs, buses, delivery vehicles, and trains are operating today in most major cities and metropolitan areas on fuels other than the standard gasoline or diesel product. Manufacturers of cars, trucks, and buses using new fuels sources is on the increase. The flexible-fueled vehicles (FFV's) can run on gasoline or ethanol, compressed natural gas (CNG), liquefied hydrogen, propane, as well as electric batteries.

All vehicles, whether powered by alternative fuel or conventional gasoline, must be certified by the manufacturer to meet federal motor vehicle safety standards (FMVSS). Even though these standards for safety are met, there has been no method developed to identify the type of fuel the first responder would be faced with.

Challenges for Public Sector Response Training

The new systems pose a wide variety of new concerns to the emergency community of fire, police, and emergency medical personnel. Electric vehicles may be using large quantities of lead-acid batteries or generating electricity of 300 volts. Other vehicles may be using methanol or ethanol fuels which require special extinguishing agents to control fires. Compressed natural gas cylinders of 3,000 pounds pressure are now located in trunks of vehicles and railroad engines are now operating on Liquefied Natural Gas supplies being pulled behind the engine in a special tank car. Filling stations across the nation are installing compressor and cascade bottle fueling systems to fuel the natural gas vehicle. Small trailer mounted cascade systems are being pulled behind vehicles to provide roadside service to those vehicles that run out of natural gas. Utility companies in New York State will soon be marketing home compressors for vehicle owners to refuel their Compressed Natural Gas vehicle in their own garage. The National Highway Transportation Safety Board has found the issue of alternative fuels significant enough to publish a special awareness bulletin alerting responders of the potential dangers of the new fuels.

Emergency response personnel need to be trained to recognize or identify vehicles with alternative fuel systems and be trained in the appropriate safety issues associated with each new fuel system. Since all the systems are using hazardous materials, it is most appropriate that the training be covered under hazardous materials curriculum.

Alternative Fuels

Providers of hazardous materials responder training should develop training or enhance existing training at the Awareness, Operations, Technician and Incident Commander levels with additional material that addresses the following concepts:

- Recognition and identification of alternative-fueled vehicles
- Chemical and physical properties for the various fuels, i.e., LPG, LNG, LH, and electro-chemical cells (batteries)
- Special response procedures and operations needed for each alternative fuel, to include:
  - Personal Protective Equipment (PPE)
  - Suppressant Agents
  - Container Breaches (i.e. fuel or battery leakage)
  - Victim Extrication and Treatment
  - Scene Evacuation
  - Incident Management System (IMS) Special Considerations
  - Mitigation and Clean-Up Requirements
  - The potential for Boiling liquid/Expanding Vapor Explosion (BLEVE)

Carbon Monoxide Response

Fire department units may encounter carbon monoxide in many different situations and incident types. These settings can range from small dwellings to large industrial facilities. CO gas will be produced from all forms of combustion that involve carbon-based fuels. Concentrations will be dependent on the type of fuel and the form or efficiency of combustion. In recent years, these incidents have been on the increase in urban as well as rural areas.

Carbon monoxide is an invisible, odorless, tasteless, and colorless gas that has the same density as air and will not float or sink, but will disperse throughout a structure.

Carbon monoxide gas is a chemical asphyxiant and will replace oxygen in the bloodstream, resulting in suffocation. This gas also has a wide flammable range; from a lower explosive limit of 12.5% in air to an upper explosive limit of 74% in air. It has an ignition temperature of 1128 degrees Fahrenheit. The National Fire Protection Association (NFPA) fire diamond will show CO as a 3 in health, a 4 in flammability, and a 0 reactivity.

The primary hazard of carbon monoxide gas is that of an asphyxiant with relatively low levels producing adverse health effects. These effects can range from mild headache after two hours of exposure to 200 parts per million (PPM) to unconsciousness after 30 minutes exposure to 1600 PPM. OSHA has set a level of no more than 35 PPM as an allowable workplace standard for an 8-hour day, and the EPA has established that residential levels should not exceed 9 PPM over an 8-hour average.

Symptoms from exposure to lower level concentrations include headache, nausea, dizziness, weakness, difficulty breathing, and other flu-like problems. Exposure to high levels will cause cyanosis, hallucinations, angina, and unconsciousness. Any patients suspected of having CO poisoning shall be moved to a fresh environment, placed on high flow O_2 and transported to the closest medical facility.

Residential CO problems can normally be traced to problems that include, but are not limited to, the use of gas furnaces, gas dryers, gas stoves, fireplaces, kerosene heaters, bar-b-que's, or vehicle that are running in or near the structure. Indications of incomplete combustion from gas burning appliances include yellow flame, soot build-up on roof vents, and soot build-up on interior walls. All possible sources shall be checked, and certified repair technicians shall be called as necessary. Southwest Gas shall be notified if any signs or symptoms of CO poisoning are exhibited.

Industrial CO problems can be associated with large furnace type operations, large scale equipment that utilize combustion type engines, or leaks from cylinders that contain compressed carbon monoxide gas. Any operation of an internal combustion engine in a confined space without adequate ventilation will create a highly dangerous and life-threatening environment.

Residential CO detectors are available and will sound two types of alerts. The first is a warning chirp that notifies there is a developing or chronic CO problem that will produce a 4-7% carbon monoxide in blood hemoglobin level over time. In the event of a warning signal, the residence should be ventilated, the test button should be pushed, and all possible sources of CO shall be checked and adjusted or repaired. The warning level is set at 60 PPM CO for greater than 66 minutes. The second alert is a full alarm that warns of levels that will produce 8-10% carbon monoxide in blood hemoglobin levels. The detector will alarm at these three points: 100 PPM will trigger an alarm within 90 minutes, 200 PPM will trigger an alarm within 35 minutes; and 400 PPM within 15 minutes.

A full alarm indicates that dangerous levels of CO have been reached and that immediate action should be taken. These actions include evacuation, ventilation, investigation, and denying access until the source of the CO is secured.

Additionally, the increased use of CO detectors has resulted in many local responders (fire, police, and EMS) being burdened with numerous calls but without a clear and definitive standard operating procedure (SOP) and proper training. Many published SOPs conflict with each other. It is reported by American Medical Association (AMA) that CO is responsible for 800 to 1,000 deaths per year and some 10,000 people seek medical attention.

Challenges for Public Sector Responder Training

Most current Awareness and Operations level training programs do not address this issue sufficiently. Provider of hazardous materials response training should enhance training for the first responder at the awareness and operations levels with material and competency instruction on the following topics:

- CO hazards and toxicity
- Limitations of home detectors
- Limitations of responder carried monitoring devices
- CO recognition and identification, including signs and symptoms of CO poisoning;
- Proper entry procedures and techniques,
- Evacuation, ventilation and source investigation procedures
- CO source control and management
- Post incident action and follow-ups.

Training should also be supported by appropriate standard operating guidelines for first responder A sample of an SOP is provided below.
All CO detector alarms shall be addressed as an emergency until no hazard has been identified. Steps

taken shall include, but are not limited to:

- *Verify detector is CO type*
- *Check for CO related symptoms and evacuate structure as necessary*
- *Check power supply to detector*
- *Assess scene for CO sources*
- *Determine need for additional resources: Haz mat or other units for CO meters, utility company, police department, etc.*
- *Utility company shall be notified if any signs or symptoms are present.*

CLANDESTINE DRUG LAB OPERATIONS

During routine emergency responses to fires or other emergencies it is possible that responders will discover the presence of a clandestine drub laboratory. Clandestine drub laboratories by their nature are disguised and are often encountered accidentally in a great variety of situations, including warehouses, store fronts, apartment buildings, single family dwellings, rural outbuildings and even truck trailer accidents. It should be generally understood that response to a clandestine drug laboratory is a hazardous materials incident. These types of incidents may expose you to toxic, flammable, explosive, and corrosive atmospheres. Without proper training, your health and safety are at risk.

Proper personal protective equipment at a clandestine drub lab incident is absolutely critical for avoiding exposure. Structural fire fighting or EMS gear offers little, if any, protection in such situations. In order to be able to recognize when you are inadequately protected, you must be aware of the limitations of your clothing and SCBA. You must understand that clothing which is adequate in one situation may be inadequate or even dangerous in another. No one protective clothing system will protect you from all situations.

In any emergency situation involving clandestine drub labs there is a risk of exposure to toxins; those materials that are capable of causing injury or death when absorbed. Through an understanding of the types of toxins, their effects, the various routes of entry, and specific biological hazards, emergency response agencies can take more appropriate actions to ensure their own health and safety during clandestine drug laboratory operations. In addition, it should be noted that effective clandestine drug lab incident response requires a well-functioning Incident Management System (IMS). Operating without an IMS or without a complete understanding of how an IMS works is inefficient and dangerous to all agencies involved. Listed in the guidelines are the current OSHA and NFPA laws and standards that apply to emergency response agencies who respond to hazardous materials incidents. Below is a discussion of the application of those hazardous materials competencies to the special hazardous materials response challenges posed by clandestine drug lab operations.

Learning Objectives

The following learning objectives *should be the minimum in any* Clan Lab Course. Upon completion of the course, participants will be able to:

- Discuss terminology associated with drug labs (glossary).
- Discuss history of clan labs.
- Demonstrate, through chemical reaction and/or video format, the possible catastrophic results of chemical interactions and reactions.
- Be familiar with the hazards associated with drug lab operations.
- Be familiar with some chemicals found at a drug lab operation.
- Explain the need for a personal protective equipment program for fire, police, and EMS personnel.
- Explain the routes of exposure and toxicological effects of short term exposures (acute) to these precursor chemicals and the possible long term (chronic) effects of clan lab chemicals on the human body.
- Discuss the federal laws and national standards associated with the use of PPE and chemical response programs.
- List common locations of clan lab operations.
- Explain the needs for well-established standard operating procedures within the fire department and between other agencies.
- Describe, through generic standard operating procedures, the operational goals and objectives for each of the following organizations:
  - Fire Department (First Responder)
  - Fire Department HMRT (Hazardous Materials Response Team)
  - Local Police
  - EMS

- Speak to the issue of responsibility for clean-up and termination of a clan lab incident.
- Explain the importance of scene management at a clan lab incident.
- List the common components of an Incident Management System.
- Overview decontamination procedures.
- Overview termination procedures.
- Explain why post-incident analysis and evaluation are necessary elements of scene management.

<u>Competencies</u>

The student will be able to:

- Name at least three general hazards associated with drug lab operations.
- Select from a list of chemicals those most commonly found in drug lab operations.
- Name two catastrophic results of chemical interactions at drug lab operations.
- Describe his/her standard operating procedures for dealing with drug lab operations and name the contact personnel from at least one law enforcement agency that they would most likely deal with.
- Describe at least two key elements of a PPE program.
- Explain the biological side effects of exposures to precursor chemicals used in illicit drug labs and express the possible acute and chronic effects of exposures to these chemical environments.
- Generally describe the overall operational goal and objectives of the following organizations:
    - Fire Department (First Responder)
    - Fire Department HMRT Units
    - Local Police Department
    - EMS
- Describe the need for establishing clean-up and termination responsibilities.

STIMULANTS

Stimulants are compounds which affect the central nervous system by accelerating its activities. Stimulants are either natural or synthetic. An example of a synthetic would be methamphetamine and a natural stimulant example would be adrenaline.

A. Natural

The first natural stimulant discovered was epinephrine (adrenaline), a substance found in adrenal glands of animals. Its effects were first discovered in 1899.

B. Synthetic

In 1919, a Japanese chemist developed the first synthetic stimulant, methlamphelaime. In 1927, a substance called 1-phenyl 2-aminopropane and its action were first described leading to the further research and development of benzedrine and dexedrine (common drugs used during the late sixties and early seventies for weight control).

CLANDESTINE DRUG LABS

The following general information is based on Drug Enforcement Agency (DEA) Special Agent Patrick Gregory's testimony before the California Select Committee on Drug and Alcohol Abuse on November 15, 1985.

On a national average, one of five (or twenty percent) of all clandestine laboratories result in, and/or are discovered through, fires and/or explosives. During 70 clandestine laboratory investigations, ten percent involved agents being confronted by suspects who had fully automatic and silenced weapons and some form of booby traps or explosive devices. In thirty percent of the cases, defendants were using electronic counter-measures, ranging from scanners to sophisticated video monitors to sound sensing devices.

During the course of these investigations, thirteen firefighters and four police officers required medical treatment as a result of exposure to hazardous chemicals and chemical wastes. Minor injuries resulted from exposure to hazardous chemicals and chemical wastes. Because of exposure to caustic, corrosive, carcinogenic, irritating, explosive, and flammable substances encountered at lab sites, every agent has suffered minor injuries including burns, rashes, headaches, light headedness, and nausea.

The first lab seized in California was in 1963 (amphetamine) in Santa Cruz.

1984 - 93 labs seized in California
1985 - 215 labs seized in California
1986 - 325 labs seized in California
 Of the 325 labs seized in California, 293 were Methamphetamine. Of those 293 labs, 82.5% were using Ephedrine as the primary chemical.
1986 - 509 labs seized nationwide
1987 - 489 labs seized in California
1987 - 682 labs seized in the United States
1988 - Approximately 1,200 laboratories were seized by law enforcement agencies, federal, state, and local police nationwide.

Clandestine Drug Laboratories remain the principle source for methamphetamine. States where most clandestine laboratories appear to be operating are:

- Southern and Northern California
- Eastern Texas
- Oregon and Washington
- New Mexico
- Florida
- Pennsylvania
- New Jersey

TYPES OF LABS AND HAZARDS

A. Extraction Labs

This is where raw plant material is changed into a finished drug by the use of chemical solvents and/or acids. The chemical structure of the drug is not altered. Some examples of this are marijuana to hashish, opium to morphine.

Also under this title are indoor or underground confined space marijuana grow farms. Marijuana grow farms have a high rate of booby trap. They grow marijuana in confined space grows so that they can reduce the oxygen levels in the grow area, making the plant produce more sap, which means more tetrahydrocannabinol (THC). This is accomplished by flooding the confined area with either carbon dioxide or propane. Both gases will displace the available oxygen, and, in the case of propane, produce a possible flammable and explosive atmosphere. Without instrumentation, the firefighter has no way of evaluating the hazard, which is O_2 deficient and possibly flammable. If faced with a rescue, these confined spaces should be approached according to OSHA's proposed Confined Space Protocol 29 CFR 1910.146.

B. Conversion Labs

Currently thought to be the most prevalent. In these labs, a raw or unfinished drug product is changed into a finished or refined drug. Here the chemical structure is changed. Examples of this are cocaine base to cocaine hydrochloride (the white powder sold on the streets as cocaine), and cocaine hydrochloride to cocaine sulfate (aka crack or rock cocaine). Numerous flammable liquids, corrosives, acids, and bases, as well as oxidizing agents, are found at these sites.

Public and Private Sector Dispatch: Hazardous Materials Response Issues

Introduction

The role of public safety communication systems in the successful resolution of hazardous materials incidents has, until now, received relatively little attention beyond the U.S. Fire Administration's 1998 Wingspread report. This section will address the following:

- The inter-relationship between public safety communication systems (also known as dispatch systems) and hazardous materials responders,
- The continuing challenges of public safety communication systems,
- The role of public safety communication professional associations, and
- Issues unique to private sector public safety communication systems.

Each of these areas must be addressed if public safety and private sector organizations intend to positively manage their responses to hazardous materials incidents.

Inter-relationship between Public Safety Communication Systems and Hazardous Materials Responders

Public safety and private sector organizations that respond to hazardous materials incidents have generally built an enviable record of responding to and managing these occurrences. However, these successes have, in part, been made possible by a hidden host of support services – training, supply, administration, maintenance, dispatch, and so forth. This section only focuses on one such service – dispatch systems – however, public safety and private sector organizations must carefully scrutinize all such support services if effective response and management of hazardous materials incidents is to continue.

An instructive analogy for the inter-relationship between dispatch systems and hazardous materials responders is that of air traffic control systems and airlines. The air traffic control personnel— the controllers — use sophisticated electronic systems to "dispatch", guide, assign alternative plans or routes of travel, activate additional resources if needed, etc., for aircraft. Yet, the work of the controllers occurs out of visual sight of those most actively involved in a given flight – the pilots, and the crew. The passengers, who have no active role in the flight, are analogous to the public; and have little conscious knowledge of the importance of the air traffic controllers to the safety of the flight. Consequently, there is a tendency to forget the important role of such hidden people and systems. The result is that resources for air traffic control equipment, and resources for training for controllers sometimes lag behind that which is actually needed. So too, unfortunately, with dispatch systems. "Out of sight, out of mind" often leads to "out of service" as needed dispatch equipment does not receive the preventative maintenance required, the purchase of new equipment is delayed, dispatcher training is downplayed or avoided, etc. Only by devoting effort and funding to dispatch can we continue to insure success operationally.

The Continuing Challenges of Public Safety Communication Systems

What follows are several pressing issues that effect both public and private sector dispatch systems. In turn, each issue effects hazardous materials response capabilities. Each issue must be dealt with, both in the short term and in the future.

Training

While training is generally recognized as essential for effective performance there has been too little actual hazardous materials orientation training associated with dispatcher – or to use the more modern term, telecommunicator – initial training or continuing education. This is in spite of the outstanding efforts of both the National Fire Protection Association (NFPA) and the Association of Public-Safety Communications Officials International, Inc. (APCO). The NFPA has developed Standard 1061, which is essentially a voluntary compliance guide for the job performance of public safety telecommunicators. Meanwhile, APCO has developed (and in 1996 approved) a complimentary minimum training standard: Project 33, National Public Safety Telecommunicator Training Standard.

The APCO standard recommends, as a minimum, training in each of eight areas:

Module 1: Roles and Responsibilities
Module 2: Legal Aspects
Module 3: Interpersonal Communications
Module 4: Technologies
Module 5: Telephone Communications Techniques and Call Processing
Module 6: Call Classification
Module 7: Radio Communications (Dispatch) Techniques
Module 8: Stress Management

These eight modules total forty hours of instruction. However, the APCO Standard does **not** include an orientation on hazardous materials. But, it lists several optional subjects such as National Crime Information Center (NCIC), Emergency Medical Dispatch, and hazardous materials.

Clearly, the APCO Training Standard will serve to further professionalize the telecommunicator field. Although the lack of required hazardous materials orientation training merits reconsideration, APCO does provide a video program on this subject. This program, entitled “Hazardous Materials Awareness for Dispatchers” includes a wealth of information, such as:

- Hazardous materials identification
- Proper information gathering
- Using the DOT Emergency Response Guidebook
- Response generation guidelines
- Coordination and support functions
- Developing standard operating procedures

Weapons of Mass Destruction (WMD) and Clandestine Drug Lab Incidents

Both of these issues are more fully addressed as separate Special Topics. However, it bears repeating that both of these types of incidents hold special challenges for telecommunicators. First, and often overlooked, is the fact that the telecommunications center itself may be an infrastructure target of terrorists. To prepare for this eventuality requires knowledge of potential threat groups, physical security countermeasures and other methods of “hardening” the facility.

In addition, both types of incidents require specialized knowledge of the types of hazardous materials that may predominate as WMD agents and/or as commonly used chemicals in drug production, whether at extraction labs or conversion labs. Without this knowledge telecommunicators may miss or fail to pass on to responders important “clues” that could potentially effect the outcome of the response.

Since both types of incidents are criminal acts telecommunicators must have knowledge of, and use (as needed), any pertinent evidence preservation (of items such as dispatch logs and tapes) and documentation techniques. In addition, both terrorist groups and illicit drug manufacturers have a keen interest in the activities of public safety. This requires the telecommunicators to practice effective operations security (OpSec), such as maintaining confidentiality of raid information, proper securing of agency and individual public safety personnel contact information (for example, home telephone numbers and addresses of law enforcement officers).

Non-Emergency Number Systems

In order to process the ever-increasing emergency calls communications systems have begun to develop equivalent non-emergency incident systems. Two such systems, using 311 as the non-emergency number, are operational in Baltimore, Maryland, and Dallas, Texas. The actual number selected is immaterial. But, the development of such systems is necessary or emergency requests for assistance – including those that will result in hazardous materials responses – will be delayed.

Funding Issues

Many public safety communication systems are outdated and perennially under-funded. Traditionally, general fund taxes were the source of such systems. Now, however, alternative funding methods such as surcharges on intra-state long distance calls, and directory assistance fees are being implemented.

But, without a firm financial footing no communication system can operate, perform preventive maintenance, invest in the on-going professional development of telecommunicators, research the specifications for new equipment, purchase and install said equipment, etc. Ultimately, this impacts on call dispatch, which impacts on response, including those involving hazardous materials.

Communication Center Management

Telecommunicators, like all other types of workers in structured organizations, have supervisors, who in turn have managers. These people all use managerial systems to accomplish tasks. Given the funding restraints common to many communications centers (see previous sub-issue about funding issues) the need for efficient and effective management systems and managers is critical.

APCO has worked with the Commission on Accreditation for Law Enforcement Agencies, Inc. (CALEA) to expand CALEA's certification process for communications centers. In the process of becoming certified by CALEA an already excellent public safety communication system should become even better.

Communication Hardware and Software Changes

One of the greatest challenges for communications systems is changing technology. The Federal Communications Commission is now actively researching frequency availability, wireless Enhanced 911 systems, etc. However, for the individual public safety communications system each potential technological change – such as common air interfaces (CAI) to improve interoperability, microwave radio systems, mobile satellite services, etc. – must be analyzed, and if useful, funded, installed, and integrated into the existing system. The task is never-ending. Yet, if not done, or done poorly, the dispatch of emergency calls, including those for hazardous materials incidents, will suffer.

The Role Of Public Safety Communication Professional Associations

Anyone reviewing the historical background of American public safety communication systems is immediately struck by the importance of professional associations in the development of these systems. In particular, the Association of Public-Safety Communications Officials International, Inc. (APCO) has played a seminal role in professionalizing the field. Since its inception in 1935 APCO has developed and completed a series of practical projects that have addressed major issues: the “ten signal” cards and other aural brevity methods, frequency coordination, advising the Federal Communications Commission, universal computer aided dispatch standards, etc.

While APCO’s role is critical to the success of these systems, it has worked with many other related associations to improve public safety communication. These organizations include the National Association of State Telecommunications Directors, and the National Emergency Number Association. Each of these associations is to be commended. And, each must be challenged to examine its awareness of hazardous materials response issues and develop effective methods to manage those issues.

Issues unique to private sector public safety communication systems

It should be clear that private sector systems share the same continuing challenges – training, funding, communication hardware and software changes, etc. — which were identified earlier in this document. In addition to them, however, there are several other issues that are unique to the private sector that may impact on hazardous materials response. Here are two:

Continuity of Services

Invariably one of the major concerns with any private sector function that was originally performed by government is the long-term survivability of the private company. In an environment where businesses fail – sometimes spectacularly – the concern is quite reasonable. The best indicator of continued endurance is prior successful existence, and the longer that prior existence the better. In addition, the specific track record of the private sector company in other jurisdictions should be carefully examined. Companies that survive do so for a reason: they’re carefully managed.

Confidentiality Concerns

Historically, law enforcement has had to be careful about information that, if it fell into the wrong hands, could compromise an on-going investigation or operation. For example, a planned raid on a suspected clandestine drug laboratory perhaps could require the pre-positioning of fire service hazardous materials personnel and emergency medical units. But the dilemma can be that including the public safety communication center in the planning process is sometimes viewed as increasing the risk of inadvertent release of critical information. Good operations security (OpSec) is a constant concern. When a private company operates the communication center it can increase concerns about OpSec. Only close coordination between the involved agencies, and the building of a track record (discussed earlier in the “Continuity of Services” section) of confidentiality will ultimately change this situation.

Summary

This Special Topic section has attempted to describe what heretofore has been little discussed – the role of communication systems in hazardous materials response. Numerous challenges – for agencies, communication systems, telecommunicators, etc. — were identified. Each of these challenges must be addressed if public safety and private sector organizations intend to positively manage their responses to hazardous materials incidents.

Realistic Approaches to Rural and Frontier Hazardous Materials Risk Management

Introduction

Hazardous materials risk management had early origins as an outgrowth of concern over protection of the public from major disasters and emergencies. Because of need, the natural evolution over time has been to expand the national focus from large, infrequently occurring fixed-facility disasters in heavily populated areas to the more realistic threats of smaller, more commonly occuring transportation and small fixed-facility incidents that are ever-present throughout the nation.

However, many of the principles and concepts of hazardous materials risk management today retain critical presumptions of levels of available resources that are true for large industries and large, well funded communities, but are unfortunately not true for most of the smaller communities nationally. This is a growing national challenge that needs to be addressed. Small jurisdictions, especially rural and frontier communities, do not have the tax base, financial resources or personnel needed to manage their hazardous materials risks in the same manner as larger, more affluent urban and suburban jurisdictions.

Rural and frontier communities nonetheless often have considerable hazardous materials risks that must be addressed, in spite of the limited resources to do so. Transportation accidents, for example, occur along routes that cross rural and frontier jurisdictions with no less frequency (and by some measures with considerably greater frequency) than they cross urban or suburban areas.

What is needed is an alternative approach to hazardous materials risk management that will address these risks while at the same time accommodating the limited resources and other unique parameters and capabilities of rural and frontier communities. The following concepts and strategies are offered to support such an alternative approach, and address an introduction to the unique character of rural and frontier communities as well as proposing realistic strategies for managing hazardous materials risks in these environments. The strategies proposed are drawn from the successful practices of a number of rural and frontier jurisdictions who have undertaken to develop their own unique methodologies for preparing for and responding to hazardous materials emergencies.

The Social Cost of Space

As Americans, we honor space. Even those Americans who live in metropolitan, urban and suburban areas love to speak of wide open spaces and annually vacation in America's hinterland to camp, fish, hunt and hike. However, residents who live permanently in the extremely rural and frontier areas of America often must pay a price for the experience. Sociologists and anthropologists call this price the "social cost of space". This cost is measured in terms of services, accessibility, standard of living, social events and other necessities, which are significantly less available in rural areas than in metropolitan areas.[1]

The underpinnings of the social cost of space are manifest to any visitor to a small town with diminished industry, population, commerce or tax bases. From an emergency preparedness perspective, this cost is reflected in a significant reduction of the services, skilled technicians, bureaucratic organizations, and technological systems necessary to maintain the high level emergency services "standards of care" that urban centers enjoy.

[1] See: A.H. Anderson, "Space as a Social Cost," *Journal of Farm Economics,* Volume 32, No. 3, 1950; and Carl Kraenzel, "Sutland and Yonland Setting for Community Organization in the Great Plains," *Rural Sociology,* Vol. 18 (1953), pp. 344-58.

This social cost of space is also reflected in important cultural differences in local management systems, techniques and terminology. These cultural differences drive the style and programs of emergency management and preparedness in rural and frontier communities. The diminished resources and limited time available force all participants to attend only to high priority issues of immediate and very real impact, and there is little tolerance or support for external mandates or requirements that are not seen as having an immediate local importance or impact. To be effective, all local emergency management programs, initiatives, and actions must pass the test of immediate actual relevance to current local affairs or problems before they will be undertaken in rural and frontier communities.

This social cost of space determines the realities of what can and cannot be done in hazardous materials risk management in rural and frontier communities. These realistic limitations give rise to a number of complex questions and issues that need to be addressed, such as the viability of alternative standards of care, alternative levels of acceptable risk, and alternative, more streamlined procedures for hazardous materials risk management and control.

Rural and Frontier Communities: Government Concepts, Definitions and Programs

There are many different definitions used to describe and discriminate between frontier, rural and urban areas. These definitions are used for different reasons by different programs, different federal and state agencies, and different disciplines, and there is no single criteria in use nationally with which everyone agrees. For example, “frontier” and “extremely rural” are defined by population density of ten or fewer persons per square mile by the U.S. Department of Health and Human Services (DHHS), for standards of care analysis purposes. By contrast, the U.S. Bureau of the Census, for the purposes of statistical census analysis, defines “urban” as comprising all territory, population, and housing in areas and places of 2,500 people or more, and defines “rural” as everything else. There are also many definitions in use that depend upon factors other than population size and density, including measures of proximity to and relationship with urban areas, measures of the degree of urbanization, and geographical area classifications by principle economic activity.

Regardless of the definitions used, it is generally understood that there are important differences in the economic, public services, and personal lifestyle characteristics of rural and frontier areas. In addition to having a smaller economic base than urban areas, rural and frontier areas also receive less external financial and services support from federal sources, which accentuates the gap between rural and frontier resource bases and those of urban areas. Because of population served, urban and metropolitan areas have historically been the primary targets of federal programs and activities, including dialogue and input regarding national standards of care and standards regarding affordable minimum levels of service. So rural and frontier areas are often held to unobtainable standards of care requirements that are affordable only with urban-level resources and services.

However, there is a growing understanding of the need to address this challenge nationally. The DHHS and the U.S. Congress have taken the lead in developing the concept of “frontier” status and promoting the need for a separate but adequate standard of care for extremely rural areas.[2] Many state governments and agencies with extensive rural and frontier areas within their jurisdiction have also been attempting to address these issues. For example, the Montana Disaster and Emergency Services has adopted the frontier designation as defined by the DDHS in an attempt to emphasize the extremely rural nature of most of its counties. To be eligible for DDHS Bureau of Health Care Delivery and Assistance support as a frontier area, the following service area criteria must be met:

[2] U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Care and Deliver Assistance, “Primary Care Activities in Frontier Areas - Regional Program Guidance Memorandum 86-10,” unpublished memorandum, Rockville, MD June 10, 1986; Laura Summer, “*Limited Access: Health Care for the Rural Poor,”* Center on Budget and Policy Priorities, Washington, D.C., March, 1991; and Congress of the United States, Office of Technology Assessment, Rural Health Care, “*Defining ‘Rural’ Areas: Impact on Health Care Policy and Research,”* July, 1989.

Service Area: a rational area in the frontier will have at least 500 residents within a 25-mile radius of the health services delivery site or within the rationally established trade area. Most areas will have between 500 and 3,000 residents and cover large geographic areas.

Population Density: the service area will have six or fewer persons per square mile.

Distance: the service area will be such that the distance from a primary care delivery site within the service area tot he next level of care will be more than 45 miles and/or the average travel time more than 60 minutes. When defining the "next level of care" we are referring to a facility with a 24-hour emergency care, with 24-hour capability to handle an emergency caesarian section or a patient have a heart attack and some specialty mix to include at a minimum, obstetric, pediatric, internal medicine and anesthesia services.[3]

How Much of the United States is frontier and rural, and what is the significance to hazardous materials transportation?

The map delineating frontier areas by county shows that about one third of the geographical area of the U.S. can be categorized as frontier.[4] The map showing non-metropolitan areas and percent rural population suggest that, in addition, well over another third of the U.S. is rural.[5] The combination of these two areas suggest that close to three fourths of the geographical area of the U.S. is frontier and rural.

Although by definition these areas serve a only a minority of the population of the U.S., the fact that most of the U.S. is frontier or rural is of key significance to hazardous materials transportation. It is extremely important to note that, from a hazardous materials risk management perspective, **the majority of all hazardous materials transportation routes lie in rural and frontier jurisdictions**.

It is recognized that past commodity flow studies and other risk assessments have indicated that risk of accident in concentrated urban areas is greater, especially those with a preponderance of fixed facility hazards, and that, by definition, the risks to the population are greater in urban areas. So there has been good justification nationally for past priorities to focus hazardous materials risk management on these threats. However, it must also recognized that rural and frontier areas today present a major un-met national transportation risk and challenge, and that this challenge is greatly accentuated by the diminished resources and lack of infrastructure in rural and frontier communities to support appropriate hazardous materials planning and response.

The Effects of Low Population on Rural and Frontier Response Organizations

In order to develop more effective strategies for rural and frontier hazardous materials risk management, it is critical to first understand the characteristics of local emergency management and response. A typical rural town has a mix of governmental and quasi-governmental groups, including those functional areas related to emergency and hazardous materials response: fire, law enforcement, emergency medical services, public works, public health, emergency management and elected public officials.

Fire: VFD, or Volunteer Fire Department, is the typical fire organization. There might be other types of districts, other names, other acronyms, but what exists, basically, is a group of individuals who volunteer their time to provide the community's fire protection services. They train, on their own time, they fight fires on their own time, and they volunteer time to fund-raising, which is often the only financial support for the response organization. Occasionally there may be a paid Chief, sometimes there are a few paid fire fighters along with lots of volunteers, but the heart of rural and frontier fire-fighting efforts is the volunteer sector, and it is structural.

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3 DHHS, "*Primary Care ....*"

4 See Figures 1, map from DHHS, "*Defining Rural Areas . . .* " on frontier counties in the U.S.

5 See Figures 2, 3 and 4, maps from DHHS, "*Defining Rural Areas . . .* " on metropolitan and urban population sites, with the remainder being rural and frontier areas.

In tandem with the volunteer structural department there may be a wildland/forestry fire crew and often a county road crew, that fights wildland fires. These crews typically can assist in domestic fire-fighting only in limited support roles. Occasionally, depending upon the geographic location, there may be a nearby military fire fighting contingent or an industrial fire brigade that can lend a hand, but with few bases or industries, these are rare.

This is the frontier fire fighting reality, minimally equipped and trained volunteers, often using hand-me-downs from regional paid departments, who are paged, leave their place of employment, drive to the fire house, take the truck with equipment to the scene, and fight what's left of the fire.

Law Enforcement: Typically, organization consists of very small police departments with small jurisdictional areas, typically within the city limits. These departments work in conjunction with sheriff's offices with large jurisdictions and insufficient staffing. Within the large geographic area of frontier counties, the officer-per-square-mile is minuscule. Given the fact the average population is less than six persons per square mile, many western areas must count on cross deputizing and mutual aid with local game wardens, highway patrol officers and tribal police to supplement local jurisdiction law enforcement officers.

Emergency Medical Services: There is a wide variety of EMS providers in extremely rural areas (volunteer, clinic, private, fire, etc.), but they all suffer from the same problems: lack of money, lack of technicians, lack of equipment and lack of volunteers. Some "hospital runs" can cost a volunteer a whole day's work. Tourists can overload systems set up for locals, drying up the volunteer base. Higher and more complex competencies make training requirements unmanageable on a volunteer basis.

Public Health: While EPA office personnel may be very familiar with acronyms like RCRA, EPCRA, CERCLA, CAA, CWA, OPA and even OSHA, it is more likely that a rural or frontier county sanitarian or code enforcement officer will be familiar with spending the day inspecting septic tanks and restaurants rather than going through hazardous materials or hazardous waste regulations. Some rural and frontier counties do not have permanent sanitarians. Many counties share sanitarians, some hire them on an as-needed basis. With their overwhelming workload and local customer focus, they have little time for, what from their perspective would seem to be, intrusive and unfunded federal mandates.

Public Works: Public works personnel should be welcomed players at emergency incidents. They are used to working outside, on streets, roads and highways. They have emergency equipment, barricades, etc. Unfortunately, while a county or state may have a great deal of equipment and operators, it is spread out. The result is that very little equipment and personnel are available locally in a small town.

Emergency Management: Emergency management is a low priority in a rural and frontier city or county government. The majority of local emergency managers are part time. Most have many other duties, with other duties being known to include safety officer, coroner, junk vehicle officer and floodplain manager. The number of management courses needed to make a good emergency manager from scratch would use up all of a part timer's hours for two years. Yet, the position is critical to emergency management and hazardous materials risk management activities in rural areas.[6] It might even be said that without an effective local emergency manager, the odds are extremely low for having a good hazardous materials or emergency management program.

Elected Public Officials: County commissioners, mayors and even sheriffs are high among the leadership of local communities. They usually are ranchers, farmers, businessmen, miners, loggers, etc. They are workers, not managers. They have the final say regarding many activities of governmental and quasi-governmental activities, yet they often have little experience to prepare them for their regular governmental duties, and usually lack the qualifications necessary to delve into disasters and hazardous materials emergencies.

[6] See Frederick J. Cowie, Ph.D., *Hazardous Materials Risk Management in Extremely Rural Areas,* 1993.

Toward Realistic Approaches to Rural and Frontier Hazardous Materials Risk Management

Federal programs, such as EPCRA and other SERC-LEPC initiatives, presume the existence of local emergency planning committees (LEPCs). This theory presupposes the existence of an industrial tax base, paid responders, training on company time, adequate equipment and a variety of other luxuries.

Frontier facts are simple. There are probably no or few paid responders, outdated or nonexistent equipment, no tax base, no time to train and no active local emergency planning committee. The amount of time, effort, and money requisite to produce a trained, equipped, planned and exercised response community is beyond the scope of most rural and frontier communities.

The EPA has funded at least one project designed to address the problems of frontier LEPCs[7], but there are still extensive challenges stemming from the fact that most frontier LEPCs exist only on paper, if even there. The EPA has had some success in creating coordinated hazardous materials response and risk management where none existed, yet this success is geographically intermittent. Much has been done, but the vast majority of the work lies ahead. In rural and frontier areas, the chances of a truck carrying hazardous materials having an accidental release within the jurisdiction of an active LEPC or within the jurisdiction of a local hazmat team are extremely poor.

Some frontier and rural states have programs and projects designed to develop active frontier LEPCs, but these programs tax the perseverance and creative skills of personnel, because of insufficient staff, time, and resources. The work that needs to be done, needs to be done effectively, efficiently and with a minimum of wasted effort and duplicated efforts.

Some approaches work better than others, some approaches have proven successes, some approaches are worth using while others can stifle any embryonic LEPC development. The following techniques and suggestions drawn from successful practices in rural frontier environments, are presented as possible alternative strategies for rural and frontier hazardous materials training and program management.

Sample Recommended Practices: An Alternative Approach to Hazardous Materials Risk Management Training in Rural and Frontier Areas

1. Start with Baseline Chemicals, Hometown Chemicals

The greatest challenge in developing a hazardous materials program with volunteers in rural and frontier communities is to make it relevant. Volunteers will not give up an evening, a weekend or a minute to hear about make-believe scenarios or federal mandates. Success, to date, in small towns with volunteers has been by the use of next-door chemicals. Failure has been catastrophic when the emphasis has been on catastrophic events and trainloads of extremely hazardous substances. The fight can't be won with theory, it can be won with facts.

Using a flip chart[8], a skilled facilitator can draw out of the local group the list of chemicals in their town that can hurt them, their kids, their parents, their friends. It does not matter what the list ends up being, because it will be real and it will be a starting place they can relate to and live with, since they do everyday! The baseline chemical list will look something like this:

- gasoline
- diesel
- LPG/propane
- acids/bases
- natural gas
- chlorine
- pesticides/poisons
- explosives

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[7] Frederick J. Cowie, Ph.D., *Developing Realistic LEPCs in Extremely Rural (Frontier) Areas*, 1994.

[8] Use technology comparable with that available locally to your audience. Flip chart is comparable to the clip board you will find in small towns. No fancy computer programs, please!

- crude oil
- anhydrous ammonia
- paints/solvents
- household chemicals

This list should be, will be, real to local fire fighters, local responders, local industrial folks. These are everyday chemicals in everyday towns. Luckily for trainers and planners, unluckily for citizens and responders, these pretty well cover the gamut of hazard classes, at least well enough to develop a baseline set of hazards. It is good to point out at this point that we are a chemical-based society, that chemicals are the reason our society is as it is. That is not to say it is good or bad, right or wrong, but that is just how it is. Chemicals are on the roads and rails, because they are destined for facilities in our towns that need them. These are the transportation industries and fixed facilities that hire our friends and neighbors, that support our communities, that make America work. The chemicals are the chemicals of modern life, even in frontier America. Let's look at them:

Gasoline: It's everywhere; flammable liquid; fairly low flash point; kills a lot of people; causes a lot of property damage; comes in large quantities; has recognizable industry names; corner filling stations. Frequent large releases, often to do with highway traffic accidents, or smaller releases due to overfills at delivery sites.

Diesel: It's everywhere; fairly high flash point; large number of small releases due to saddle tanks on trucks involved in traffic accidents.

LPG/Propane: It's the heating fuel of choice in rural, camping and barbecuing America; comes in varying sized containers; distribution sites in or near all small towns; infamous from Kingman, Arizona; associated with BLEVEs; a lot of it on the road; a liquefied-gas, looking for space, air.

Acids/Bases: Lots of acids used in refining and manufacturing; corrosives; eat their way to a more neutral pH; comes in large and small quantities; lot of it on the Interstates.

Natural Gas: Rarely on lists; explodes, burns, asphyxiates; infrastructure often old; releases often caused by backhoes; gathering lines and pipeline facilities.

Chlorine: A killer; basic manufacturing chemical; basic water purification chemical; large and small cylinders; lots of rail cars; municipal swimming pools.

Pesticides/Poisons: Including herbicides, fungicides, etc.; on seed wheat and potatoes, etc.; lots of it on roads at certain times of year; designed to kill; store in co-ops in or near all small towns.

Explosives: Unexploded military ordnance; old nitroglycerine and dynamite; high school chemistry labs; terrorist activities.

Crude Oil: Large quantities; production-area specific; environmentally nasty; very high flash point.

Anhydrous Ammonia: No water content, therefore hydrotropic (water-seeking); corrosive; inhalation hazard; distribution sites in or near all small towns; nurse tanks pulled by pickups.

Paints/Solvents: Everywhere; hardware stores and car parts stores; dry cleaning and automotive; many carcinogenic; flammable liquids.

Household Chemicals: Cleaning products; drain cleaners; charcoal starter; paint thinner; old stuff nobody knows what it is any more, and so on.

It should always be remembered that there rarely are either historical or zoned areas for chemicals in small towns. Hazardous materials distribution points are often in close proximity to residential areas, schools, retirement homes and medical facilities, often downwind in the pathway of prevailing winds. Once the frontier community firmly believes that there are hazardous materials next door, next door to their kids and spouses and parents and friends, then they can be moved to the next step, human pathways for chemicals, good and bad.

Pathway examination is critical to elevating the consciousness of small communities about hazardous materials. It humanizes and personalizes what is otherwise a technical nightmare. Humans intake air or food or liquids in four ways, and they intake hazardous materials in these same four ways, hazardous materials that can maim or kill them. If the emphasis is placed on the humans, the citizens, the responders, the industry employees, there is a much better chance at success, a much higher acceptance ration, than if the left-brain, technical side is overemphasized. [Technically-oriented trainers tend to over-chemicalize hazardous materials incidents, thus the following pathways section may be given first to humanize hazardous materials incidents.]

2. Entrance to the Human Body: Four Pathways

It is critical to emphasize in every way that they, the responders, citizens, industry employees, are the most important things: not chemicals, not management systems, governments, structures or highways. Emphasize that the way their body takes in food, water, oxygen, etc. is going to be the exact same way it takes in carbon monoxide, poison, etc. Prove to them that they have to understand themselves in order to stay safe. Discuss the four pathways, parallel them to environmental area for further emphasis. Show the environmental as a secondary safety problem, long term safety problem, yet a safety problem indeed. **Safety first, and it's their safety!**

1. Inhalation: Breathing, in and out. Have them actually do it forcefully. Explain to them that this is a pathway and that does not differentiate the kind of hazard in that pathway. It could be a corrosive, a poison, an asphyxiant. The results would be different, all bad. Remind them that their body will breath, in and out, automatically. They can't stop the pathway. Environmentally, contrast clean air with air pollution.

2. Absorption: Something on the skin, slowly moving through the skin, past the muscles and into the blood stream. Again, it could be different hazards using the same pathway. Environmentally, this can be compared with percolation through the soil into the aquifer.

3. Ingestion: Eating or drinking is the usual idea. But people don't usually eat or drink hazardous materials straight, but they could be swallowing contaminated saliva. Children could be playing on contaminated dirt. All swallowed material goes into the digestive tract. Environmentally similar to dumping something directly into the stream or river.

4. Injection: Needle injection often comes up, but at incidents it is usually either done via new or old cuts, abrasions, punctures, etc. This speeds up, through a more direct pathway, the entrance into the blood stream. Environmentally similar to a release near a wellhead that siphons material directly into the aquifer.

This creates a good teaching paradigm necessary for good training: Participants identify **both with** their own personal human body functions **and with** the chemicals which exist next door to them, their loved ones and their friends.

3. Personal Protective Equipment (PPE) in Frontier Areas

A person's past history, experiences, and training are far more important in changing behavior at hazardous materials incidents than is new data. Therefore, a trainer or facilitator, in order to be effective and change behavior, must address the standard incident comfort level of the responders, especially in rural and frontier areas. The local responders are not professional data managers used to manipulating abstract concepts. Deal with them where they are. Ask them for examples of personal protective equipment (PPE) they have and what it protects them against. A list might contain some or all of the following. Law enforcement: vests/bullets; latex gloves/blood borne pathogens. Fire: Bunker gear/some heat and flames; SCBA/airborne hazards. EMS: latex gloves/blood borne pathogens; goggles/blood borne pathogens, projectiles. Public works: leather gloves/scrapes, cuts. Public health: latex gloves. Emergency managers: Hard hats/things that hurt their heads.

Once they are comfortable explaining their PPE (they may have never used this phrase or acronym before), ask them to review the baseline chemicals and the four pathways. Then lead a discussion of PPE for hazardous materials incidents. Let the group come to the conclusion that they virtually have no protection against chemicals, except the firefighters and their SCBA in relation to inhalation hazards. What about simultaneous inhalation and absorption hazards or corrosives? Is the bunker gear really helpful at a hazardous materials incident? Are there false senses of security and protection?

Provide them with an understanding of the four levels, A-B-C-D of PPE according to EPA and OSHA. Have them discuss where they personally fit on the A-D scale, which for the most part is the "street clothes" level. Then gently advise them that their PPE is **distance**, pure and simple. Distance moves their own, individual four pathways away from the chemical processes involved in the incident. They can understand this. They may want to do something. They may want "hands on." But what they need is to be safe.

4. North American Emergency Response Guide (NAERG) ***in Frontier Areas***

With regards to safety, the most important document in hazardous materials response in rural and frontier jurisdictions is the NAERG. It is an accepted national standard of care. It is that standard against which incident response will most likely be measured by post-incident authorities. It is universally available, it can be adopted and should be adopted as the transportation incident response plan by jurisdictions, volunteer and paid fire departments, law enforcement, EMS, public health, public works and emergency managers, in lieu of oral or non-existent plans. Yet, it is not often marketed well. However, if it is introduced to the response and planning community here, after the baseline chemicals, four pathways and PPE/distance, then it is accepted as a **necessary and appropriate** guide to initial response, hands down.

Why? Because the appropriate question, after distance is described as personal PPE in frontier areas, is "What Distance?" The answer for NAERG chemicals is in the Guides. Safe distance is the hook to get their interest, then one can do NAERG training. Once they understand how to determine the **isolation** radius, how far to get people out and how far to keep new people away, then they can proceed to other parts of the Guides: Potential Hazards, Protective Clothing, Fire, Spill or Leak, First Aid, etc. This is a user-friendly, foolproof system. They can be shown the green pages with their isolation and protective action distances and water-reactive tables and the white pages with the data management ideas and narrative sections. But if they don't see how this is important to them personally, individually, then they will not use it. And the way to get them to use it is to get them to buy into **personal safety first, then public safety!**

5. Don't try to sell ICS (Incident Command System): Use tabletop exercises with realistic scenarios to develop locally-intelligible incident management from the chaotic ground up.

The resistance to management training in general, and ICS training in particular, in rural and frontier areas is legendary and well-founded. Many governmental, managerial and developmental ads have come and gone. Time-restricted local responders don't want another three-letter acronym to put in the trash with MOB, TQM and MBA. In rural areas, any medium-sized to large incident, especially highway incidents, demands the use of a management system. Let the incident scenario demand management help, it can do it by itself. Use the five basic operational response areas: fire, law enforcement, EMS, public health, public works.

It has been found that in rural and frontier areas, everything is done with neighbors, mutual aid and outside help. There are just not enough locals to go around. The fire lead may be the local VFD, but there usually are two or three mutual aid VFDs involved, plus a county wildland fire crew and maybe one from state forestry. The law enforcement lead may be the county sheriff's office, but they need help from city police, state highway patrol, game wardens, and in the west, tribal police, FBI and ATF. Public works lead may be either county roads or state highways, but each needs the other and sometimes city street crews' help. One county public health nurse or sanitarian can't handle a big incident, so city or state folks are called in. In addition, local, county and state emergency managers, public officials and industry personnel may be needed.

Let this group of fifteen or twenty agencies, which are necessary to handle a not-uncommon incident, demand a management system and the responders will beg for help. When someone comes to help, don't let them bring tomes of professional looking ICS/NIIMS documents. All a frontier or rural responder or manager needs is the basic concepts: Span of control and a logical differentiation of roles. Roles: Incident Commander (or Unified/Joint Command); Commander support (Liaison, Safety, Public Information); Operational Support (Logistics, Planning, Finance) and Operations (Fire, Law enforcement, EMS, Public Works, Public Health, Other).

Demonstrate that the Incident Commander and the Operations Chief need to be managers, perhaps with an operational specialty, but the emphasis has to be on management skills and not specific operational expertise. Explain the need for perspective, reflection, data management, analysis of the situation. Differentiate decision making from implementation of the decision. Show the need to group functional response agencies (Fire, Law enforcement, EMS, Public Works, Public Health, Other) and that each group needs a control, a lead person.

Once they can see this, then they will become interested in training to ICS, the national standard for incident management. Until they see the need by walking through incident scenarios, however, ICS trainers are wasting time in frontier America.[9]

6. Marketing CHEMTREC, CHEM-TEL, MSDSs and Information Management in Frontier Areas

Once the participants realize the incident scenario might or will involve technical personnel beyond the local responders' defensive operations level, whether they are hazmat team members, emergency room nurses and doctors, or public health nurses or technicians, local responders will see the need for information above and beyond that which NAERG can provide. That is when the trainer or facilitator shows them in the NAERG how to access CHEMTREC and/or CHEM-TEL to get the MSDSs and the manufacturer data needed to learn the chemical specifics often necessary for technical response. Do not get bogged down here in EPA or OSHA regulations, just use a real MSDS from one of the baseline chemicals, like anhydrous ammonia, chlorine or LPG. Keep up the momentum of the training, don't kill it with regulatory confusion.

This is also a good time, since the subject is data management, to discuss data collection and data management. Show them that all incidents require responders and participants to know certain information in order to handle situations properly: exact location, chemical name, container, amount originally in container, amount released, release rate, weather, temperature, wind, responsible party names and numbers, insurance company names and numbers, etc. The group of participants, from the participating agencies and all affected groups, should develop a jurisdictionally-correct checklist. The NAERG pages 2 and 3 are a good start, but the hazmat team or the clerk and recorder might want different or subsequent information. Put their needs into the system early on.

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[9] Frederick J. Cowie, Ph.D., *A Visioning Approach to Exercise Design in Extremely Rural (Frontier) Areas,* 1997.

7. Getting Past Negativity with Frontier Audiences

As a trainer from Idaho once said, what they say is "Ain't got no LEPC! Don't want no LEPC!" Starting from scratch is the hardest thing to do and nothing succeeds like success. These two truisms may seem contradictory, but they are reality on the frontier and in rural areas. The key to success is targeting. No one can bring all jurisdictions up to speed at the same time. That approach beckons disaster. Target efforts to one local jurisdiction, county or small town, where there is one person in some important role (fire, law enforcement, EMS, public health, public works) who can act as a local catalyst. This person should be willing to dedicate work over the next three to five years, because that is what it takes to develop a local emergency hazardous materials response system. Then commit yourself to make trips to that jurisdiction every month for the next year.

Start with two or three awareness courses (using the principles outlined above). Then do a series of successive tabletop exercises, the first one being an orientation, working through the need for a management system (as outlined above). At that first orientation meeting, use a simple oral or one-page hazard analysis system, where the locals decide what are most likely, most locally interesting, most locally important scenarios.[10] Plan to do three or four tabletops, making them sequentially more complex. Never make them more deadly or more complex or more intense than needed to give the local responders **practice** (that's what exercises should be in rural areas, practices, not tests) doing what they are currently equipped and trained to do. Do not go overboard, don't kill everyone, don't plan to fail!

The evolution of frontier exercises has led to the development of a two-hour exercise where four-to-six different scenarios, using baseline chemicals and relevant local data, are given to local teams, consecutively, one every twenty minutes. For each incident, the local teams then must develop incident strategies as well as operational management plans for the functional areas of fire, law enforcement, EMS, public health and public works, as well as plan to interface with the fixed facility or the transporter. This forces the team to think quickly, as a team, and shows them that things that used to take the hours in early exercises where the team was in formational stages, can now be done in a matter of minutes, with an increasing level of professionalism, confidence and competency. Use of this exercise is recommended before moving outside.

8. Moving the Whole Thing Outside: The Field Exercise

Do not have a field exercise until two successive tabletops, using different scenarios, have proven that the local incident management system works. In the rural and frontier areas of America, very few responders will be at the Operations Level II, perhaps half will be at Awareness Level I. Some will have no training whatsoever. Regardless, there will be a dilemma. *The local field personnel will be wanting "hands on" because that's what they are trained to do. That is what they want to do and that is why they volunteered to do all that work in the first place.* It is critical that everyone at all levels of government understands this. The responders, the real field people, want to go outside and play. *On the other hand, the reality is that response should be according to EPA, OSHA and the NAERG. The Incident Commander, the Operations Chief and the Controls/Leads for fire, law enforcement, EMS, public works and public health should understand and should be implementing an NAERG-based response plan that is essentially "hands-off" and "minds-on!"*

No one should be allowed to "play" until a management systems is in place that is based on training, equipment, exercising and planning which in turn are to be based on federal regulations and guidelines. No one should be allowed to go to the field, even to do defensive "hands-on," until the management (IC and Ops Chief, plus Operational Functional Controls/Leads) are sure that everyone in Operations, including all field personnel and mutual aid folks, realize that all "hands'-on" must be in compliance with standards and with the "minds-on" management plan developed in the tabletop exercises. Everyone must realize that field exercises in frontier areas are almost universally defensive exercises. All necessary training should have been accomplished and exercised before a field exercise is undertaken, regardless how much chomping at the bit goes on.

9. Federal Agencies, Regulations and National Standards: Their Roles in Frontier Areas

So far the plan has been to sell safety, planning, exercises and hard work using the principles of commons sense, personal and familial safety and community service. It must be remembered that frontier folks are non-governmental types, volunteers, people who do other things for a living at the rate of 60-80 hours a week. The only way to get them "in compliance" is to work them into it slowly. Sow them the personal win-win, the community win-win, the volunteer-organization win-win, then build on that. It is best not to mention federal regulations early on, for maybe the first six meetings, or six months or a year. Build the trust, build the confidence, build the team, show them how they have been "in compliance" (explain it as "progressive activities toward compliance," which will in fact be the case if one follows the course outlined above), and how they can now accelerate that process. Give them the necessary basics, at a level comparable to the frontier need!

[10] See hazard analysis form in Fred Cowie, *Developing Realistic LEPCs . . . .*

A. OSHA

Start with OSHA 29 CFR 1910.120 and give them the actual five level training regulations. Show them how what they have been doing complies with the regulations. Of course, a trainer could introduce these concepts, briefly and simply, early on in the Awareness Level I training, but do not waste a community confidence-and-awareness-building opportunity, such as an Awareness course, by trying to explain federal regulations. They might throw the Awareness out with the bath water, as it were.

Explain OSHA as the employee safety and health people. Employees here being considered as paid or volunteer, thus incorporating volunteer fire fighters and volunteer ambulance personnel. This is also a good time to address the “hazard communication” concept, the MSDSs system and why and how that system works. It is very helpful later on for them to know this. It is not necessary for them to understand hazard communication in order to obtain an MSDS from CHEMTREC for an ER doctor during an incident. It is necessary for them to understand it to help develop and sell a comprehensive planning effort later on.

B. FEMA

FEMA is best marketed as the citizen’s friend, the group that puts back up bridges, repairs roads, promotes and manages flood insurance programs. If OSHA looks after the responders, FEMA looks after the citizens. Emergency managers don’t manage flood waters or forest fires or earthquakes, they manage the activities of people.

C. EPA

If the role of OSHA and FEMA are best explained by using the words themselves and not the acronym, then this holds true for EPA as well. The Environmental Protection Agency lets the responders and the citizens know that someone is watching out for the air, soil and water which form the environment in which they exist. Someone is keeping tabs on the hazards at the secondary, environmental level and that somebody is the EPA. Sometimes the EPA acts as OSHA, sometimes it acts in concert with FEMA, but it is basically a regulatory agency designed to keep the environment and its inhabitants healthy.

D. DOT

The U.S. Department of Transportation has a role to play in hazardous materials because the business of America runs on chemicals, manufactured in one place and used in another. The regulations and guidelines are voluminous and well intentioned. What rural and extremely rural responders need to know is for all intents and purposes contained in the NAERG, which in the U.S. is sponsored by DOT.

E. *National Fire Protection Association (NFPA)*

Firefighters have a group, the NFPA, which develops national standards for various things, including competencies regarding hazardous materials response. While they are not federal regulations, they are national standards, against which response and response planning can be measured, both before the fact and after an incident, by lawyers, judges, juries and regulators. Firefighters should be familiar with NFPA.

F. *Emergency Planning and Community Right-to-Know Act (EPCRA) or SARA Title III*

EPCRA or SARA Title III brings together many of the hazardous materials initiatives of OSHA, FEMA, EPA and DOT under one roof and provides for the development of an infrastructure for coordinated hazardous materials risk management. That infrastructure is the local emergency planning committee (LEPC) and state emergency response commission (SERC) system. If there has been a coordinated series of viable local exercises and locals understand the NAERG and MSDSs, as well as standard defensive fire fighting and EMS procedures at hazardous materials incidents, and use a basic form of ICS, then SARA Title III’s planning and exercising requirements should make complete sense. But do not try to sell SARA Title III first. Sell safety first and the regulation second or third or fourth, it will have far better results.

G. CERCLA, RCRA, CWA, CAA and so on

Let the specialist in these fields, if there are any locally, deal with the niceties of these laws, do on inflict them upon ranchers, farmers, loggers, miners, small business women and men acting as volunteer ambulance drivers and volunteer fire fighters. If there are no local specialists, negotiate with state personnel to supply needed expertise for these areas during complex incidents.

Sample Recommended Practice:
An Alternative Approach to Hazardous Materials Program Management in Rural and Frontier Areas

1. Planning Efforts in Frontier Areas

Plans must be the written version of actual field activities. Until sufficient scenarios have been developed and until sufficient emergency operations procedures have been developed for these incidents and “exercised,” then intense planning efforts will produce documents, but not realistic plans. However, once the NAERG has been adopted locally, once the management team concept has been accepted and practiced, once the functional areas under Operations have standard operating procedures for the cooperating agencies, once the response community acts like a team, once industry is taken in as a partner and is not perceived as the enemy, then planning efforts are productive. They help take the team to a higher level, a consistently proactive level, a planning team level. Soon various functional components of the bigger team begin to have their own team spirit. Soon smaller sub-groups, for instance industry and fire, vie to see who can have the most efficient and effective internal operating procedures. Soon the plan is a live organism and not a deadly shelf document.

History has shown several things regarding this approach. One: Awareness courses and sequentially harder tabletops are the best builder of community support for hazardous materials and emergency management planning activities. Two: Once the home fire is started, training, planning and exercising become self-generating and the facilitator can move on to another jurisdiction.

One of the key planning issues facing rural communities, especially those that have developed successful Operations Level II defensive response capabilities, is addressing with the local elected officials their responsibility for providing for Level III and Level IV, hazardous materials technician and specialist support. This aggressive, offensive support is required when the incident needs outstrip the local capabilities. During an incident is no time to address “What do we do when we can do no more?”

Whether the actual answer lies with contracted services of providers on retainer or under contract, or with state or federal or industrial responders, the answer should be in writing. It should be kept current and it should be easily and quickly initiated by the incident commander, without unnecessary delay or need for executive approval. Lack of response capabilities does not eliminate public safety or planning responsibilities on the part of a jurisdiction. This is abundantly clear to regulators, judges and plaintiffs’ lawyers.

It is of great concern to rural and frontier hazardous materials risk management personnel that wholesale distribution facilities for anhydrous ammonia and propane, tank farms for flammable liquids, and co-ops with large quantities of pesticides and farm chemicals in or in close proximity to small towns with little or no response capabilities. It must be remembered, that the ability to contract for hazmat response services from a distant urbanized area, with perhaps six or ten hours elapsing before the arrival of the first response truck, does not alleviate the problems caused either by transportation or fixed facility releases in small towns.

2. Training Efforts and Additional Equipment in Frontier Areas

Simultaneous with a higher level of planning efforts comes increased training efforts. The different scenarios have shown responders their weaknesses, their voids, their shortcomings. They see the real personal and professional need for further training. They begin to ask for more training, a higher level of training, more intense training. People want to become functional team leaders, operational leaders, incident commanders. People want more specific training on baseline chemicals: acids, chlorine, anhydrous ammonia. People want new equipment and the training to use it.

Training monies are often the easiest for agencies to come by, through state or federal training grants. Equipment is harder to find, but industrial benefactors can be found and monies saved through training grants can be reallocated to equipment purchases. A process of continuous, incremental improvement leads to increased planning and training activities.

Hazardous materials response efforts in small towns, where no full team will ever be found due to tax base, population base and industrial base problems, have been known to spur on regional efforts. In certain rural areas, similar closely-located communities have attempted to pool personnel and equipment to field regional teams. These teams plan to train together and come together upon the arrival of the different members to the incident site from four or six surrounding communities.

It may take five years of hard work, but it will never happen if the process isn’t started now. It will never happen if everyone, or sometimes anyone, says it can never happen. Yet, it can and has happened, but it takes a logical process, geared to rural and frontier cultural and jurisdictional realities.

One of the most logical and most productive ways to obtain training is to approach the local industry representative, such as a anhydrous distributor, a trainmaster or a tank farm operator, and request set-aside training for local responders or for spaces for local responders at local industry training classes. This not only builds teams and trust, it also facilitates response when incoming industry responders are familiar with local governmental or volunteer responders. It is also a great idea to contact state, regional or national CAER® and TRANSCAER® representatives, railroad training car representatives, petroleum industry representatives, the Chlorine Institute, the state Department of Agriculture or Environmental Quality, EPA, DOT, FEMA and other federal agencies or private organizations to learn about upcoming training opportunities, most of which or free or have but a nominal cost.

3. Building on the Baseline

Once the baseline chemicals are accepted as just that, the foundation of local hazardous materials risk management; when the local PPE supply has grown to a level to handle the hazards involved with baseline chemicals; after sufficient scenarios have been exercised to develop a local incident management system with team members familiar with each other and the ICS system; and at the time the local team is just that, a team, then the time has come to go past the baseline, to build on the foundation.

This can be done, well, very and logically. In the developmental exercise or practice situation with their local scenarios, the facilitator encourages and directs the players to design the scenarios which will allow them to **safely and successfully practice** their parts. Once the fire folks have handled chlorine, acids, anhydrous and flammable liquids successfully sufficient times; after EMS has triaged and transported a variety of standard cases; when law enforcement has proven its mettle with crowd control and traffic jams; sanitarians have managed disposal and road crews have diked and barricaded to their hearts content, then it is time to crank up a notch the different factors involved in the scenarios in order to **stress the seasoned responders** (remember, that early on stress is not the key, practice is) and force them to a higher level. How is that done?

Logically and systematically! It must always be kept in mind that given the local tax base, population base, commerce base and industry base, there is an optimum level of response for that given community. Analysis of the local conditions can result in a fairly accurate determination of **current** and **optimum** response levels.[11] Keep in mind, one does not want to intentionally design a scenario to over stress the local capabilities without simultaneously accounting for mutual aid, state, federal or industrial resources to meet the local need.

Given the above, cranking up the scenario is simple. For law enforcement, it is possible to make the incident a crime scene, using either an environmental crime, a terrorist crime or a dumb crime. For fire, the chemicals can be made more toxic, more flammable, and more corrosive. For fire and EMS the injuries can be more life threatening, the extrication more complex, the interface with the chemicals more intense. For public health, spread some steaks around from a frozen food truck, drop some pesticides into surface water, and cause a more serious aquifer-related problem. For public works, have a need for damming and diking, dust remediation, or extensive barricading. Have some cows and horses affected, fishing or hunting seasons impacted or tourist traffic, if you want to see some real action. But never, **never**, do any of this without both the input from and the concurrence of the affected functions and their associated agencies.

The principle of continual small improvements, which works so well in management activities, works well also in scenario design. Even changing the location of an incident, without actually changing the non-location facts of the scenario, changes jurisdictions, lead agencies and the ICS management folks involved in event. Just remember, this is a team-building exercise, a **practice**, a small piece in a long-term process.[12]

4. The Future of Frontier LEPCs and Frontier HazMat

We should be taking our lead from the people, from the responders in the rural and frontier areas, from those affected by our decisions. The lead should not be coming from the regulators or the legislators. The laws, especially SARA Title III, were designed for the populace and the local responders. The laws and the regulators that enforce them should not become the focus of attention. The goal should remain the same, support of local responders and citizens regarding hazardous materials risk management at the local level. Federal agencies should be looking to the towns, not to downtown. They should be using the knowledge and experience of the successful rural and frontier LEPCs to develop initiatives designed to create more successful ones.

It should be remembered that everything depends not upon regulation and enforcement, but upon finding one local person to take the lead and develop the local team over a period of three to five years. It should be acknowledged that few, less than half probably, of all extremely rural counties will ever achieve successful LEPCs. The goal should be an extremely rural, frontier “standard of care,” which accepts the U.S. DHHS and U.S. Congress reality-based concept of frontier status. And everyone should accept that someone has to act as the skilled facilitator of the local process.

How can the federal government facilitate this local process? **Think outside of the lines!** Perhaps OSHA could promote something resembling enhanced-operations Level II or focused-technician Level III which would easily allow for in-compliance rural responses to acid or chlorine or other baseline releases in extremely rural areas. Remember, the responses will always occur (without the non-existent frontier hazmat team) and they will most often occur out-of-technical-compliance if the standard, the compliance standard, is not flexed. DOT could allow for equipment purchases for basic, non-extravagant items under training grants. EPA, FEMA and DOT, under training grants, could allow for overtime or replacement-time payments for volunteers (who are losing wages) who are currently donating nights and weekends to all exercises or training. This would do nothing more than make them equal with paid responders. Or perhaps Congress could fund mobile in-state regional response teams for areas (and states) without sufficient tax, population or industry bases.

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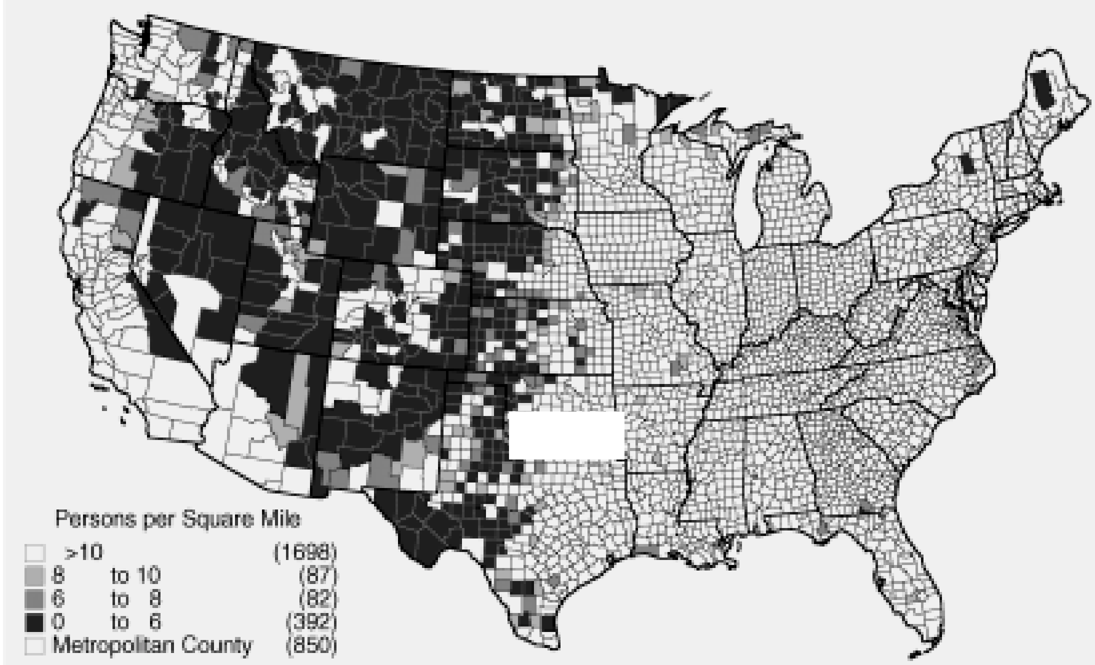
[11] See Cowie, *“Beyond Rural . . . .”* concerning response level determination.

[12] See Cowie, “*Visioning . . . .*” for fundamental basics of this process.

Figure 1

Map 11

FRONTIER COUNTIES, 1992
By Nonmetropolitan County

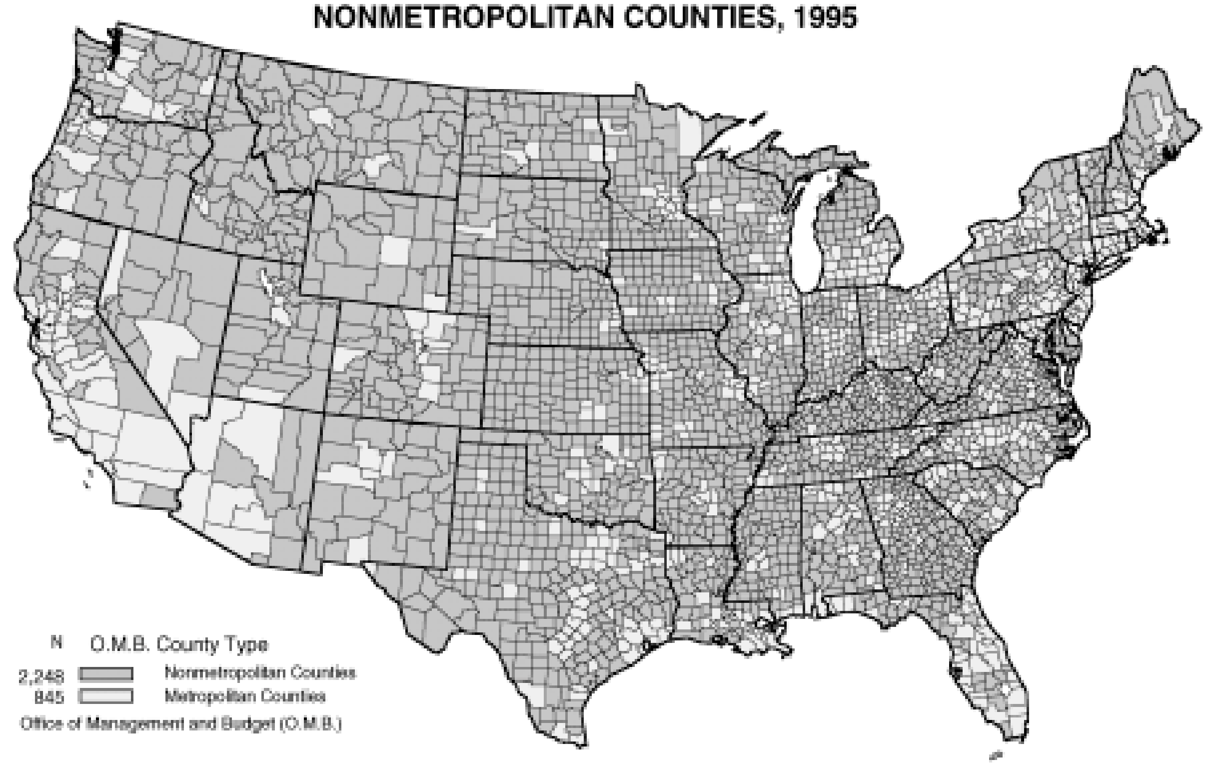


Source: Area Resource File, OHPAR, BHPr, HRSA, PHS, US DHHS, February 1995.
Produced by: North Carolina Rural Health Research Program,
Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Figure 2

Map 2

NONMETROPOLITAN COUNTIES, 1995



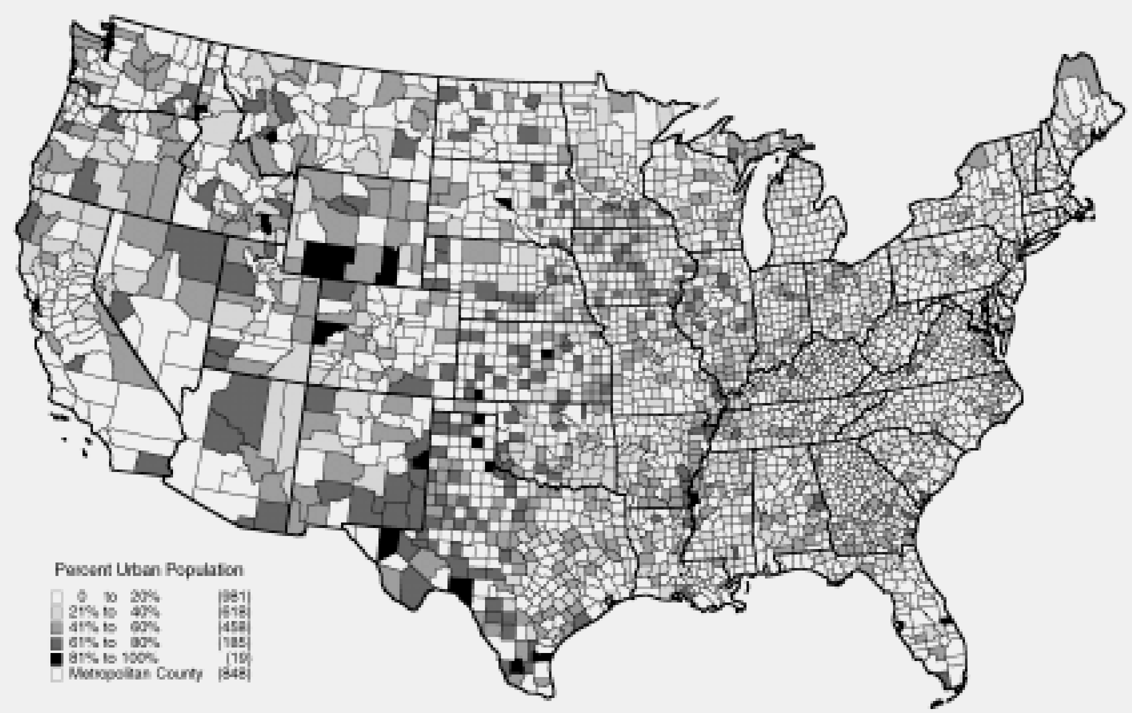
Data Source: US Bureau of Census; Office of Management and Budget, 1995.
Produced by: NC Rural Health Research Program, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Figure 3

Map 3

NONMETROPOLITAN COUNTIES, 1994

PERCENT URBAN POPULATION

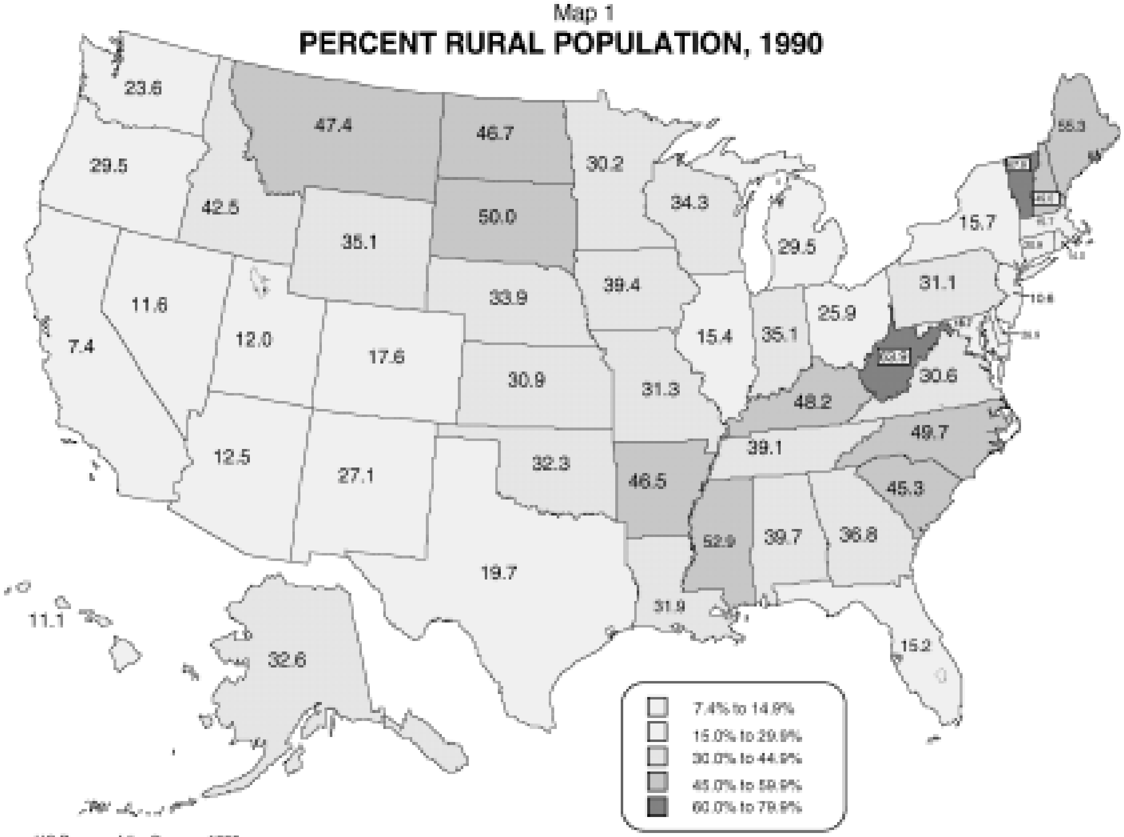


Note: The number of metropolitan counties depicted here excludes 10 independent city FIPS codes in VA.

Source: US Bureau of Census, Office of Management and Budget, 1994.
Produced by: North Carolina Rural Health Research Program, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Figure 4

Map 1
PERCENT RURAL POPULATION, 1990



Source: US Bureau of the Census, 1990.
Produced by: North Carolina Rural Health Research Program, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Hazardous Materials

Incident Response Training Guidelines

Hazardous Materials Response-Related Standards

Introduction

There are important Occupational Safety and Health Act (OSHA) or Environmental Protection Agency (EPA) regulations that must be followed when responding to an incident involving hazardous materials. These include regulations which prescribe level of protective equipment, selection and use of respirators, training curriculum criteria, or procedures that must be followed during the response, stabilization, and recovery efforts. This section of the *Guidelines* contains an quick reference summary of these regulations.

Regulations and standards are often referred to as standard of care documents. While portions of existing regulations and standards may vary in application by individual State, Tribal, Territory and local policy, it should be remembered that these established procedures and guidelines are federal requirements that are considered by the emergency response profession in general as minimal and essential standards of care. Therefore it is important that employers, training program managers, and instructors be aware of and familiar with the provisions of these standard of care documents.

The following summaries of response related regulations are intended to provide a quick reference guide and overview of the provisions of each regulation. For the details of any regulation or standard covered in this summary it is necessary to review the entire section or document. Do not use this summary for compliance with the regulation, use the official document.

Summaries are provided in this section for the following regulations and standards of care:

- Hazardous Waste Operations and Emergency Response (HAZWOPER) 29 CFR 1910.120
- First Responder Operations Level Offensive Operations: OSHA Quips
- Employee Records 29 CFR 1910.20
- Personal Protective Equipment, including Eye and Face Protection 29 CFR 1910.133, Respiratory Protection 29 CFR 1910.134, Occupational Head Protection 29 CFR 1910.135, and Occupational Foot Protection 29 CFR 1910.136, Hand Protection 29 CFR 1910.138
- Confined Space Operations 29 CFR 1910.146
- Ventilation for Confined Space Operations
- Bloodborne Diseases 29 CFR 1910.1030
- Lockout / Tagout 29 CFR 1910.147
- Right-to-Know and Material Safety Date Sheets (MSDS) 29 CFR 1910.1200
- Joint Commission on Accreditation of Healthcare Organizations
- Process Safety Management of Highly Hazardous Chemicals 29 CFR 1910.119

HAZARDOUS WASTE OPERATIONS and EMERGENCY RESPONSE (HAZWOPER)

29 CFR 1910.120

(Federal register Vol.54 No.42/ Monday March 6, 1989)

This document was published as final rule Monday March 6, 1989 and contains regulations pertaining to worker safety at several types of hazardous waste sites and emergency response operations without regard to the location of the site. The vast majority of public sector employees will be covered under the emergency response portion of the regulations. The purpose of this document is to provide the means to identify, evaluate, and control safety and health hazards, and provide a program for emergency response in hazardous waste operations. Due to the complexity of this material, it is recommended that you consult a safety professional or local OSHA office for further interpretation and application. Because of the breadth and overall importance of this document, two summaries are provided. The first is a summary of the requirements, for the general reader. The second is a summary of the sectional organization of the document, to assist readers wishing to subsequently reference or review specific sections of the regulation.

1. Summary of HAZWOPER Requirements

General Requirements

Written plan shall be made available to anyone on the site, as well as to federal authorities.

- All personnel on the site shall be informed of the hazards.
- Personal protective equipment shall be provided at no cost to the employees.
- A pre-designated representative of the company shall be appointed to become the incident commander. He/she will control the Incident Command System (ICS) in case of emergency.
- A written standard operating procedure (SOP) shall be developed for every purpose.
- A written hazardous communication program shall be implemented based on the information in Hazardous Communication Right-To-Know (RTK) section of this document.
- All excavations during site preparation shall be shored or sloped in a manner that will not allow accidental collapse.
- A post-emergency response plan that involves clean-up, follow-up, and start-up procedures shall be developed.

Written Safety and Health Program

- Organizational Structure
  - show the specific chain of command
  - review and update as often as needed to reflect the current status
- Comprehensive Work Plan
  - address the specific tasks and objectives of the site operation
- Site Specific Safety and Health Plan
  - shall contain hazardous analysis specific to that site
  - shall include employee training on all hazards
  - personal protective equipment to be used

- control measures to be used
- frequency and types of monitoring
- decontamination procedures
- emergency response plan
- confined space entry procedures (see *Confined Space* in this document)
- spill containment plan and procedures shall be outlined
- standard operating procedure (SOP) shall be outlined
- medical surveillance plan requirements shall be outlined and include:
  — a written surveillance program
  — all physical exams of site workers
  — accurate records of medical surveillance
  — hazardous analysis and monitoring
  — on-site record keeping

Training

- All personnel on the site shall be trained in hazardous waste operations before they participate in any activity that could expose them to hazardous substances, safety, or health hazards.
- Only authorized personnel shall be allowed on the site.
- Content of training:
  - names of persons responsible for site safety and health
  - safety, health, and other hazards present on the site
  - use of personal protective equipment
  - safe work practices
  - safe engineering practices
  - medical surveillance requirements
- General site workers, laborers, and supervisors shall have a minimum of 40 hours of off-site instruc tion and three days on-site training under the direct supervision of a trained, experienced supervisor.
- Workers on the site occasionally and workers regularly on site shall receive at least 24 hours of off-site instruction and one day of on-site training by a trained, experienced supervisor.
- Regular workers required to wear respirators shall undergo an additional 16 hours of off-site instruction and two days of on-site training by a trained, experienced supervisor.
- Management and supervisors shall attend at least 40 hours of off-site instruction and three days of field supervised training and an additional 8 hours of specialized training on topics such as personal protective equipment, employee training, spill containment, and monitoring techniques.
- Trainers shall be qualified to instruct employees and have completed a trainer's course and attained certification as a trainer from that course.
- Each certified worker shall undergo an additional 8 hours refresher training course annually.

Record Keeping

- Written programs and documentation:
  - Organizational Structure
  - Work Plan
  - Standard Operating Procedures (SOP's)
  - Medical Surveillance Program
  - Decontamination Program
  - Emergency Response Plan
  - Safety and Health Program
  - Hazardous Communication Program
  - Training Program
  - Post Emergency Response Plan

2. Summary of HAZWOPER by Sections

(a) Scope, application, and definitions *pg 9317*

1. Scope - This section covers the following operations, unless the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards.
   - (i) Clean-up required by a government
   - (ii) Work at RCRA sites
   - (iii) Voluntary clean-up at sites recognized by a government
   - (iv) Work at treatment, storage, and disposal sites
   - (v) Emergency response operations

2. Application - Defines who regulations apply to
   - (i) All applicable 1910 and 1926 regulations of Title 29 apply to hazardous waste and emergency response
   - (ii) Hazardous substance clean-up operations must comply
   - (iii) Operations at sites listed in 1 (iv)
   - (iv) Emergency response operations which are not listed in 1 (I) through 1 (iv) must only comply with the requirements of paragraph (q)

3. Definitions

   Buddy system - groups of 2 or more to provide rapid response to employees in the event of an emergency

   Clean-up operation - work removing hazardous substances

   Decontamination - removal of hazardous substance to preclude adverse effects

   Emergency response or responding to emergencies - response effort from outside the immediate release area or by other designated responders (i.e. mutual aid groups, local fire departments, etc.)

   Facility - any building, structure, pipeline, etc.

   Hazardous materials response (HAZMAT) team - means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring the possible close approach to the substance for the purpose of control or stabilization of the incident. A HAZMAT team may be a separate component of a fire brigade or fire department

   Health hazard - a chemical, mixture of chemicals, or a pathogen that acute or chronic exposure may occur

   IDLH - immediately dangerous to life or health which may cause irreversible health effects

   Oxygen deficiency - atmosphere with less than 19.5% oxygen

(b) Safety and Health Program *pg 9318*

(1) General - required for hazardous waste operations and contains 7 specific areas of planning
(2) Organizational structure part of site program - describes lines of authority
(3) Comprehensive workplan of the site program - addresses logistics and resources
(4) Site-specific safety and health plan part of program - addresses hazards

(c) Site characteristics and analysis *pg 9319*

(1) General - evaluation used to identify specific hazards
(2) Preliminary evaluation - performed prior to entry
(3) Hazard identification - identify hazards to health by inhalation, absorption, etc.
(4) Required information - gathered prior to employees entering site
(5) Personal protective equipment - includes chemical exposure protection and respiratory protection
(6) Monitoring - using instruments to evaluate health hazards
(7) Risk identification - once hazard is identified evaluate risks involved
(8) Employee notification - all known chemicals and hazards must be explained to employees

(d) Site control *pg 9320*

(1) General - appropriate site control measures shall be taken

(2) Site control program - program to protect employees must be developed
(3) Elements of a site control program - items such as site map, buddy system. etc.

(e) **Training** (this does not apply to emergency responders) *pg 9320*
(1) General - all employees, supervisors, etc. working on site shall be trained
(2) Elements to be covered - names, hazards, PPE, work practices, engineering controls, and medical surveillance
(3) Initial training
- General site workers must receive 40 hours training off site and a minimum of 3 days field experience .
- Workers on site occasionally - must receive 24 hours training off site and 1 day field experience
- Workers on site in areas where exposures are under permissible limits - must receive 24 hours training off site and 1 day field experience
- Workers with 24 hours of training who may become general site workers must receive 16 additional hours of training and 2 days of field experience

(4) Management supervisor training - on-site management who supervise employees engaged in hazardous waste operations shall receive 40 hours of training and 3 days field experience
(5) Qualifications of trainers - satisfactorily completed training and be an instructor
(6) Training certification - a certificate shall be issued upon completion of training
(7) Emergency response - Those who may respond at a hazardous waste clean-up site and may expose them selves to hazardous substances shall be trained
(8) Refresher training - requires annual refresher training
(9) Equivalent training -documentation of employee's work experience/training

(f) **Medical surveillance** (Pertains to Haz Mat Teams) *pg 9321*
(1) General - Covers hazardous waste/clean up workers and paragraph (q)(9) members of a hazmat team and hazardous materials specialist
(2) Employees covered - Includes employees who are exposed to hazardous substances or health hazards at or above the permissible levels, those who wear a respirator for 30 days or more a year, all employees injured due to over exposure from an emergency involving a hazardous substance, and members of a hazmat team
(3) Frequency of medical examinations and consultations/ includes hazmat teams - prior to assignment, every 12 months unless physician states longer (no longer than biennially), at termination of employment or reassignment, as soon as possible upon notification that employee has developed signs or symptoms indicating possible over exposure to hazardous substance or health hazards, or that employee was injured or exposed above the permissible exposure limits/levels or at more frequent times if physician determines necessary.
(4) Content of medical examinations and consultations - Work or job related items
(5) Examination by a physician and cost - licensed physician at no cost to employee
(6) Information provided to physician - employer shall provide appropriate job related information, a copy of 29 CFR 1910.120, description of PPE the employee will use, and information from previous medical examinations
(7) Physicians written opinion - Shall provide information to employer and employee regarding findings of exam and tests
(8) Record keeping - Records of medical surveillance examinations, physicians opinions, medical complaints, and other information

(g) **Engineering controls, work practices, and personal protective equipment for employee protection** *pg 9322*
(1) Engineering controls, work practices, and PPE for substances regulated in Subparts G & Z
(2) Engineering controls, work practices, and PPE for substances not regulated in Subparts G & Z
(3) Personal protective equipment - Describes all aspects of PPE
(4) Totally encapsulating chemical protective suits - Describes chemical protective clothing
(5) Personal protective equipment (PPE) program - Need for written program describing all aspects of clothing selection and use

(h) **Monitoring** *pg 9323*

(1) General - Describes general concepts of where and how monitoring is applied
(2) Initial entry - Air monitored upon entry to identify any IDLH or flammable condition
(3) Periodic monitoring - Shall be conducted when the possibility of an IDLH or flammable atmosphere has

developed and at other times
(4) Monitoring high-risk employees - After clean-up phase

(i) **Informational programs required by employer at certain sites** *pg 9323*

(j) **Handling drums and containers** *pg 9323*
(1) General - Handling, transportation, labeled, and disposal
(2) Opening drums and containers - Procedures for opening containers, protective equipment, safety precautions, and others
(3) Material handling equipment - Selection of proper equipment
(4) Radioactive waste - special precautions for this type material
(5) Shock sensitive wastes - Special precautions for these materials
(6) Laboratory waste protocols - Special precautions for laboratory waste
(7) Sampling drum and container contents - Done in accordance with site safety plan
(8) Shipping and transport - procedures to store and ship these containers
(9) Tank and vault procedures - Procedures similar to drums and containers

(k) **Decontamination** *pg 9325*
(1) General - Procedures shall be developed and followed
(2) Decontamination procedures - Procedures shall be developed, communicated to staff, and implemented before any employee or equipment may enter site
(3) Location - Done in an area to minimize exposure
(4) Equipment and solvents - Shall be properly disposed of
(5) Personal protective equipment - Shall be decontaminated, cleaned, laundered, maintained or replaced as needed
(6) Unauthorized employees - Shall not remove clothing from change rooms
(7) Commercial laundries or cleaning establishments - shall be informed of potentially harmful effects of exposure
(8) Showers and change rooms - When a shower is needed for decontamination special procedures special procedures are needed and must meet the requirements of 29 CFR 1910.141

(l) **Emergency response by employees at uncontrolled hazardous waste sites** *pg 9325*
(1) Emergency response plan - Shall be developed and implemented by employer
(2) Elements of the emergency response plan - Describes 11 minimum elements
(3) Procedures for handling emergency incidents - Includes features of site, and seven operational procedures to be followed

(m) **Illumination - Provides guidelines for amount of light to be provided** *pg 9325*

(n) **Sanitation at temporary work place** *pg 9325*
(1) Potable water - Such as for drinking
(2) Nonpotable water - Such as for firefighting purposes
(3) Toilet facilities - Describes number and types
(4) Food handling - Shall meet applicable regulations of local jurisdiction
(5) Temporary sleeping quarters - Heated, ventilated, etc.
(6) Washing facilities - In near proximity to work site
(7) Showers and change rooms - Provisions for facilities

(o) **New technology programs** *pg 9326*
(1) Employer shall develop and implement procedures for new technologies and equipment
(2) New technologies - Such as foam, absorbents, adsorbents, etc. shall be evaluated

(p) **Certain operations conducted under RCRA of 1976** *pg 9326*
(1) Safety and health program - Develop and implement written plan
(2) Hazard communication program - Must meet 29 CFR 1910.1200
(3) Medical surveillance program
(4) Decontamination program

(5) New technology program
(6) Materials handling program
(7) Training program
(8) Emergency response program

(q) Emergency response to hazardous substance releases *pg 9328*

This paragraph covers employers whose employees are engaged in emergency response no matter where it occurs

(1) Emergency response plan - Shall be developed in writing and implemented to handle anticipated emergencies

(2) Elements of an emergency response plan - As a minimum the plan shall address 11 elements which range from pre-emergency plans to equipment

(3) Procedures for handling emergency response - Includes 10 operational procedures including the need for an incident commander and site safety officer

(4) Skilled support personnel - Includes operational procedures for personnel (not necessarily the employer's own) for such functions as equipment operators of cranes, or earth moving

(5) Specialist employees - Include employee who as part of their job have with special knowledge, skill or ability which includes training an competency demonstration

(6) Training - Includes five levels of response training
Note: Employer should read the job descriptions of these five levels to determine which best describes the type or level of activity their employees will participate in. This will determine the level of the employers emergency response plan and level of training required. See pg 9329

- (i) First responder awareness - no set hour requirement, has 6 competency skill areas
- (ii) First responder operations - Shall receive a minimum of 8 hours of training which include the 6 competency areas of First Responder Awareness as well as the 6 competencies specifically for this level
- (iii) Hazardous materials technician - Shall receive 24 hours of training in 9 competency areas plus those required in items (ii) and (iii).
- (iv) Hazardous materials specialist - Shall be trained to the level of technician in addition to 9 additional competencies.
- (v) On scene incident commander - Assumes command of an incident beyond the awareness level, has 24 hours of training equal to the first responder operations level plus 6 additional compe tencies

(7) Trainers - Shall have completed a training course for the subjects they are expected to teach along with instructional experience

(8) Refresher training - Those employees trained under (q)(6) shall receive annual refresher training or demon strate competencies

(9) Medical surveillance - Members of a HAZMAT team and hazardous materials specialist shall receive a baseline physical exam (see paragraph (f)) and any emergency response personnel who exhibits signs or symptoms associated with a hazardous materials exposure shall be provided with medical consultation (see paragraph f (3)(ii)

(10) Chemical protective clothing - Clothing and equipment by HAZMAT team members shall meet requirements of (g)(3) - (g)(5)

(11) Post-emergency response operations - Upon completion of emergency response specific conditions for removal of contaminated material and clean-up must be followed

Appendix A - Personal protective equipment test methods *pg 9330*

A. Totally-encapsulating chemical protective suit pressure test procedures
B. Totally-encapsulating chemical protective suit qualitative test procedures

Appendix B - General description and discussion of the levels of protection and protective gear *pg 9332*

Part A - Personal protective equipment is divided into four categories based on the degree of protection afforded (levels A,B,C,D)
Part B - Types of hazards for which levels A,B,C,D protection are appropriate

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Appendix C - Compliance guidelines *pg 9333*

1. Occupational safety and health program is discussed
2. Training (emergency response pg 9334, middle column, second paragraph)
3. Decontamination procedures are outlined
4. Emergency response plans (Hazardous Materials Emergency Response Planning Guide - NRT 1 is helpful)
5. Personal protective equipment programs is reviewed
6. Incident command system (ICS) is discussed
7. Site safety and control plans are important to the incident commander

Appendix D - References *pg 9335*

Amendments to original document of March 6, 1989
(Federal Register Vol. 59 No. 161/ Monday August 23, 1994

Appendix B - Last two paragraphs were revised which describes chemical protective clothing
Appendix E - Training curriculum guidelines *pg 43270*

It is noted that the legal requirements are set forth in the regulatory text of 1910.120. The guidance set forth here represents a highly effective program that in the areas covered would meet or exceed the regulatory requirements. In addition, other approaches could meet the regulatory requirements.

Suggested core criteria: *pg 43270*

1. Training facility - Sufficient resources to conduct training
2. Training director - Person in charge
3. Instructors - Criteria for staff including instructional review procedures
4. Course materials - Reviewed and approved by training director
5. Students - Includes screening procedures
6. Ratios - Recommends student-instructor ratio
7. Proficiency assessment - Includes testing procedures
8. Course certificate - Written documentation of completion of course
9. Record keeping - Describes record keeping procedures
10. Program quality control - Annual audit of program quality

Suggested program quality control criteria: *pg 43271*

A. Training plan - Is it adequate and appropriate
B. Program management, training, director, staff, consultants - Is the program adequate and are staff effective
C. Training facilities and resources - Is it adequate and appropriate
D. Quality control and evaluation - Quality control and evaluation plans
E. Students - Adequate procedure for accepting students
F. Institutional environment and administrative support - Enough help
G. Summary/evaluation questions - Overall program evaluation procedures

Suggested training curriculum: *pg 43272*

A. General hazardous waste operations and site-specific training
    1. Off-site training - Hazardous waste operations
    2. Refresher training - Criteria for annual refresher
    3. On-site training - Specific site training/information
B. RCRA Operations training for treatment, storage, and disposal (note: See appendix for additional information about TSD operations)
    1. Minimum training requirements
    2. Provide training prior to entering site

C. Emergency response training - 1910.120 (q) - may be appropriate for public sector emergency response personnel

  a. General considerations - May require interaction between emergency responder and site operators

    (1) First responder awareness
    (2) First Responder operations
    (3) Hazardous materials technician
    (4) Hazardous materials specialist
    (5) Incident commander

First Responder Operations Level Offensive Operations: OSHA Quips

First Responders that are trained in emergency response under the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation 29 CFR 1910.120q are generally trained to the First Responder Awareness and First Responder Operations levels, but are not generally trained to the Technician level. As a result, First Responders are limited to engaging in only defensive operations and are legally prevented from approaching the release to plug, patch or otherwise stop the release.

For decades first responders such as firefighters and public works personnel routinely plugged leaks in containers such as automobile fuel tanks, truck saddle tanks, and leaks in residential natural gas lines. However, the HAZWOPER regulation precluded first responders from continuing to perform these tasks.

To facilitate the ability to engage in this type of offensive work many agencies have written standard operating procedures (SOP) that provide guidelines for conducting these procedures. They submit the SOP to the Occupational Safety and Health Administration (OSHA) that has jurisdiction and, in most cases, find that OSHA will approve the SOP. Once the SOP is approved by OSHA, the actions are considered acceptable by operations level personnel as long as the scope of the SOP is not violated.

For jurisdictions that desire to have their operations level personnel engage in offensive operations they need to:

A. Develop a separate Standard Operating Procedure for each offensive operation, such as plugging vehicle fuel tank leaks, plugging saddle tank leaks, plugging natural gas line leaks. The content of each SOP should be, at a minimum:

1. The title of the SOP
2. The scope of the SOP
3. The PPE required for conducting the offensive operation.
4. The actual procedure to be followed when engaging in the offensive operation
5. The training required prior to allowing personnel to engage in the offensive operation, with emphasis on the proper PPE and NOT exceeding the scope of the SOP

B. Submit the SOP to your OSHA representative for approval

C. Following approval of the SOP by your OSHA representative, train your personnel as defined in the SOP

D. Don’t allow your trained personnel, in actual field operations, to exceed the scope as defined in the SOP

By addressing these simple steps, the capabilities of your first responder operations level personnel can be greatly enhanced and your dependence on Technician level personnel will be reduced for these routine type of incidents.

OSHA Quips

The following question/answer (Quips) interpretations of OSHA 1910.120 have been issued related to the subject of Operations Level offensive operations.

Operations Level Firefighters.
29 CFR 1910.120(q)(6)(ii)

May an emergency responder trained only at the operations level under paragraph (q)(6)(ii) of the standard perform aggressive or offensive actions at an emergency involving a small spill or leak of gasoline without the employer being in violation of the Standard? Typical actions would include plugging or patching a leaking automobile gas tank.

Operations level training by itself is designed to enable emergency responders to safely perform defensive action at a safe distance from the point of release; personnel who have not been trained beyond the operations level are not considered adequately trained to take aggressive action at the point of release and are not permitted to do so. Such action would be in violation of 29 CFR 1910.120(q)(6)(iii), which defines the training requirements for personnel designated to take aggressive action (i.e., hazmat techs).

However, “a small spill or leak of gasoline” would not necessarily constitute an emergency or potential emergency covered under the HAZWOPER standard. Firefighters with or without operations level training may be permitted to handle non-emergency releases of an identified hazardous substance which they are adequately trained and equipped to control. Where an emergency or potential emergency release has occurred, personnel who have not been trained beyond the operations level may perform defensive action, only, deferring aggressive action to more highly trained personnel.

De Minimis Training Policy for Firefighters.
29 CFR 1910.120(q)(6)(iii)

29 CFR 1910.120 is a performance based regulation, providing some flexibility to the employer in meeting the requirements of the regulation. With regard to training, paragraph (q)(6) states “ training shall be based on the duties and function to be performed by each responder;” all employees must be adequately trained to perform their assigned job duties without danger to themselves or others.

Hazardous materials technician (hazmat tech) training is necessary for emergency responders who take aggressive action in a potentially dangerous area to stop the release. OSHA may, in appropriate circumstances, consider violations of hazmat tech training to be “de minimis,” however, when they do not impact on the ability of responders to safely perform their assigned job duties. The burden would be on the employer to demonstrate to OSHA that the violation did not pose a hazard to the safety or health of employees and that the violation was in fact de minimis in nature.

Therefore, in certain limited circumstances, personnel who do not meet all of the training requirements for the hazmat tech level, but who have training beyond the first responder operations level, would be considered by OSHA to be adequately trained to perform a specific task not otherwise permitted for operations level personnel.

The September 20, 1991 letter addressed to Ron Runge to which you refer was intended to apply only to firefighters. OSHA considers properly trained firefighters to already have extensive training and experience in handling gasoline or other fuel incidents by nature of their regular job duties. However, where the identity of the hazardous substance involved in an uncontrolled release cannot be determined, or where the hazardous substance is one for which firefighters have not received specific training or do not have adequate control equipment, aggressive action should be deferred to a fully trained HAZMAT team. Further, response by a fully trained HAZMAT team may be necessary whenever there are factors which may complicate response efforts.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Consideration for the de minimis policy for 29 CFR 1910.120(q)(6)(iii) is generally limited to small scale emergency involving limited quantities of a known hazardous substance which firefighters are adequately trained and equipped to handle.

Roles and Duties, Hazard Assessment, and Firefighters.
29 CFR 1910.120(q)(2)(ii) and (q)(6)(iii)

You can that the HAZMAT team in one of your urban counties has adopted the policy that gasoline spills of 25 gallons or less do not require response by a HAZMAT team, and can be safely handled by firefighters with "operations plus" training.

OSHA has no authority to determine how State and local authorities divide responsibilities between their fire departments and HAZMAT teams, and express no view on that issue. However, if fire department members with inadequate HAZWOPER training tool aggressive action to respond to a hazardous substance emergency, a violation of 29 CFR 1910.120(q)(6)(iii) would exist; this would not be the case is the fully trained and equipped HAZMAT team were to respond. OSHA does acknowledge that in many cases firefighters may have the capabilities to safely respond to spills where fewer than 25 gallons of gasoline are involved without full hazmat tech training provided they have extensive training in the safe handling of gasoline.

However, the hazard assessment of which incidents can be safely handled by responders without full hazmat tech training cannot be based on quantity alone. Ambient conditions and specific hazards at the scene must be included in the hazard assessment. Which incidents can be safely handled by responders who do not meet all of the competencies required for hazmat tech level would depend also on the extent and content of the additional training beyond the operations level which they had received.

Employers must establish in their written emergency response plan, required in paragraph (q)(2)(ii), guidelines for determining in which scenarios aggressive action should be deferred to the fully trained HAZMAT team. Personnel who will be expected to take aggressive action, but who have not been assigned the full duties of the hazmat tech level, should as part of their training be instructed in these guidelines to enable them to determine which scenarios are beyond their ability to handle safely.

Firefighters Responding to Propane and Gasoline Fires.
29 CFR 1910.120(q)(6)(ii) and (iii)

Firefighters trained to the operations level, who are also trained in the hazards of propane, may enter the danger area to shut off the valves that will starve the fire and thus extinguish it. Normally, employees trained to the operations level would be restricted from taking aggressive action. This is considered to be a special case. The principle hazards from propane are fire and explosion, not toxicity. Because propane fires are common, most firefighters are fully trained and equipped to respond to propane fires, including taking aggressive action by shutting off the valves in the danger area.

If firefighters are fully trained and equipped (which is a high degree of training), and have also received first responder operations level training, OSHA believes they have sufficient training to take aggressive action due to propane's relatively low toxicity.

It would be only a technical violation of 29 CFR 1910.120(q)(6) for not having the additional training required of a HAZMAT technician if a firefighter took aggressive action in the danger area during a propane fire of leak, was fully trained and equipped to handle the fire and had first responder operations level training. In this circumstance OSHA would not issue a citation.

Releases of gasoline similar to the example involving propane discussed above may be addressed by operations level emergency responders if they have the required PPE, emergency response equipment, and specific training in the safety and health hazards associated with gasoline.

Operations Level Offensive Operations: OSHA Quips

Employers who expect firefighters to shut off a gasoline valve in the danger area, and who can show that employees are trained to the operations level and adequately trained in the hazards of gasoline, have committed a technical violation of 1910.120 (q)(6)(iii) for such employees not having the training required of a HAZMAT technician.

NOTE: The fire and explosion hazards of propane and gasoline are very substantial. The interpretations herein are applicable only when firefighters are fully trained and equipped to handle the explosion and fire hazards of propane, gasoline, or similar gases and liquids.

Firefighters Taking Aggressive Action and Technical Violations
29 CFR 1910.120(q)(6)(iii)

It would be only a technical violation of 29 CFR 1910.120(q)(6) for not having the additional training required of a HAZMAT technician if a firefighter took aggressive action in the danger area during a propane fire or leak, was fully trained and equipped to handle the fire and had first responder operations level training. In this circumstance OSHA would not issue a citation.

If an injury occurred during an emergency response involving these responders (operations level plus additional training) the CSHO would need to consider whether the responders' training and experience were sufficient for the tasks being performed.

A violation of training requirements that resulted in an actual injury to an employee during an emergency response by definition cannot be a "technical violation." Thus, if an injury occurred and the CSHO determined that the responders' training and experience were not sufficient for the tasks being performed, then a citation should be issued noting a violation of 29 CFR 1910.120(q)(6)(iii) and carrying a penalty that requires abatement. Whether abatement should require full training in all of the competencies of the HAZMAT technician level, or whether certain training requirements could safely be omitted, would depend on the training needed to safely perform the tasks in question.

If, however, the CSHO determined that the training which had been provided to the employees in question had been provided to the employees in question had been adequate, then the training violation would be considered a de minimis violation and no citation would be issued for inadequate training. In this situation the CSHO might determine that the cause of the injury was due to a violation of some other requirement of 29 CFR 1910.120 or other standards, for which a citation carrying a fine and requiring abatement would be appropriate.

EMPLOYEE RECORDS

29 CFR 1910.20

The purpose of this section is to give general guidelines concerning the retention of and employee access to medical and exposure records. It is always advisable to make copies rather than loan out documents. If the request for documents is of a serious nature, seek legal counsel.

Current employees, former employees, employees being transferred to a new location, and their representatives have the right to review and receive a copy of any record mentioned below which is *relevant to that employee*.

Medical Records

- Audio Testing
- Chest X-Ray *(These must be available for review, but they do not have to be loaned or copied)*
- Descriptions of Treatments
- Employee Medical Complaints
- First Aid Log
- Post-Employment Physical
- Pre-Employment Physical
- Previous Employment Medical Tests
- Respiratory Fit Testing *(A test to determine which size respirator to wear and to test its fit)*

Exposure Records

- Air monitoring records
- Copy of 29 CFR 1910.20, access to employee exposure and medical records
- Employee medical access training records *(The documentation that informs employees of their right to access exposure and medical records)*
- Measures for controlling worker exposure to chemicals *(Personal protective equipment, ventilation, material handling procedures, etc.)*
- Methodologies used to gather data *(Types of monitoring devices used, procedures, areas included, and substances monitored such as vapors, fumes, gases, or dusts)*
- Noise monitoring records
- Records by the Assistant Secretary of Labor for Occupied Safety and Health
- Record of OSHA 200 Log *(A list of occupational injuries, illnesses, and deaths suffered by employees, which is required by OSHA for all companies employing 10 or more employees)*

Records Not Required to be Released

- Drug testing results
- Health insurance claims *(If it is kept in a file other than the employee's medical file, you do not have to release this information)*
- Medical records prepared for litigation
- Records by the Assistant Secretary of Labor for Occupational Safety and Health
- Voluntary Employee Assistance Programs (EAP) *(Drug and alcohol programs, family/personal counseling)*

Employee Records OSHA 1910.120

Employee Requirements to Obtain Medical Records

Employee and representatives may obtain medical records according to the following conditions:

- The request is in writing and contains the following:
  - — company name
  - — date authorization will expire, if applicable
  - — date of request
  - — description of medical information requested
  - — employee name
  - — employee representative name, if applicable
  - — employee signature
  - — purpose for request

- If authorization is revoked, it shall be in writing.

Employer Rights and Responsibilities

- The employer can only require employee to answer questions that aid in location of information. *(i.e., dates, locations where employee worked during time in question)*
- Employer shall not charge for the first copy or any additional information at another time.
- Employer may charge a reasonable price for a second copy of the same information received earlier.
- If a copy machine is not available, the documents may be loaned for a reasonable time to have copies made. *(It is best to have office personnel make a copy to avoid the possibility of loss.)*
- Medical records shall be kept on file for 30 years after an employee's termination.
- Names and identifiers of other employees shall be deleted.
- The information requested shall be released within 15 working days. If this is not possible, an expla nation must be given to employee and a date of expected compliance.
- X-rays may be loaned at employer discretion, but viewing in house is sufficient and preferred.

Training

Employees first entering work shall be informed annually of the following:

- the existence, location, type of records, and person to contact to retrieve information
- the procedure for accessing records in writing
- their right to access medical records

Transfer or Disposal of Medical Records

- If a business is sold, the successor shall maintain the previous owner's records.
- If a business is closing, current employees shall be notified at least three (3) months prior to closing that they have a right to receive their records.
- OSHA shall be notified three months in advance of closing that you intend to dispose of medical and exposure records.

Record Keeping

Employers shall retain the following records for duration of employment plus 30 years:

- Analysis using Exposure Records
- Exposure Records
- Material Safety Data Sheets
- Medical Records
  (Time begins after employee termination)

PERSONAL PROTECTIVE EQUIPMENT

The purpose of this section is to outline general requirements for respirators, eye, head, foot, and fall protection. Personal protective equipment (PPE) is not always the best method for controlling hazards. However, it can be the fastest and most economical method of protecting employees from known hazards.

29 CFR 1910.132 General Requirements

(a) Protective equipment shall be provided, used, and maintained to protect employees

(b) Where employees provide their own protective equipment, employer must assure its adequacy

(c) All personal protective equipment must be of safe design and construction

(d) Hazard Assesment and Equipment Selection
- (1) Employer shall assess the workplace to determine if hazards are present, or are likely to be, which necessitate PPE
- (2) if so, employer shall: select and require use of appropriate PPE; communicate selection decisions to employees; select PPE that
- (3) Written certification of hazard assessment required

(e) Defective or damaged personal protective equipment shall not be used

(f) Employers shall provide training to all employers required to use PPE
- (1) PPE training must cover: when PPE is necessary; what PPE is necessary; how to don, doff, adjust and wear PPE; limitations of PPE; proper care, maintenance, useful life and disposal
- (2) Employees must demonstrate an understanding of training topics and ability to use PPE
- (3) Retraining may be required
- (4) Written certification of training required

29 CFR 1910.133 Eye and face protection

(a) General provisions
- (1) Protective eye and face equipment shall be required when there is a reasonable probability of injury than can be prevented by such equipment.
- (2) Protectors shall meet minimum requirements for fit, durability, etc.
- (3) Persons with corrective lenses in spectacles - Specifies special equipment
- (4) Eye and face PPE shall be distinctly marked to facilitate identification of the manufacturer.
- (5) Employer must ensure that each affected employee uses equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation.

(b) Criteria for devices
- (1) Purchased after July 5, 1994 shall comply with ANSI Z87.1-1989, “American National Standard Practice for Occupational and Educational Eye and Face Protection,”.
- (2) Purchased before July 5, 1994 shall comply with the ANSI “USA standard for Occupational and Educational Eye and Face Protection,” Z87.1-1968.

Personal Protective Equipment

29 CFR 1910.134 Respiratory protection

(a) Permissible practice
- (1) Use of equipment to prevent breathing contaminated air
- (2) Respirators provided by employer when equipment is necessary
- (3) Employee shall use device in accordance with training and instructions

(b) Requirements for a minimal acceptable program
- (1) Written standard operating procedures
- (2) Respirators selected on basis of hazard
- (3) User shall receive training in proper use
- (4) Removed
- (5) Regular cleaning of unit
- (6) Storage of unit
- (7) Inspected routinely - at least once a month and after use
- (8) Appropriate surveillance or work area and degree of exposure or stress shall be maintained
- (9) Regular inspection and evaluation to determine effectiveness of program
- (10) Persons shall not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent. The respirators user's medical status should be reviewed periodically (for instance annually)
- (11) Approved or accepted respirators shall be used

(c) Selection of respirators
- (1) Proper selection according to American National Standard Practices for Respiratory Protection Z88.2-1969

(d) Air quality
- (1) Grade D breathing air
- (2) Breathing air may be supplied by cylinders or compressor
- (3) Air line couplings shall be appropriate
- (4) Breathing air containers shall be marked accordingly

(e) Use of respirators
- (1) Standard procedures shall be developed for use
- (2) Correct respirator shall be specified for each job
- (3) Written procedures shall be prepared covering safe use in dangerous atmospheres
- (4) Frequent random inspections of equipment
- (5) Proper instruction shall be provided to wearer

(f) Maintenance and care of respirators
- (1) Program for maintenance and care shall be established
- (2) Inspection procedures
- (3) Routinely used respirators shall be collected and cleaned as frequently as necessary to insure proper protection to the wearer
- (4) Replacement or repairs shall be done by experienced persons
- (5) Shall be properly stored after inspection and cleaning

(g) Identification of gas mask canisters
- (1) Properly worded labels shall be used to identify units
- (2) Those who issue units shall see that they are properly used and labeled
- (3) Units shall have proper markings
- (4) Special high-efficiency filter for protection against radionuclides shall be properly labeled
- (5) Units may only be used in atmospheres above 16% oxygen level
- (6) Each unit shall be painted a distinctive color

29 CFR 1910.135 Occupational head protection

(a) General provisions
(1) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.
(2) The employer shall ensure that a protective helmet designed to reduce electrical shock hazard is worn by each such affected employee when near exposed electrical conductors which could contact the head.

(b) Criteria for devices
(1) Protective helmets purchased after July 5, 1994 shall comply with ANSI Z89.1-1986, “American National Standard for Personnel Protection-Protective Headwear for Industrial Workers-Requirements”.
(2) Protective helmets purchased before July 5, 1994 shall comply with the ANSI standard “American National Standard Safety Requirements for Industrial Head Protection,” ANSI Z89.1-1969.

29 CFR 1910.136 Occupational foot protection

(a) The employer shall ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee’s feet are exposed to electrical hazards.

(b) Criteria for devices
(1) Protective footwear purchased after July 5, 1994 shall comply with ANSI Z41-1991, “American National Standard for Personal Protection-Protective Footwear”.
(2) Protective footwear purchased before July 5, 1994 shall comply with the ANSI standard “USA Standard for Men’s Safety-Toe Footwear,” Z41.1-1967

29 CFR 1910.137 Electrical protective devices.

This section outlines the performance criteria for electrical shock protection, in addition to minimal maintenance requirements, for Personal Protective Equipment, where applicable (i.e. gloves).

29 CFR 1910.138 Hand protection

(a) Employers shall select and require employees to use appropriate hand protection when exposed to hazards such as:
(1) Skin absorption of harmful substances
(2) Severe cuts and lacerations
(3) Severe abrasions
(4) Punctures
(5) Chemical or thermal burns
(6) Harmful temperature extremes

(b) Employers shall base selection on an evaluation of performance characteristics of the hand protection relative to:
(1) Task(s) to be performed
(2) Conditions present
(3) Duration of use
(4) Hazards and potential hazards identified

Permit-Required Confined Spaces for General Industry

29 CFR 1910.146: Final Rule

(Federal Register Vol. 58 No. 9/ Thursday January 14, 1993)

The purpose of this section is to describe the recommended procedures to be followed with regard to confined spaces in industry. Also, it includes definitions of both permit and non-permit required confined spaces and the regulations that apply to each. Confined spaces are often overlooked in industry, yet they are one of the leading causes of death in today's industrial environment.

(a) Scope and application *pg 4549*

This regulation contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces. This section does not apply to agriculture, to construction, or shipyard employment.

(b) Definitions *pg 4549*

- "Acceptable entry conditions" - Conditions that must exist to allow entry
- "Attendant" - Individual stationed outside who monitors authorized entrants
- "Authorized entrant" - Employee authorized to enter a permit space
- "Blanking or binding" - Absolute closure of a pipe, line, duct, etc.
- "Confined space" - Large enough to enter, limited or restricted egress and entry, is not designed for employee occupancy
- "Double block and bleed" - Closure of line, pipe, duct, etc. and opening drain
- "Emergency" - event that may endanger occupants
- "Engulfment" - Material surrounding victim that can be aspirated and cause death by strangulation, constriction, or crushing
- "Entry" - Pass through an opening into permit-required space
- "Entry permit" - Written document provided by employer to allow and control entry
- "Entry supervisor" - Person such as foreman, crew chief, etc.
- "Hazardous atmosphere" - Atmosphere that may expose employees to risk of death, incapacitation, impairment of ability to self-rescue, or injury from causes such as:
  - Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit
  - Airborne combustible dust at a concentration that meets or exceeds its lower flammable limits
  - Atmospheric oxygen concentration below 19.5 percent or above 23.5
  - Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published
  - Any atmospheric condition that is immediately dangerous to life or health
- "Hot work permit" - A permit for welding, cutting, etc.
- "Immediately dangerous to life and health" - Any condition that poses an immediate or delayed threat to life
- "Inerting" - Means the displacement of the atmosphere with a noncombustible gas
- "Isolation" - Completely removed and protected against the release of energy
- "Oxygen deficient atmosphere" - Oxygen level below 19.5 percent
- "Permit required space" - Space that contains a hazardous atmosphere, material that has the potential for engulfment, or has internal configuration that may trap an individual such as inwardly converging walls
- "Prohibited condition" - Any condition in a permit space not allowed during an entry
- "Rescue service" - The personnel designated to rescue employees from permit spaces
- "Retrieval system" - Equipment to lift persons from a permit space
- "Testing" - Process by which hazards are identified and evaluated

(c) General requirements *pg 4551*

(1) The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.
(2) If permit area is determined, the employer shall inform exposed employees.
(3) If the employer deems there will be no entry, take measures to prohibit entry.
(4) If the employer deems entry is appropriate, develop written plan.
(5) An employer may use specified alternate procedures to enter area.
(6) When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, the employer shall reevaluate that space and, if necessary, reclassify it as a permit-required confined space.
(7) A space classified by the employer as a permit-required confined space may be reclassified as a non-permit confined space under specific procedures.
(8) When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry, the host employer shall inform the contractor of permit spaces, apprise the contractor of the elements, that make it a permit space,apprise the contractor of any precautions, coordinate entry operations with contractor and debrief contractor.
(9) In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall obtain available information about permit space hazards, coordinate entry operations, and inform host employer of permit space program contractor will follow.

(**d) Permit space program**

(1) Implement the measures necessary to prevent unauthorized entry.
(2) Identify and evaluate the hazards of permit spaces before employees enter them.
(3) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations.
(4) Provide the following equipment at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly.
(5) Evaluate permit space conditions using specified procedures when entry operations are conducted.
(6) Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations.
(7) If multiple spaces are to be monitored by a single attendant, include procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces.
(8) Designate the persons who are to have active roles in entry operations, identify the duties of each such employee, and provide each such employee with the appropriate training.
(9) Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue.
(10) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this section.
(11) Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space.
(12) Develop and implement procedures necessary for concluding the entry after entry operations have been completed.
(13) Review and revise entry operations when the employer has reason to believe that the mea sures taken under the permit space program may not protect employees.
(14) Review the permit space program, using the canceled permits within 1 year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

(e) Permit system

(1) Before entry is authorized, the employer shall document the completion of measures by preparing an entry permit.
(2) Before entry begins, entry supervisor identified must sign the entry permit to authorize entry.
(3) The completed permit shall be posted at the entry portal or by any other equally effective means.
(4) The duration of the permit may not exceed the time required to complete the assigned task on the permit.
(5) The entry supervisor shall terminate entry and cancel the entry permit when entry operations have been completed, or a condition that is not allowed arises.
(6) The employer shall retain each canceled entry permit for at least 1 year to facilitate the review of the permit-required confined space program

(f) Entry permit

The entry permit that documents compliance with this section and authorizes entry to a permit space shall identify:

(1) The permit space to be entered;
(2) The purpose of the entry;
(3) The date and the authorized duration of the entry permit;
(4) The authorized entrants within the permit space, by name or by such other means as will enable the attendant to determine quickly and accurately, for the duration of the permit;
(5) The personnel, by name, currently serving as attendants;
(6) The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;
(7) The hazards of the permit space to be entered;
(8) The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;
(9) The acceptable entry conditions;
(10) The results of initial and periodic tests accompanied by the names or initials of the testers and by an indication of when the tests were performed;
(11) The rescue and emergency services that can be summoned and the means for summoning those services;
(12) The communication procedures used by authorized entrants and attendants to maintain contact during the entry;
(13) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this section;
(14) Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and
(15) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

(g) Training

(1) The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned..
(2) Training shall be provided to each affected employee before the employee is first assigned, before these is a change in assigned suties, when there is a change in permit space operations and whenever the employer has reason to believe there are deviations for permit entry procedures.
(3) The training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary.
(4) The employer shall certify that the training required has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and the authorized representatives.

(h) Duties of authorized entrants

The employer shall ensure that all authorized entrants:

(1) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
(2) Properly use equipment;
(3) Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space;
(4) Alert the attendant whenever the entrant recognizes warning sign or symptom of exposure to a dangerous situation, or detects a prohibited condition; and
(5) Exit from the permit space as quickly as possible whenever an order to evacuate is given, the entrant recognizes any warning sign or symptom of exposure to a dangerous situation, the entrant detects a prohibited condition, or an evacuation alarm is activated.

(i) Duties of attendants

The employer shall ensure that each attendant:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
(2) Is aware of possible behavioral effects of hazard exposure in authorized entrants;
(3) Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants accurately identifies who is in the permit space;
(4) Remains outside the permit space during entry operations until relieved by another attendant;
(5) Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;
(6) Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under certain conditions;
(7) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
(8) Takes actions when unauthorized persons approach or enter a permit space while entry is underway to warn unauthorized person of hazards, advise unauthorized person to exit, and inform authorized entrants and supervisor if unauthorized persons have entered;
(9) Performs non-entry rescues as specified by the employer's rescue procedure; and
(10) Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

(j) Duties of entry supervisors

The employer shall ensure that each entry supervisor:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
(2) Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
(3) Terminates the entry and cancels the permit;
(4) Verifies that rescue services are available and that the means for summoning them are operable;
(5) Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
(6) Determines, whenever responsibility for a permit space entry operation is transferred, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

(k) Rescue and emergency services

(1) Employer shall ensure that each member of the rescue service is provided with, and is trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from permit spaces, perform the assigned duties, practice making rescues at least once every 12 months, trained in basic first aid and CPR.
(2) When an employer (host employer) arranges to have persons other than the host employer's employees perform permit space rescue, the host employer shall inform rescue service of hazards they may confront, and provide rescue service with access to all permit spaces.
(3) To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.
(4) If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

VENTILATION

Basic Field Application for Confined Space Operations

The purpose of this section is to show when and where ventilation is necessary, as well as the various types of ventilation used.

General Requirements

- Any time an area is known to be contaminated with dust or fumes (toxic or not), a ventilation system shall be installed.
- A respiratory protection program shall be established wherever it is necessary to use respiratory protection equipment. (See *Personal Protective Equipment*)

Examples of hazards to look for in the work area include:

- dust hazards from abrasive blasting
- blast cleaning enclosures
- organic abrasives which are combustible
- areas where particulate fibers are present
- dust hazards in general

Ventilation Requirements

Testing should be done in the ventilation area before any operation takes place in an area where oxygen concentration is less than 19.5% or the Lower Explosive Limit (LEL) is greater than 10%.

Types of Ventilation Systems

- Open air ventilation
- Constant air flow systems

Exhaust Systems

Fans shall be grounded in areas ventilating flammable dusts or fumes. The fan shall be approved for the particular conditions or hazard.

BLOODBORNE DISEASES

29 CFR 1910.1030

The purpose of this section is to serve as a guide to help protect employees from exposure to blood or infectious materials in the work place. It will help employers and supervisors provide written programs and policies that will help ensure work place safety when there is a possibility of exposure to body fluids. Also, it serves as a training guideline for employees and promotes awareness of bloodborne dangers in the work place.

(a) Scope and Application

This section applies to all occupational exposure to blood or other potentially infectious materials. This section outlines those measures that can be taken to prevent or minimized exposure to bloodborne pathogens through proper planning. It also provides guidelines for the proper cleanup and disposal of those materials, including bodily fluids, that may cause disease.

(b) Definitions

- "Assistant Secretary" means the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.
- "Blood" means human blood, human blood components, and products made from human blood.
- "Bloodborne Pathogens" means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).
- "Clinical Laboratory" means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.
- "Contaminated" means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.
- "Contaminated Laundry" means laundry which has been soiled with blood or other potentially infectious materials or may contain sharps.
- "Contaminated Sharps" means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.
- "Decontamination" means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.
- "Director" means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.
- "Engineering Controls" means controls (e.g., sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.
- "Exposure Incident" means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.
- "Handwashing Facilities" means a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.
- "Licensed Healthcare Professional" is a person whose legally permitted scope of practice allows him or her to independently perform the activities required by paragraph (f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up.
- "HBV" means hepatitis B virus.
- "HIV" means human immunodeficiency virus.
- "Occupational Exposure" means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.
- "Other Potentially Infectious Materials" means (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

- "Parenteral" means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.
- "Personal Protective Equipment" is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.
- "Production Facility" means a facility engaged in industrial-scale, large-volume or high concentration production of HIV or HBV.
- "Regulated Waste" means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.
- "Research Laboratory" means a laboratory producing or using research-laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV but not in the volume found in production facilities.
- "Source Individual" means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims; clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.
- "Sterilize" means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.
- "Universal Precautions" is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.
- "Work Practice Controls" means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

(c) Exposure Control

(1) Each employer having an employee(s) with occupational exposure shall establish a written Exposure Control Plan designed to eliminate or minimize employee exposure, which includes the exposure determination, the schedule and method of implementation of the plan, and the procedure for the evaluation of circumstances. Each employer shall ensure that a copy of the Exposure Control Plan is accessible to employees in accordance with 29 CFR 1910.1020(e) and that the plan will be reviewed and updates at least annually.

(2) Each employer who has an employee(s) with occupational exposure shall prepare an exposure determination. This exposure determination shall be made without regard to the use of personal protective equipment.

(d) Methods of Compliance

(1) Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

(2) Engineering and work practice controls shall be used to eliminate or minimize employee exposure, engineering controls shall be examined and maintained, employers shall provide handwashing facilities which are readily accessible to employees or provide either an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes, and ensure that employees wash their hands any other skin with soap and water immediately.

- Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed.
- Shearing or breaking of contaminated needles is prohibited.
- Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed.
- Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.
- Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets or on countertops or benchtops where blood or other potentially infectious materials are present.
- All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.
- Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

- Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.
- Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary, unless the employer can demonstrate that decontamination of such equipment or portions of such equipment is not feasible.

(3) When there is occupational exposure, the employer shall provide, at no cost to the employee, and ensure employee uses appropriate personal protective equipment such as, but not limited to, gloves, gowns, laboratory coats, face shields or masks and eye protection, and mouthpieces, resuscitation bags, pocket masks, or other ventilation devices.

(4) Employers shall ensure that the worksite is maintained in a clean and sanitary condition. The employer shall determine and implement an appropriate written schedule for cleaning and method of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area.

(e) HIV and HBV Research Laboratories and Production Facilities

(1) This paragraph applies to research laboratories and production facilities engaged in the culture, production, concentration, experimentation, and manipulation of HIV and HBV. It does not apply to clinical or diagnostic laboratories engaged solely in the analysis of blood, tissues, or organs. These requirements apply in addition to the other requirements of the standard.

(2) Research laboratories and production facilities shall meet a specified criteria, including but not limited to, incinerating or decontaminating all regulated waste, keeping lab doors closed when working with HIV or HBV, placing all contaminated materials in a durable, leakproof, labeled or color-coded container, limiting to authorized persons, posting hazard warning signs, conducting activities in biological safety cabinets that involve potentially infectious materials, and wearing appropriate protective clothing. Certified biological safety cabinets (Class I, II, or III) or other appropriate combinations of personal protection or physical containment devices shall be used for all activities with other potentially infectious materials.

(3) HIV and HBV research laboratories shall meet the specified criteria, including each laboratory shall contain a facility for hand washing and an eye wash facility which is readily available within the work area, and an autoclave for decontamination of regulated waste shall be available.

(4) HIV and HBV production facilities shall meet the specified criteria, including work areas shall be separated from areas that are open to unrestricted traffic flow within the building, work area shall be water resistant, sink for hand washing shall be provided, access doors shall be self- closing, an autoclave shall be available within or near work area, and a ducted exhaust-air ventilation system shall be provided.

(f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up

(1) The employer shall make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident and shall ensure that all medical evaluations and procedures including the hepatitis B vaccine and vaccination series and post-exposure evaluation and follow-up, including prophylaxis, are made available and conducted at no cost to the employee by an accredited laboratory, provided at a reasonable time and place, performed by or under the supervision of a licensed physician or under the supervision of another licensed healthcare professional, and provided according to recommendations of the U.S. Public Health Service current at the time these evaluations.

(2) Hepatitis B vaccination shall be made available after the employee has received the training required in and within 10 working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

(3) Post-exposure Evaluation and Follow-up. Following a report of an exposure incident, the employer shall make immediately available to the exposed employee a confidential medical evaluation and follow-up, including documentation of the route(s) of exposure, and the circumstances under which the exposure incident occurred, identification and documentation of the source individual, unless the employer can establish that identification is infeasible or prohibited by state or local law; collection and testing of blood for HBV and HIV serological status, post-exposure prophylaxis, when medically indicated, counseling, and an evaluation of reported illnesses.

(4) The employer shall ensure that the healthcare professional responsible for the employee's Hepatitis B vaccination is provided a copy of this regulation and ensure that the healthcare professional evaluating an employee after an exposure incident is provided with a copy of this regulation, a description of the exposed employee's duties as they relate to the exposure incident, documentation of the route(s) of exposure and circumstances under which exposure occurred, results of the source individual's blood testing, if available, and all medical records relevant to the appropriate treatment of the employee including vaccination status which are the employer's responsibility to maintain.
(5) The employer shall obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.
(6) Medical records required by this standard shall be maintained.

(g) Communication of Hazards to Employees

(1) Warning labels shall be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials. Labels required by this section shall include a legend, shall be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color, shall be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.
(2) Employers shall ensure that all employees with occupational exposure participate in a training program which must be provided at no cost to the employee and during working hours.

(h) Recordkeeping

(1) The employer shall establish and maintain an accurate record for each employee with occupational exposure, in accordance with 29 CFR 1910.1020, including employee name and social security number, a copy of the hepatitis B vaccination status, a copy of all results of examinations, medical testing, and follow-up procedures, a copy of the healthcare professionals written opinion, and a copy of information provided to the healthcare professional. The employer shall ensure that employee medical records kept confidential, and not disclosed or reported without the employee's express written consent to any person within or outside the workplace except as required by this section or as may be required by law.
(2) Training records shall include the following information: the dates of the training sessions; the contents or a summary of the training sessions; the names and qualifications of persons conducting the training; and the names and job titles of all persons attending the training sessions. Records shall be maintained for 3 years from the date on which the training occurred.
(3) The employer shall ensure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director, employees, to employee representatives, to the Director, and to the Assistant Secretary, and the subject employee for examination and copying.
(4) The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h). If the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the Director, at least three months prior to their disposal and transmit them to the Director, if required by the Director to do so, within that three month period.

(i) Effective Dates

(1) The standard shall become effective on March 6, 1992.
(2) The Exposure Control Plan shall be completed on or before May 5, 1992.
(3) Information and Training and Recordkeeping shall take effect on or before June 4, 1992.
(4) Engineering and Work Practice Controls, Personal Protective Equipment, Housekeeping, HIV and HBV Research Laboratories and Production Facilities, Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up, and Labels and Signs, shall take effect July 6, 1992.

LOCKOUT / TAGOUT

29 CFR 1910.147

(a) Scope, application and purpose

This standard covers the servicing and maintenance of machines and equipment in which the "unexpected" energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy. This standard applies to the control of energy during servicing and/or maintenance of machines and equipment. This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy in order to prevent injury to employees.

(b) Definitions applicable to this section

- "Affected employee." An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.
- "Authorized employee." A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.
- "Capable of being locked out." An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.
- "Energized." Connected to an energy source or containing residual or stored energy.
- "Energy isolating device." A mechanical device that physically prevents the transmission or release or energy, including but not limited to the following: A manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.
- "Energy source." Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.
- "Hot tap." A procedure used in the repair maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.
- "Lockout." The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
- "Lockout device." A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.
- "Normal production operations." The utilization of a machine or equipment to perform its intended production function.

- “Servicing and/or maintenance.” Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or start-up of the equipment or release of hazardous energy.
- “Setting up.” Any work performed to prepare a machine or equipment to perform its normal production operation.
- “Tagout.” The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.
- “Tagout device.” A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

(c) General Requirements

(1) The employer shall establish a program consisting of energy control procedures, employee training and to periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start-up or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

(2) If an energy isolating device is not capable of being locked out, the employer’s energy control program under paragraph shall utilize a tagout system, unless the employer can demonstrate that the utilization of a tagout system will provide full employee protection. After January 2, 1990, whenever replacement or major repair of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.

(3) When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program and demonstrate full compliance with all tagout-related provisions

(4) Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section. The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance.

(5) Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources. Lockout devices and tagout devices shall be singularly identified; shall be the only device(s) used for controlling energy; shall not be used for other purposes; and shall meet the specific requirements of durability, standardization, substantialness, and identifiability.

(6) The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

(7) The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. The training shall include authorized employees receiving training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control, affected employees being instructed in the purpose and use of the energy control procedure, employees being instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out, and limitations of tags. The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee’s name and dates of training.

(8) Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.
(9) Affected employees shall be notified by the employer or authorized employee of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

(d) Application of control

The established procedures for the application of energy control (the lockout or tagout procedures) shall cover the following elements and actions and shall be done in the following sequence:

(1) Preparation for shutdown - Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.
(2) Machine or equipment shutdown- The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.
(3) Machine or equipment isolation - All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).
(4) Lockout or tagout device application - (1) Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees. (2) Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a “safe” or “off” position. (3) Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the “safe” or “off” position is prohibited.
(5) Stored energy - (1) Following the application of logout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe. (2) If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.
(6) Verification of isolation - Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

(e) Release from lockout or tagout

Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:

(1) The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.
(2) The work area shall be checked to ensure that all employees have been safely positioned or removed. Before and after lockout or tagout devices are removed and before machines or equipment are energized, affected employees shall be notified that the lockout or tagout devices have been removed.
(3) Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer’s energy control program. The employer shall demonstrate that the specific procedure shall include verification by the employer that the authorized employee who applied the device is not at the facility, making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

(f) Additional requirements

(1) In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, in the following sequence of actions: (1) Clear the machine or equipment of tools and materials; (2) Remove employees from the machine or equipment area; (3) Remove the lockout or tagout devices; of this section; (4) Energize and proceed with testing or positioning; (5) Deenergize all systems and reapply energy control measures to continue the servicing and/or maintenance.

(2) Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures and shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

(3) When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

(4) Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

HAZARD COMMUNICATION STANDARD WORKER RIGHT-TO-KNOW (RTK)

29 CFR 1910.1200

(a) Purpose

The purpose of this section is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets and employee training.

(b) Scope and application

This section requires chemical manufacturers or importers to assess the hazards of chemicals which they produce or import, and all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training. In addition, this section requires distributors to transmit the required information to employers. This section applies to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency, to laboratories with certain exceptions, and to work operations where employees only handle chemicals in sealed containers.

(c) Definitions

- “Article” means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.
- “Assistant Secretary” means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.
- “Chemical” means any element, chemical compound or mixture of elements and/or compounds.
- “Chemical manufacturer” means an employer with a workplace where chemical(s) are produced for use or distribution.
- “Chemical name” means the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name which will clearly identify the chemical for the purpose of conducting a hazard evaluation.
- “Combustible liquid” means any liquid having a flashpoint at or above 100 deg. F (37.8 deg. C), but below 200 deg. F (93.3 deg. C), except any mixture having components with flashpoints of 200 deg. F (93.3 deg. C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.
- “Commercial account” means an arrangement whereby a retail distributor sells hazardous chemicals to an employer, generally in large quantities over time and/or at costs that are below the regular retail price.
- “Common name” means any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.
- “Compressed gas” means: (i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F (21.1 deg. C); or (ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg. C) regardless of the pressure at 70 deg. F (21.1 deg.C); or (iii) A liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 deg. C) as determined by ASTM D-323-72.
- “Container” means any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this section, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.
- “Designated representative” means any individual or organization to whom an employee gives written authorization to exercise such employee’s rights under this section. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.
- “Director” means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.
- “Distributor” means a business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.
- “Employee” means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.
- “Employer” means a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.
- “Explosive” means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.
- “Exposure or exposed” means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure.

- “Subjected” in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)
- “Flammable” means a chemical that falls into one of the following categories:
  - (i) “Aerosol, flammable” means an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;
  - (ii) “Gas, flammable” means: (A) A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent by volume or less; or (B) A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the lower limit;
  - (iii) “Liquid, flammable” means any liquid having a flashpoint below 100 deg. F (37.8 deg. C), except any mixture having components with flashpoints of 100 deg. F (37.8 deg. C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.
  - (iv) “Solid, flammable” means a solid, other than a blasting agent or explosive as defined in 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.
- “Flashpoint” means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested as follows: (i) Tagliabue Closed Tester (See American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24-1979 (ASTM D 56-79)) for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100 deg. F (37.8 deg. C), that do not contain suspended solids and do not have a tendency to form a surface film under test; or (ii) Pensky-Martens Closed Tester (see American National Standard Method of Test for Flash Point by Pensky-Martens Closed Tester, Z11.7-1979 (ASTM D 93-79)) for liquids with a viscosity equal to or greater than 45 SUS at 100 deg. F (37.8 deg. C), or that contain suspended solids, or that have a tendency to form a surface film under test; or (iii) Setaflash Closed Tester (see American National Standard Method of Test for Flash Point by Setaflash Closed Tester (ASTM D 3278-78)). Organic peroxides, which undergo auto-accelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.
- “Foreseeable emergency” means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.
- “Hazardous chemical” means any chemical which is a physical hazard or a health hazard.
- “Hazard warning” means any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s), including target organ effects, of the chemical(s) in the container(s). (See the definitions for “physical hazard” and “health hazard” to determine the hazards which must be covered.)
- “Health hazard” means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term “health hazard” includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B describes the criteria to be used to determine whether or not a chemical is to be considered hazardous for purposes of this standard.
- “Identity” means any chemical or common name which is indicated on the material safety data sheet (MSDS) for the chemical. The identity used shall permit cross-references to be made among the required list of hazardous chemicals, the label and the MSDS.
- “Immediate use” means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
- ”Importer” means the first business with employees within the Customs Territory of the United States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.
- “Label” means any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.
- “Material safety data sheet (MSDS)” means written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (g) of this section.
- “Mixture” means any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.
- “Organic peroxide” means an organic compound that contains the bivalent -O-O-structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.
- “Oxidizer” means a chemical other than a blasting agent or explosive as defined in 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.
- “Physical hazard” means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.
- “Produce” means to manufacture, process, formulate, blend, extract, generate, emit, or repackage.
- “Pyrophoric” means a chemical that will ignite spontaneously in air at a temperature of 130 deg. F (54.4 deg. C) or below.

- "Responsible party" means someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.
- "Specific chemical identity" means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.
- "Trade secret" means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D sets out the criteria to be used in evaluating trade secrets.
- "Unstable (reactive)" means a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.
- "Use" means to package, handle, react, emit, extract, generate as a by-product, or transfer.
- "Water-reactive" means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.
- "Work area" means a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.
- "Workplace" means an establishment, job site, or project, at one geographical location containing one or more work areas.

(d) Hazard determination

(1) Chemical manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them to determine if they are hazardous. Employers are not required to evaluate chemicals unless they choose not to rely on the evaluation performed by the chemical manufacturer or importer for the chemical to satisfy this requirement.
(2) Chemical manufacturers, importers or employers evaluating chemicals shall identify and consider the available scientific evidence concerning such hazards. For health hazards, evidence which is statistically significant and which is based on at least one positive study conducted in accordance with established scientific principles is considered to be sufficient to establish a hazardous effect if the results of the study meet the definitions of health hazards in this section.
(3) The chemical manufacturer, importer or employer evaluating chemicals shall treat the following sources as establishing that the chemicals listed in them are hazardous: (i) 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA); or, (ii) "Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment," American Conference of Governmental Industrial Hygienists (ACGIH) (latest edition). The chemical manufacturer, importer, or employer is still responsible for evaluating the hazards associated with the chemicals in these source lists in accordance with the requirements of this standard.
(4) Chemical manufacturers, importers and employers evaluating chemicals shall treat the following sources as establishing that a chemical is a carcinogen or potential carcinogen for hazard communication purposes: (i) National Toxicology Program (NTP), "Annual Report on Carcinogens" (latest edition); (ii) International Agency for Research on Cancer (IARC) "Monographs" (latest editions); or (iii) 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.
(5) The chemical manufacturer, importer or employer shall determine the hazards of mixing chemicals.
(6) Chemical manufacturers, importers, or employers evaluating chemicals shall describe in writing the procedures they use to determine the hazards of the chemical they evaluate, to be made available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director.

(e) Written hazard communication program

(1) Employers shall develop, implement, and maintain at each workplace, a written hazard communication program which at least describes how the criteria specified for labels and other forms of warning, material safety data sheets, and employee information and training will be met, including a list of the hazardous chemicals known to be present, and the methods the employer will use to inform employees of the hazards of non-routine tasks and the hazards associated with chemicals contained in unlabeled pipes in their work areas.
(2) Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed shall additionally ensure that the hazard communication programs developed and implemented include the methods the employer will use to provide the other employer(s) on-site access to material safety data sheets for each hazardous chemical the other employer(s)' employees may be exposed to while working; the methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and, the methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.
(3) The employer may rely on an existing hazard communication program to comply with these requirements.
(4) The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with the requirements of 29 CFR 1910.1020 (e).
(5) Where employees must travel between workplaces during a workshift, the written hazard communication program may be kept at the primary workplace facility.

(f) Labels and other forms of warning

(1) The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the identity of the hazardous chemical(s), the appropriate hazard warnings, and the name and address of the chemical manufacturer, importer, or other responsible party.
(2) For solid metal, solid wood, or plastic items that are not exempted as articles due to their downstream use, or shipments of whole grain, the required label may be transmitted to the customer at the time of the initial shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes. The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of the first shipment.
(3) Chemical manufacturers, importers, or distributors shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked in accordance with this section in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act (49 U.S.C. 1801 et seq.) and regulations issued under that Act by the Department of Transportation.
(4) If the hazardous chemical is regulated by OSHA in a substance-specific health standard, the chemical manufacturer, importer, distributor or employer shall ensure that the labels or other forms of warning used are in accordance with the requirements of that standard.
(5) The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the following information, expect as otherwise provided: (i) Identity of the hazardous chemical(s) contained therein; and, (ii) Appropriate hazard warnings, or alternatively, words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.
(6) The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information.
(7) The employer is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer.
(8) The employer shall not remove or deface existing labels on incoming containers of hazardous chemicals, unless the container is immediately marked with the required information.
(9) The employer shall ensure that labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift.
(10) The chemical manufacturer, importer, distributor or employer need not affix new labels to comply with this section if existing labels already convey the required information.
(11) Chemical manufacturers, importers, distributors, or employers who become newly aware of any significant information regarding the hazards of a chemical shall revise the labels for the chemical within three months of becoming aware of the new information.

(g) Material safety data sheets

(1) Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data sheet in the workplace for each hazardous chemical which they use.
(2) Each material safety data sheet shall be in English, and shall contain the following information: the identity used on the label, and on trade secrets, physical and chemical characteristics of the hazardous chemical, physical hazards of the hazardous chemical, health hazards of the hazardous chemical, the primary route(s) of entry, the OSHA permissible exposure limit, ACGIH Threshold Limit Value, and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the material safety data sheet, where available, whether the hazardous chemical is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens (latest edition), any generally applicable precautions for safe handling and use, any generally applicable control measures which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, emergency and first aid procedures, the date of preparation of the material safety data sheet or the last change to it; and, the name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the material safety data sheet, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.
(3) If no relevant information is found for any given category on the material safety data sheet, the chemical manufacturer, importer or employer preparing the material safety data sheet shall mark it to indicate that no applicable information was found.
(4) Where complex mixtures have similar hazards and contents, the chemical manufacturer, importer or employer may prepare one material safety data sheet to apply to all of these similar mixtures.
(5) The chemical manufacturer, importer or employer preparing the material safety data sheet shall ensure that the information recorded accurately reflects the scientific evidence used in making the hazard determination.
(6) Chemical manufacturers or importers shall ensure that distributors and employers are provided an appropriate material safety data sheet with their initial shipment, and with the first shipment after a material safety data sheet is updated and either provide material safety data sheets with the shipped containers or send them to the distributor or employer prior to or at the time of the shipment.
(7) Distributors shall ensure that material safety data sheets, and updated information, are provided to other distributors and employers with their initial shipment and with the first shipment after a material safety data sheet is updated. The distributor shall either provide material safety data sheets with the shipped containers, or send them to the other distributor or employer prior to or at the time of the shipment; Wholesale distributors shall also provide material safety data sheets to employers or other distributors upon request.

(8) The employer shall maintain in the workplace copies of the required material safety data sheets for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s).
(9) Where employees must travel between workplaces during a workshift, the material safety data sheets may be kept at the primary workplace facility.
(10) Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals.
(11) Material safety data sheets shall also be made readily available, upon request, to designated representatives and to the Assistant Secretary, in accordance with the requirements of 29 CFR 1910.1020(e). The Director shall also be given access to material safety data sheets in the same manner.

(h) Employee information and training

(1) Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and material safety data sheets.
(2) Employees shall be informed of: the requirements of this section, any operations in their work area where hazardous chemicals are present, and, the location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.
(3) Employee training shall include: methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area, the physical and health hazards of the chemicals in the work area, the measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, and the details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

(i) Trade secrets

(1) The chemical manufacturer, importer, or employer may withhold the specific chemical identity, including the chemical name and other specific identification of a hazardous chemical, from the material safety data sheet, provided that the claim that the information withheld is a trade secret can be supported, information contained in the material safety data sheet concerning the properties and effects of the hazardous chemical is disclosed, the material safety data sheet indicates that the specific chemical identity is being withheld as a trade secret, and, the specific chemical identity is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of this paragraph.
(2) Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity of a hazardous chemical is necessary for emergency or first-aid treatment, the chemical manufacturer, importer, or employer shall immediately disclose the specific chemical identity of a trade secret chemical to that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement.
(3) In non-emergency situations, a chemical manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity, otherwise permitted to be withheld, to a health professional providing medical or other occupational health services to exposed employee(s), and to employees or designated representatives, under specific conditions.
(4) The confidentiality agreement may restrict the use of the information to the health purposes indicated in the written statement of need, may provide for appropriate legal remedies in the event of a breach of the agreement, including stipulation of a reasonable pre-estimate of likely damages, and, may not include requirements for the posting of a penalty bond.
(5) Nothing in this standard is meant to preclude the parties from pursuing non-contractual remedies to the extent permitted by law.
(6) If the health professional, employee, or designated representative receiving the trade secret information decides that there is a need to disclose it to OSHA, the chemical manufacturer, importer, or employer who provided the information shall be informed by the health professional, employee, or designated representative prior to, or at the same time as, such disclosure.
(7) If the chemical manufacturer, importer, or employer denies a written request for disclosure of a specific chemical identity, the denial must be provided to the health professional, employee, or designated representative, within thirty days of the request, be in writing, include evidence to support the claim that the specific chemical identity is a trade secret, state the specific reasons why the request is being denied, and, explain in detail how alternative information may satisfy the specific medical or occupational health need without revealing the specific chemical identity.
(8) The health professional, employee, or designated representative whose request for information is denied may refer the request and the written denial of the request to OSHA for consideration.
(9) When a health professional, employee, or designated representative refers the denial to OSHA, OSHA shall consider the evidence to determine if: the chemical manufacturer, importer, or employer has supported the claim that the specific chemical identity is a trade secret, the health professional, employee, or designated representative has supported the claim that there is a medical or occupational health need for the information, and, the health professional, employee or designated representative has demonstrated adequate means to protect the confidentiality.

(10) If OSHA determines that the specific chemical identity requested is not a “bona fide” trade secret, or that it is a trade secret, but the requesting health professional, employee, or designated representative has a legitimate medical or occupational health need for the information, has executed a written confidentiality agreement, and has shown adequate means to protect the confidentiality of the information, the chemical manufacturer, importer, or employer will be subject to citation by OSHA. If the execution of a confidentiality agreement would not provide sufficient protection against the potential harm from the unauthorized disclosure of a trade secret specific chemical identity, the Assistant Secretary may issue such orders or impose such additional limitations upon the disclosure.

(11) If a citation for a failure to release specific chemical identity information is contested by the chemical manufacturer, importer, or employer, the matter will be adjudicated before the Occupational Safety and Health Review Commission in accordance with the Act’s enforcement scheme and the applicable Commission rules of procedure.

(12) Notwithstanding the existence of a trade secret claim, a chemical manufacturer, importer, or employer shall, upon request, disclose to the Assistant Secretary any information which this section requires the chemical manufacturer, importer, or employer to make available. Where there is a trade secret claim, such claim shall be made no later than at the time the information is provided to the Assistant Secretary so that suitable determinations of trade secret status can be made and the necessary protections can be implemented.

(13) Nothing in this paragraph shall be construed as requiring the disclosure under any circumstances of process or percentage of mixture information which is a trade secret.

(j) Effective dates

Chemical manufacturers, importers, distributors, and employers shall be in compliance with all provisions of this section by March 11, 1994.

Joint Commission on Accreditation of Healthcare Organizations

Joint Commission on Accreditation of Healthcare Organizations (JCAHO) is the primary standard setting body for the health care industry. The standards published by JCAHO reflect the work of many advisory groups from private, state and federal sectors, representing the expertise in the delivery of healthcare. The standards are a minimum benchmark for healthcare organizations to achieve in order to become accredited by JCAHO. The cornerstone of this process is *The Comprehensive Accreditation Manual for Hospitals: The Official Handbook (CAMH).* This manual is updated on a quarterly basis to reflect the most current accreditation information and updated standards. The latest version is effective January 1, 1997 with the next update due in May, 1997. The manual is divided into fifteen sections containing 578 individual standards relating to all phases of hospital organization and operations. The sections are:

> Patient Rights and Organizational Ethics (RI Standards)
> Assessment of Patients (PE Standards)
> Care of Patients (TX Standards)
> Education (PF Standards)
> Continuum of Care (CC Standards)
> Improving Organization Performance (PI Standards)
> Leadership (LD Standards)
> Management of the Environment of Care (EC Standards)
> Management of Human Resources (HR Standard)
> Management of Information (IM Standards)
> Surveillance, Prevention and Control of Infection (IC Standards)
> Governance (GO Standards)
> Management (MA Standards)
> Medical Staff (MS Standards)
> Nursing (NR Standards)

In addition to the listed sections, the manual illustrates a detail outline of the accreditation process including the general intent of each standard along with the scoring and aggregation rules for each section.

This process is extremely important to hospitals as JCAHO accreditation is a requirement in most states for hospital licensure, Medicare/Medicaid funding and insurance payments.

The Joint Commission also publishes a manual entitled *Guidelines for the Design and Construction of Hospital and Health Care Facilities*. This document provides guidelines to providers, designers and construction organizations in the building of health care facilities.

For additional information on these publications and/or standards contact:
Joint Commission on Accreditation of Healthcare Organizations
One Renaissance Boulevard
Oakbrook Terrace, IL 60181-9887   Phone: (630) 792-5800

Process Safety Management of Highly Hazardous Chemicals
29 CFR 1910.119

This section contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. These releases may result in toxic, fire or explosion hazards.

(a) Application

(b) Definitions

- “Atmospheric tank” means a storage tank which has been designed to operate at pressures from atmospheric through 0.5 p.s.i.g. (pounds per square inch gauge, 3.45 Kpa).
- “Boiling point” means the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (p.s.i.a.) (760 mm.). For the purposes of this section, where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products, ASTM D-86-62, which is incorporated by reference as specified in Sec. 1910.6, may be used as the boiling point of the liquid.
- “Catastrophic release” means a major uncontrolled emission, fire, or explosion, involving one or more highly hazardous chemicals, that presents serious danger to employees in the workplace.
- “Facility” means the buildings, containers or equipment which contain a process.
- “Highly hazardous chemical” means a substance possessing toxic, reactive, flammable, or explosive properties and specified by paragraph (a)(1) of this section.
- “Hot work” means work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.
- “Normally unoccupied remote facility” means a facility which is operated, maintained or serviced by employees who visit the facility only periodically to check its operation and to perform necessary operating or maintenance tasks. No employees are permanently stationed at the facility. Facilities meeting this definition are not contiguous with, and must be geographically remote from all other buildings, processes or persons.
- “Process” means any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities. For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.
- “Replacement in kind” means a replacement which satisfies the design specification.
- Trade secret” means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer’s business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D contained in 1910.1200 sets out the criteria to be used in evaluating trade secrets.

(c) Employee participation

(1) Employers shall develop a written plan of action regarding the implementation of the employee participation required by this paragraph.
(2) Employers shall consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management in this standard.
(3) Employers shall provide to employees and their representatives access to process hazard analyses and to all other information required to be developed under this standard.

(d)(1)(i) through (d)(2)(i)(E) Process safety information. The employer shall complete a compilation of written process safety information to enable the employer and the employees involved in operating the process to identify and understand the hazards posed by those processes involving highly hazardous chemicals.

(d)(2)(ii) Where the original technical information no longer exists, such information may be developed in conjunction with the process hazard analysis in sufficient detail to support the analysis.

(d)(3)(i)(A) through (d)(3)(i)(H) These paragraphs outline the required information regarding the equipment to be used in the applicable processes.

(d)(3)(ii) The employer shall document that equipment complies with recognized and generally accepted good engineering practices.

(d)(3)(iii) For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the employer shall determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

(e)(1) Process hazard analysis shall be completed according to the following schedule:

- (i) No less than 25 percent of the initial process hazards analyses shall be completed by May 26, 1994;
- (ii) No less than 50 percent of the initial process hazards analyses shall be completed by May 26, 1995;
- (iii) No less than 75 percent of the initial process hazards analyses shall be completed by May 26, 1996;
- (iv) All initial process hazards analyses shall be completed by May 26, 1997.
- (v) Process hazards analyses completed after May 26, 1987 which meet the requirements of this paragraph are acceptable as initial process hazards analyses. These process hazard analyses shall be updated and revalidated, based on their completion date, in accordance with paragraph (e)(6) of this standard.

(e)(2)(i) through (e)(5) These paragraphs outline the choice of methodologies of the hazards analyses, the items that the analyses must address, who should conduct the analyses, and the requirement to establish a system to address, implement and document the findings/recommenda tions resulting from the analyses.

(e)(6) through (e)(7) At least every five (5) years after the completion of the initial process hazard analysis, the process hazard analysis shall be updated and revalidated. Employers shall retain process hazards analyses and updates or revalidation’s for each process covered by this para graph for the life of the process.

(f)(1)(i)(A) through (f)(1)(iii)(C) These paragraphs cover the requirement to document normal and emergency operating procedures as well as precautions to avoid or minimize physical contact with the process’ chemicals.

(f)(1)(iii)(D) & (E) Quality control for raw materials and control of hazardous chemical inventory levels and any special or unique hazards.

(f)(1)(iv) Safety systems and their functions.

(f)(2) Operating procedures shall be readily accessible to employees who work in or maintain a process.

(f)(3) The operating procedures shall be reviewed as often as necessary to assure that they reflect current operating practice. The employer shall certify annually that these operating procedures are current and accurate.

(f)(4) The employer shall develop and implement safe work practices to provide for the control of hazards during operations. These safe work practices shall apply to employees and contractor employees.

(g)(1)(i) through (g)(3) Outlines the training required of employees and contractors and the documentation required.

(h)(1) through (h)(3)(v) These paragraphs are requirements that apply to contractors performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process only.

(i)(1) through (i)(2)(iv) The employer shall perform a pre-startup safety review for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information. These paragraphs discuss the required elements of the pre-startup safety review.

(j)(1)(i) through (j)(j)(6)(iii) These paragraphs detail the requirements of the employer to assure and document the continued mechanical integrity of the equipment used in covered processes.

(k)(1) through (k)(2) Outline the requirements for Hot Work Permits on covered processes.

(l)(1) through (l)(5) These paragraphs outline the management of changes within the covered processes.

(m)(1) through (m)(7) These paragraphs outline the requirements and procedures for incident investigation. The employer shall investigate each incident which resulted in, or could reasonably have resulted in a catastrophic release of highly hazardous chemical in the workplace. Incident investigation reports shall be retained for five years.

(n) Emergency planning and response. The employer shall establish and implement an emergency action plan for the entire plant in accordance with the provisions of 29 CFR 1910.38(a). In addition, the emergency action plan shall include procedures for handling small releases. Employers covered under this standard may also be subject to the hazardous waste and emergency response provisions contained in 29 CFR 1910.120(a), (p) and (q).

(o)(1) through (o)(5) Compliance Audits must be conducted by the employer at least every 3 years. Employers shall retain the two (2) most recent compliance audit reports.

(p)(1) through (p)(3) ...Trade secrets...Employers shall make all information necessary to comply with the paragraph available to those persons responsible for compiling the process safety information, those assisting in the development of the process hazard analysis, those responsible for developing the operating, and those involved in incident investigations, emergency planning and response and compliance audits without regard to possible trade secret status of such information. Nothing shall preclude the employer from requiring the persons to whom the information is made to enter into confidentiality agreements not to disclose the information. Employees and their designated representatives shall have access to trade secret information contained within the process hazard analysis and other documents required to be developed by this standard.

Hazardous Materials and Terrorist Incident Response Planning

Curriculum Guidelines

About the Planning Guidelines

The Planning Curriculum Guidelines are intended to assist public sector training managers and employers to understand the requirements for training public sector personnel involved in planning for hazardous materials and terrorist emergencies. Existing regulatory requirements are defined, and training recommendations are offered to help public sector training mangers improve the quality and effectiveness of hazardous materials and terrorist incident response planning.

The Planning Curriculum Guidelines are organized into 14 sections. The first section addresses general planning training issues and includes:

- What is a plan?
- Requirements for hazardous materials planning.
- The planning process.
- The need to train.
- The scope of the planning Curriculum

The second through eleventh sections address training objectives that should be achieved by public sector employees performing various hazardous materials and terrorist incident response planning functions. The competency areas are:

- Planning Orientation
- Planning Essentials
- Planning Specialties
    - Commodity Flow Study
    - Hazard Analysis
    - Capability Assessment
    - Planning for Protective Actions
    - Plan Implementation and Maintenance
    - Facility Planning
    - Planning for Public Education

The final 4 sections are appendices provided a reference in using the *Guidelines,* and include:

- Appendix A: Planning Guide Summaries
- Appendix B: Planning Models
- Appendix C: Terrorist Incident Planning Models
- Appendix D: National Response Team's Integrated Contingency Plan Guidance

Planning for Hazardous Materials and Terrorist Incidents

Curriculum Guidelines

Planning Training Issues

General Training Issues

What is a Plan?

According to the Federal Emergency Management Agency (FEMA), an emergency operations plan (EOP) is a document that:

- Assigns responsibility to organizations and individuals for carrying out specific actions at projected times and locations in an emergency.
- Sets forth lines of authority and organizational relationships, and shows how all actions will be coordinated.
- Describes how people and property will be protected in emergencies and disasters.
- Identifies personnel, equipment, facilities, supplies, and other resources available for use during response and recovery operations.
- Identifies steps to address mitigation concerns during response and recovery activities.

The fundamental logic that underlies the development of emergency plans is that these and related decisions must be addressed before an incident occurs. During an emergency, no time exists to resolve such issues or to practice and refine roles and responsibilities. The complex analysis and preparation required to establish an effective emergency operations capability must be completed in advance so that public officials and response personnel can act quickly and decisively to control dangerous situations and protect the public.

Given this rationale, an emergency plan must be more than just a document. To be effective, all personnel who will participate in a hazardous materials or terrorist incident response must know their roles and responsibilities and be competent in the tasks they will perform. This goal is greatly enhanced by participation of tasked organizations in an integrated planning process, including exercising the plan and periodically revising the plan as needed.

The elements covered in a hazardous materials or terrorist incident response plan and the approach to planning will vary, depending on the jurisdiction's or facility's unique needs. However, all plans should contain: (1) an analysis of the emergencies likely to occur; (2) an assessment of available resources and existing capabilities; (3) detailed response operations strategies and assignments that address notification, command and control, life safety, and other functional requirements; and (4) identification of prevention measures that can mitigate the seriousness of an emergency or prevent it from occurring. The level of detail captured in the plan will also vary, but must be adequate to allow tasked organizations and individuals to develop comprehensive SOPs in their assigned areas.

Requirements for Hazardous Materials and Terrorist Incident Response Planning

The responsibility to plan for and, if possible, prevent or mitigate hazardous materials or terrorist emergencies is a fundamental extension of the civic responsibility of state and local organizations to ensure the safety of responders and to protect the public. Congress recognizes this government responsibility for emergency management in the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended. Hazardous materials emergency planning is also required under a number of other federal laws and regulations.

The Emergency Planning and Community Right-to-Know Act (EPCRA)
Title III of Superfund Amendments and Reauthorization Act of 1986 (SARA)

EPCRA and Title III of SARA require the formation of state emergency response commissions (SERCs), tribal emergency response commissions (TERCs), emergency planning districts, and local emergency planning committees (LEPCs). Each LEPC must develop, exercise, and maintain an emergency plan that identifies: (1) facilities and transportation routes related to specific chemicals; (2) response procedures of facilities and local emergency and medical personnel; (3) names of community and facility emergency coordinators; (4) procedures for notifying officials and the public in the event of a hazardous material release; (5) methods for detecting a release and identifying areas and populations at risk; and (6) schedules for exercising the emergency plan.

OSHA 29 CFR Part 1910.120

The Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1910.120) require employers involved in hazardous waste operations to develop and implement an emergency response plan for employees. The elements of this plan must include: (1) recognition of emergencies; (2) methods and procedures for alerting employees; (3) evacuation procedures and routes; (4) means and methods for emergency medical treatment; (5) lines of authority; (6) on-site decontamination procedures; (7) site control means; and (8) methods for evaluating the plan.

Resource Conservation and Recovery Act (RCRA)

Under subtitle C of RCRA, the Environmental Protection Agency (EPA) implements standards for the treatment, storage, and disposal of hazardous wastes through permits issued by EPA or an authorized state. Permit requirements include a facility contingency plan, with required opportunities for local government and public comment and input into the plan development.

FEMA Emergency Operations Plan Requirements

Planning requirements for jurisdictions receiving FEMA funds are set forth in 44 CFR Part 302, effective May 12, 1986. This regulation requires states and local governments to prepare emergency operations plan (EOPs) that: (1) identify available personnel, equipment, facilities, supplies, and other resources in the jurisdiction; and (2) describe the method or scheme for coordinating actions taken by individuals and government services in the event of emergencies, including those involving hazardous materials.

Coordination with Federal Response

State and local hazardous materials emergency preparedness should include plans for coordination with and support for federal response to emergencies. The National Contingency Plan (NCP) is coordinated by the National Response Team under section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The NCP provides for federal support to local responders during hazardous materials transportation and fixed facility incidents. The Federal Response Plan (FRP), coordinated by FEMA, describes resources and support for state and local governments during natural and man-made disasters, including major hazardous materials emergencies.

Other Facility Planning Requirements

Facilities that store, handle, or transport certain types and quantities of hazardous materials may be subject to additional federal contingency planning regulations. In this context, the term "facility" is meant to have a wide connotation, and may include, but is not limited to, any mobile or fixed onshore or offshore building, structure, installation, equipment, pipe, or pipeline. A particular facility may be subject to one or more of the following federal regulations:

- EPA's Oil Pollution Prevention Regulation (SPCC and Facility Response Plan Requirements)— 40 CFR part 112.7(d) and 112.20 to 112.21
- MMS's Facility Response Plan Regulation—30 CFR part 254
- RSPA's Pipeline Response Plan Regulation—49 CFR part 194
- USCG's Facility Response Plan Regulation—33 CFR part 154, subpart F
- EPA's Risk Management Programs Regulation—40 CFR part 68
- OSHA's Emergency Action Plan Regulation—29 CFR 1910.38(a)
- OSHA's Process Safety Standard—29 CFR 1910.119
- EPA's Resource Conservation and Recovery Act Contingency Planning Requirements—40 CFR part 264, subpart D, 40 CFR part 265, subpart D, and 40 CFR part 279.52

In addition, states and local jurisdictions may mandate regulatory requirements and procedures that must be considered in hazardous materials and terrorist incident response planning. Local governments and facilities are encouraged to coordinate the development of hazardous materials and terrorist incident response plans with relevant state and local agencies to ensure compliance with any additional regulatory requirements.

The Planning Process

There is no single correct way to write a hazardous materials or terrorist incident emergency plan. Each entity must plan according to its own situation, based on such factors as geographic size, types of hazards, populations at risk, resources, and level of preparedness. Jurisdictions and facilities should choose the planning elements and processes most appropriate to their circumstances. However, every community and industry needs to evaluate its preparedness for hazardous materials incidents and plan accordingly.

Various explanations of the planning process can be found in the literature, including those described in the *Guide for All-Hazard Emergency Operations Planning* (FEMA SLG 101), *Hazardous Materials Emergency Planning Guide* (NRT-1), *Technical Guidance for Hazards Analysis* (EPA/FEMA/DOT), *Handbook of Chemical Hazard Analysis Procedures* (FEMA/DOT/EPA), and *Emergency Management Guide for Business & Industry* (FEMA 141). These documents and approaches to planning, which are briefly described in Appendices A and B, incorporate the generic functional requirements of planning, although the steps and procedures may be defined somewhat differently. Jurisdictions and facilities should review these and/or other models to select a process that best meets their unique planning needs and preferences.

Whatever model is adopted for the planning process, a team approach is strongly recommended. A planning team is the best mechanism for incorporating the various types of expertise needed in planning, building consensus among organizations and individuals affected by the plan, and promoting professional relationships and understanding among responders. Team members can also help ensure that plans are adequately implemented, evaluated, and maintained after promulgation, and that personnel are given the training and tools they need to achieve competency in their assigned roles and responsibilities.

No specific format is mandated for the results of hazardous materials or terrorist incident response planning. SLG 101 discusses format options for all-hazard and hazard-specific community plans. NRT's *Integrated Contingency Plan Guidance* (see Appendix C) describes an approved format for consolidating multiple plans that facilities may have to prepare in compliance with various federal regulations. However, a format is "good" if users understand it, are comfortable with it, and can extract the information they need. FEMA recommends that planning teams consider the following design characteristics when deciding upon a format: organization, progression, consistency, adaptability, and compatibility.

The approach taken in these *Guidelines* identifies two fundamental planning products, both of which are derived from a common hazards analysis and capability assessment base: (1) an emergency operations plan that addresses preparedness for, response to, and short-term recovery from hazardous materials or terrorist incidents; and (2) a prevention/mitigation section of the plan that addresses measures designed to eliminate or reduce the effects of potential emergencies (e.g., land use planning, building codes, inspections, equipment testing, release detection, site security, containment, and fail safe engineering). Note that community development planning, long-term recovery, and organizational administrative planning (financial management, personnel management, record keeping, labor relations, etc.) are outside the intended scope of the *Guidelines*.

The Need to Train

The skill and training of individual responders is only one aspect of safe and effective emergency operations. Terrorist and hazardous materials incidents are complex and involve the coordinated and timely actions of many different persons, often under stressful conditions. The quality of this coordination—based on clearly defined lines of authority, adequate communication systems, availability of resources when needed, etc.—may play a more important role than individual responder training in minimizing injuries and maximizing control of the emergency.

In hazardous materials and terrorist instigated emergencies, the importance of pre-response planning cannot be overstated. Plans provide a mechanism for evaluating operational strategies, defining roles and procedures, communicating organizational assignments, and assessing the adequacy of responder training. The integrated team planning process fosters trust and cooperation among individuals and organizations that must work together during an incident. Planning also leads to effective mitigation and prevention measures, thus providing communities and facilities with an opportunity to eliminate or reduce the costly and tragic effects of hazardous materials incidents before they occur.

Effective response and prevention planning depends upon the ability of the people who do the work. The quality of hazard analyses and capability assessments, and the effectiveness of response and prevention plans, is directly related to the competency of the personnel assigned responsibility for performing related tasks—public and private sector officials, agency and program managers, planners, technical experts, and many others.

OSHA's regulation 29 CFR 1910.120(q) requires that all employees be properly trained to perform their roles in response to hazardous materials emergencies. By convention, this is extended to responders to terrorist incidents as well. Employers are not now federally required to train personnel involved in planning. However, federal guidelines strongly recommend that all personnel who participate in the hazardous materials or terrorist incident response planning process at the state and local levels be trained to full competency to perform their roles.

The Scope of the Planning Curriculum

The *Hazardous Materials and Terrorist Incident Response Planning Curriculum* addresses training needed by persons who have a defined role in the development, implementation, evaluation, and maintenance of hazardous materials and terrorist incident emergency plans and standard operating procedures (SOPs). These critical documents must be prepared by state governments, local communities/jurisdictions, community support services organizations (hospitals, schools, mass care, business/industry, etc.), public sector agencies, and private sector facilities that store, use, or transport significant quantities of hazardous materials.

Training requirements for the curriculum span a tremendous variety of functions, skills, and audiences. In the public sector, functional responsibilities include directing and controlling the planning process, collecting data and managing information, identifying hazards, analyzing related vulnerabilities, estimating risk, assessing capabilities, serving as operational experts in writing plans and SOPs, implementing and integrating the results with other planning efforts, designing and evaluating complex exercises, and updating the plan on a regular basis. Individuals performing this work include community officials, SERC and LEPC members, agency and program managers, emergency managers, fire service workers, police, emergency medical services personnel, public works officials, community services and volunteer organization representatives, consultants and technical experts, and many others.

In the private sector, similar roles and functions must be performed. In addition, facilities that meet certain criteria must also conduct technically sophisticated analyses for chemicals they store, handle, or transport; develop production/process safety management plans and employee safety plans; and comply with employee and community right-to-know requirements and other reporting mandates. Potential training audiences include industry owners and executives, business planners, production/process managers, functional managers (e.g., communications, public information, emergency response, etc.), safety officers, technical experts, and others employed by the facility. Local government personnel who have responsibilities for reviewing and approving facility plans and/or enforcing compliance with existing regulations and standards may also benefit by training in this area.

This diversity of audiences and roles presents a special challenge for managing training for hazardous materials and terrorist response planning. Access to training audiences is more complex because the interdisciplinary nature of the audience suggests a broad range of possible training delivery mechanisms. Audience members may have limited time available for training in planning since this role is often viewed as an ancillary duty to primary work responsibilities. Finally, hazardous materials and terrorist incident training resources may be limited, necessitating an emphasis on response training, with planning and prevention receiving a lower organizational priority.

General Training Issues

Organization of the Planning Curriculum Guidelines

The goal of the *Hazardous Materials and Terrorist Incident Response Planning Curriculum* is to enhance the knowledge, skills, and attitudes of a broad spectrum of state and local training audiences, thus promoting better hazardous materials and terrorist incident planning by jurisdictions and facilities. The curriculum is organized into three training levels based on general skill requirements of the target audience: Planning Orientation, Planning Essentials, and Planning Specialties. These areas are briefly described below; more detailed information on each is presented in subsequent sections of the *Guidelines*.

Planning Orientation

The Planning Orientation curriculum area provides an introduction to hazardous materials and terrorist incident response planning, with an emphasis on the need for effective plans and the benefits to be derived. Instruction is designed to help individual students identify their roles and responsibilities in the planning process, and motivate them to participate fully and effectively as planning team members. Desired training competencies include an awareness level understanding of general hazardous materials and terrorist incident planning concepts, processes, and legal requirements. No prerequisite knowledge of planning and emergency management concepts is assumed, and no skill development is attempted. Training should result in a positive attitudinal change and a general understanding of the planning function.

Planning Essentials

The Planning Essentials curriculum area provides participants with the knowledge and skills they need to develop a basic integrated hazardous materials and terrorist incident emergency plan for a jurisdiction or facility. The primary training audience is local planning team members. Training objectives cover a broad range of general competencies, including the ability to function effectively in a team environment, assist in or conduct a basic hazards analysis and capability assessment, work with others to analyze options and draft sections of the plan, and participate in plan implementation, evaluation, and maintenance.

Planning Essentials addresses basic skills, with an emphasis on the student’s ability to interpret and use information provided by various technical specialists in developing the plan. More advanced planning skills are covered in the Planning Specialties curriculum area, discussed below. Audience members are assumed to already possess training competencies covered in Planning Orientation and an expertise in the professional discipline that the student represents on the planning committee. Managerial, administrative, and logistic requirements for organizing the planning process, including staff recruitment and assignments, are not addressed.

Planning Specialties

Recognizing that many skills are needed to support the planning process above those involved in basic plan development, the Planning Specialties curriculum area has been organized to articulate additional, often more advanced learning competencies. State and local planning needs and training requirements will vary considerably in these specialty areas. Hence, the curriculum supports selective focused training by jurisdictions and facilities in only those specialty skill areas where training is needed at any given time.

The list of specialty areas included in the curriculum is intended to reflect the prevailing needs of state and local training organizations. It is anticipated that more specialty areas will be defined over time, and some may be eliminated or modified as needs change. Specialty skill training areas identified for the current edition of the *Guidelines* include the following:

- Commodity Flow Study
- Hazards Analysis and Threat Assessment
- Capability Assessment
- Planning for Protective Actions
- Plan Implementation and Maintenance
- Facility Planning
- Planning for Public Education

Content of the Guidelines

The following sections of the *Guidelines* identify training requirements for each major curriculum area: Planning Orientation, Planning Essentials, and Planning Specialties. These requirements are defined primarily in the form of terminal and enabling objectives that describe basic competencies needed by audience members to successfully perform related tasks. Narrative information describing the curriculum area, target audiences, subject matter content, and recommended training methodologies is included, as appropriate.

The training requirements described in this model support the tasks needed to produce comprehensive OSHA and SARA Title III plans and facility plans. They reflect the general planning philosophies and team approaches incorporated in FEMA and NRT guidance. As noted previously, the training requirements address a variety of audiences and needs. A challenge for state and local training managers will be to match the unique roles and responsibilities of personnel in their jurisdictions with the categories used in this model, or to tailor the model to meet their specific needs.

Appendices

The four appendices to this section of the Guidelines provide reference information for the design and delivery of planning instruction. The four appendices are:

Appendix A- Planning Guide Summaries
This appendix provides content summaries of key reference documents used in the preparation of the *Hazardous Materials Planning Curriculum Guidelines*. These materials include the *Guide for All-Hazard Emergency Operations Planning* (FEMA SLG 101), *Hazardous Materials Emergency Planning Guide* (NRT-1), *Technical Guidance for Hazards Analysis* (EPA/FEMA/DOT), *Handbook of Chemical Hazard Analysis Procedures* (FEMA/DOT/EPA), and *Emergency Management Guide for Business & Industry* (FEMA 141).

Appendix B- Planning Models
This appendix provides an outline of the different planning models and approaches to planning promulgated in the key reference documents described in Appendix A.

Appendix C- Terrorism Incident Response Planning Models
This appendix provides an outline of evolving adaptations of the general planning models for specific application to response planning for terrorist incidents. It also includes a sample response resource guide for the evolving body of federal, state, local and private sector specialized resources that are available to assist local responders in handling terrorist incidents.

Appendix D- National Response Team's Integrated Contingency Plan Guidance
This appendix provides a full reprint of the NRT's definitive guidance on integrated diverse facility planning requirements and deliverables into one functional facility emergency response plan, or integrated contingency plan.

Hazardous Materials and Terrorist Incident Response Planning

Training Guidelines

Planning Orientation

General Training Considerations

Introduction

The Planning Orientation curriculum area provides an introduction to hazardous materials and terrorist incident response planning, with an emphasis on the need for planning and the benefits to be derived. Instruction should to help individual students identify their roles and responsibilities in the planning process, and motivate them to participate fully and effectively as planning team members. Desired training competencies include an awareness level understanding of general hazardous materials and terrorist incident planning concepts, processes, and legal requirements. No previous knowledge is assumed, and no skill development should be attempted. Training should result in a positive attitudinal change and the achievement of a general understanding of the planning function.

Audience

The primary training audience for Planning Orientation includes all potential participants in the hazardous materials and terrorist incident planning process from jurisdictions, government and response agencies, community services organizations, private sector facilities and transporters, and other businesses and industries. Specifically included are elected and appointed officials, CEOs, program mangers, and others who are able to influence jurisdictional and organizational planning priorities and resources. In addition, training is encouraged for the broad spectrum of persons who have a “stake” in planning, i.e., they may be impacted by the results of planning, although they have no defined role in the actual development of emergency plans. Thus, audience members might include:

- Jurisdiction and facility planning team members
- LEPC and SERC members
- Local and state government officials, including elected and appointed
- Facility owners and managers
- Representatives of government and response agencies, including SOP writers
- Representatives of community support services and volunteer organizations
- Emergency responders and mitigation/prevention personnel
- Citizens in the impacted planning jurisdiction
- Special interest and advocacy groups
- Emergency program managers

Methodology Recommendations

The typical training delivery format for Planning Orientation is a brief (one to four hours) presentation or seminar led by an experienced and dynamic facilitator. Whenever possible, the audience should include representatives from a broad range of organizations and disciplines, thereby promoting a heightened understanding of the diverse interests and requirements associated with hazardous materials and terrorist incident response planning. Since training should motivate and encourage attitudinal change, the use of presentation graphics and instructional media (slides, videotapes, etc.) is particularly appropriate. Other considerations include:

- Training must be tailored to audience needs, recognizing that some students may have no understanding of emergency management or the challenges associated with interdepartmental planning and coordination.
- When possible, training should permit group interactions and foster initial team building.
- Training experiences should be practical and constructive to promote positive attitudinal change. The discussion of hazardous materials and terrorist threats, which is important to focus attention and clarify program need, should emphasize positive solutions through community and industrial planning and cooperation.
- Course materials should include local examples and issues to help generate interest and participation in local planning processes.
- Recruitment of students may be an issue due to lack of preexisting interest in the subject. “Teaser” programs and strategies to peak community interest and enrollment may be appropriate.

PLANNING Training Issues | Planning Orientation Training Guidance | Planning Essentials Training Guidance | Planning Specialties Training Guidance: Planning Specialties Introduction | Commodity Flow Studies | Hazard Analysis | Capability Assessment | Planning for Protective Actions | Plan Implementation & Maintenance | Facility Planning | Planning for Public Education | Appendix A Planning Guide Summaries | Appendix B Planning Models | Appendix C Planning for Terrorist Incidents | Appendix D NRT ICP Guidance

Recommended Training

Planning Orientation

The following instructional objectives describe student competencies recommended for orienting planning team members and others to the subject of hazardous materials and terrorist incident response planning. The legislative and regulatory basis for this training can be found primarily in the requirements specified in OSHA 1910.120 for development of employers' emergency response plan, SARA Title III for development of planning jurisdiction emergency response plans, and various federal agency regulations for development of facility and transporter emergency response plans. Sources for the material include the planning guidance in FEMA SLG 101, NRT-1, and other reference documents, the most important of which are described in the Appendices. The objectives are designed to be comprehensive, i.e., to address the training requirements of all identified audience members; thus, training developers and instructors will need to tailor these objectives to meet local audience interests, needs, and planning processes.

ORIENT-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as ORIENT-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
ORIENT-1	Given a description of potential hazardous materials and terrorist incident risks, explain the purpose and benefits of integrated hazardous materials emergency planning, and describe typical roles and participants in the emergency management system.
ORIENT-1.1	Describe the nature of the hazardous materials and terrorist incident threat and associated risks for the government, industry, and community, including the relationship between natural and technological hazards.
ORIENT-1.2	Describe the purpose and benefits of a comprehensive and integrated approach to hazardous materials and terrorist incident response planning, including the relationships among plans, SOPs, and exercises.
ORIENT-1.3	Describe the roles and general responsibilities of federal, state, and local government agencies and private sector organizations in integrated hazardous materials and terrorist incident preparedness, response, recovery, and mitigation/prevention.
ORIENT-2	Given a jurisdiction or facility with the need to develop an integrated hazardous materials plan, identify legal requirements impacting the planning process and product.

Recommended Training

ORIENT-2.1 Identify hazardous materials planning requirements for state and local jurisdictions contained in the following authorities:
- Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended
- Title III of the Superfund Amendments Reauthorization Act (SARA)
- Hazardous Materials Emergency Planning Guide (NRT-1)
- OSHA 29 CFR 1910.120 and EPA 40 CFR

ORIENT-2.2 List legislation and regulations that affect facility planning requirements, including:
- EPA's Oil Pollution Prevention Regulation (SPCC and Facility Response Plan Requirements)— 40 CFR part 112.7(d) and 112.20 to 112.21
- MMS's Facility Response Plan Regulation—30 CFR part 254
- RSPA's Pipeline Response Plan Regulation—49 CFR part 194
- USCG's Facility Response Plan Regulation—33 CFR part 154, subpart F
- EPA's Risk Management Programs Regulation—40 CFR part 68
- OSHA's Emergency Action Plan Regulation—29 CFR 1910.38(a)
- OSHA's Process Safety Standard—29 CFR 1910.119
- OSHA's HAZWOPER Regulation—29 CFR 1910.120
- EPA's Resource Conservation and Recovery Act Contingency Planning Requirements—40 CFR part 264, subpart D, 40 CFR part 265, subpart D, and 40 CFR part 279.52

ORIENT-2.3 Describe the characteristics and advantages of all-hazard planning and hazard-specific planning.

ORIENT-3 Given the assignment to conduct hazardous materials and terrorist emergency planning, identify the scope and elements of an integrated hazardous materials and terrorist incident emergency plan.

ORIENT-3.1 Define the scope (in terms of types of emergencies and functions to be addressed) of an integrated hazardous materials and terrorist emergency plan for a jurisdiction or facility.

ORIENT-3.2 Identify the elements of an integrated hazardous materials and terrorist emergency plan that are necessary to meet local, state, and federal requirements and guidelines.

ORIENT-4 Given the assignment to conduct hazardous materials and terrorist incident emergency planning, identify and describe the major steps, participants, and other resources needed in the planning process.

Note: Various explanations of the planning process can be found in the literature, including those described in the Guide for All-Hazard Emergency Operations Planning (FEMA SLG 101), Hazardous Materials Emergency Planning Guide (NRT-1), Technical Guidance for Hazards Analysis (EPA/FEMA/DOT), Handbook of Chemical Hazard Analysis Procedures (FEMA/DOT/EPA), and Emergency Management Guide for Business & Industry (FEMA 141), and NRT's Integrated Contingency Plan Guidance. These approaches to planning, which are briefly described in Appendix B, incorporate the generic functional requirements of planning, although the steps and procedures may be defined somewhat differently. Jurisdictions and facilities should select and/or modify these models to best meet their unique planning needs and preferences.

ORIENT-4.1 Identify and describe the major steps in the planning process to be used.

ORIENT-4.2

Identify participants and other resources needed for the planning process.

ORIENT-5

Given an assignment to participate in or support integrated hazardous materials and terrorist incident response planning, develop strategies for promoting planning.

ORIENT-5.1

Describe the participant's role, responsibilities, and work requirements in the integrated hazardous materials and terrorist incident response planning process.

ORIENT-5.2

Identify related information and training needs, available resources, contacts, and possible obstacles or constraints.

ORIENT-5.3

Develop strategies for promoting planning.

Hazardous Materials and Terrorist Incident Response Planning

Training Guidelines

Planning Essentials

General Training Considerations

Introduction

The Planning Essentials curriculum provides participants with the knowledge and skills they need to develop a basic integrated hazardous materials and terrorist incident emergency plan for a jurisdiction or facility. The primary training audience is local planning team members. Training objectives cover a broad range of generic competencies, including the ability to function effectively in a team environment, assist in or conduct a basic hazards analysis and capability assessment, work with others to analyze options and draft sections of the plan, and participate in plan implementation, evaluation, and maintenance.

Planning Essentials covers basic skills, with an emphasis on the ability to interpret and use information provided by various technical specialists in developing the plan. More advanced planning skills are addressed in Planning Specialties. Audience members are assumed to already possess training competencies covered in Planning Orientation and an expertise in the professional discipline that the student represents on the planning committee. It is further assumed that managerial, administrative, and logistic requirements for organizing the planning process, including staff recruitment and assignments, have already been accomplished. The training competencies for senior management of the overall planning process are addressed separately in this guidance as a planning specialty area.

Audience

The training audience for Planning Essentials includes planning team members who have a defined responsibility in researching, preparing, implementing, and maintaining hazardous materials and terrorist incident response plans for jurisdictions or facilities. These persons generally represent their organization or functional specialty in an integrated planning process. Audience categories can be summarized as follows:

- For communities, training audiences may include local government emergency planners, SERC/LEPC and Area Committee members, hazardous materials officers and team leaders, emergency program managers, public sector agency representatives, community support services and volunteer organization representatives, and various technical specialists.

- For private sector facilities, audience members may include industry owners and executives, general planners, production/process managers, functional managers (e.g., communications, public information, emergency response, etc.), safety officers, technical experts, and others employed by the facility.

- Personnel who have responsibilities for reviewing and approving facility plans and/or enforcing compliance with existing community regulations and standards may also benefit by training.

Methodology Recommendations

It is recognized that the planning needs of different jurisdictions and facilities, and the resulting training needs of planning team members, can vary greatly, depending on such factors as geographic size, demographics, hazards, local resources, and political preferences. <u>However, Planning Essentials is intended to address the generic training requirements of all hazardous materials and terrorist incident response planners.</u> Training managers, course developers, and instructors may need to tailor materials to meet the unique needs and interests of different audiences, incorporating elements covered in Planning Specialties, as appropriate.

Training can typically be accomplished in two to four days of classroom instruction led by an experienced facilitator. Breaking training into modules (e.g., Hazards Analysis) that are delivered at different times is also possible, and this approach may be beneficial if timed to coincide with planning team assignments. However, team building is very important in the planning process, so continuity of student groupings throughout training is recommended. Other training considerations include the following:

- Training should focus on the actual development of local plans, with the product and participation in the group planning process used to demonstrate student mastery of the objectives.

- Audience should be heterogeneous, reflecting the diverse community members and professional disciplines involved in the planning process. It is highly recommended that team members who will work together in subsequent planning efforts be trained together as a team.
- Course methodology should emphasize group interactions, team building, and resolution of interpersonal conflicts, as well as the development of the plan product itself.
- Course materials should be multi-tracked in terms of type of plan (OSHA, SARA, etc.) to facilitate tailoring the instruction to the needs of the audience.
- Instruction should include practical strategies for merging local plan requirements and needs (i.e. merging several plan requirements into one development effort) to foster more efficient planning efforts.
- Instruction should emphasize the need for on-going planning commitments by the team and the organizations they represent.
- Instruction should emphasize the need for ongoing evaluation at each step in the planning process.
- Instructors should emphasize that steps in the planning process, although taught sequentially, may actually be performed simultaneously.

Recommended Training

Planning Essentials

The following instructional objectives describe competencies recommended for training planning team members and others in the essentials of hazardous materials and terrorist incident response planning. The legislative and regulatory basis for this training can be found primarily in the requirements specified in OSHA 1910.120 for development of employers' emergency response plan, SARA Title III for development of planning jurisdiction emergency response plans, and various federal agency regulations for the development of facility and transporter emergency response plans. The objectives incorporate generic concepts and processes derived from various sources in the planning literature. Several of the most important reference documents, and more specific models for planning, are described in the Appendices. The objectives are intended to be comprehensive, i.e., to address the training requirements of all identified audience members; thus, training developers and instructors will need to tailor these objectives to meet local audience interests, needs, and planning processes.

ESSN-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as ESSN-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
ESSN-1	Given an assignment as a planning team member and an overview of the planning process to be used, describe an appropriate planning strategy and identify team member responsibilities in the process.

Recommended Training

ESSN-1.1 Describe the benefits of a team approach to planning and identify skills necessary to participate in the team planning process.

ESSN-1.2 Identify team members with related roles, coordination requirements, available resources, and administrative support systems.

ESSN-1.3 Describe roles of participants in the team planning process, to include organizational and/or functional areas of responsibility.

ESSN-1.4 Demonstrate an understanding of the planning process mission statement, goals, and objectives.

ESSN-1.5 Describe the expected results of the planning process, to include the plan format and time lines.

ESSN-2 Given a review of pertinent information sources and data collection methods, demonstrate the ability to identify, acquire and summarize background information related to individual organizational and/or functional area(s) of responsibility that will impact the team planning process.

ESSN-2.1 Demonstrate the ability to identify, gather, and review copies of policies, plans, and authorities (e.g., community Emergency Operations Plans, mitigation/prevention plans, response agency SOPs, facility plans, codes and ordinances, etc.).

ESSN-2.2 Demonstrate the ability to review critiques of actual incidents, exercises, and drills and identify issues to be addressed in the plan.

ESSN-2.3 Demonstrate the ability to review changes and trends impacting the jurisdiction, organization, or facility and identify issues to be addressed in the plan.

ESSN-2.4 Demonstrate the ability to interview managers, public officials, technical specialists, and practitioners in organizations affected by the plan and identify issues to be addressed in the plan.

ESSN-2.5 Identify, aggregate, and summarize related planning issues, priorities, concerns, and challenges.

ESSN-3 Given an assignment as a planning team member and an overview of the planning process to be used, identify and describe the purpose, benefits, major steps, and participant's role in Hazards Analysis & Capability Assessment.

ESSN-3.1	Explain the purpose, benefits, and major steps in conducting a Hazards Analysis.
ESSN-3.2	Explain the purpose, benefits, and major steps in conducting a Capability Assessment.
ESSN-3.3	Identify responsibilities in the Hazards Analysis & Capability Assessment processes, as appropriate.
ESSN-3.4	Describe the methods and expected results of the Hazards Analysis & Capability Assessment processes, including roles of various planning team members and technical specialists.
ESSN-4	Given an assignment as a planning team member and an overview of the planning process to be used, demonstrate the ability to identify, collect, review and interpret the Hazards Analysis & Capability Assessment data.
ESSN-4.1	Demonstrate the ability to collect or assist in collecting the data, as required.
ESSN-4.2	Demonstrate the ability to review and interpret the data.
ESSN-4.3	Demonstrate the ability to identify, map, and prioritize hazards, risk areas, and vulnerable zones, and identify capability shortfalls and excesses (gap analysis).
ESSN-5	Given an assignment as a planning team member and the results of research and input from other planning team members, describe the issues and solutions to be addressed in the plan and identify needed assignments for developing the plan.
ESSN-5.1	Describe issues and solutions to be addressed in the plan by examining existing plans, Hazards Analysis results, Capability Assessment results and other pertinent information.
ESSN-5.2	Identify plan development tasks to be assigned to planning team and other organizational representatives.
ESSN-6	Given identified issues and solutions to be addressed in the plan and assignments to planning team members, demonstrate the ability to participate in developing or updating the Integrated Hazardous Materials and Terrorist Incident Response Emergency Plan, to address preparedness, response and short term recovery.
ESSN-6.1	Identify the planning elements necessary to comply with regulatory requirements, standards, and guidelines.

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ESSN-6.1.1	If developing or updating a jurisdictional plan, describe format guidelines specified in SLG-101 and NRT-1.
ESSN-6.1.2	If developing or updating a facility or organization plan, describe format guidelines specified in the NRT's Integrated Contingency Plan guidance.
ESSN-6.2	Demonstrate the ability to develop or update the plan to meet the required regulatory elements.
ESSN-7	Given identified issues and solutions to be addressed in the plan and assignments to planning team members, demonstrate the ability to participate in developing or updating a comprehensive prevention/mitigation section in the plan.
ESSN-7.1	Identify prevention/mitigation strategies and techniques to address the identified issues and solutions.
ESSN-7.2	Demonstrate the ability to write the plan to meet all identified prevention/mitigation planning needs.
ESSN-8	Given a completed draft hazardous materials plan, demonstrate the ability to participate in the plan review and appraisal process.
ESSN-8.1	Identify the purpose and benefits of reviewing the plan.
ESSN-8.2	Demonstrate the ability to conduct an internal draft plan review to assess adequacy and completeness.
ESSN-8.3	Demonstrate the ability to facilitate an external review of the draft plan, which may include peer review, management review, community input, and state/federal review.
ESSN-8.4	Demonstrate the ability to make necessary revisions, and promote formal plan promulgation.
ESSN-9	Given a completed hazardous materials and terrorist incident response plan, describe an appropriate strategy and identify methods for implementing the plan.
ESSN-9.1	Identify the purpose and benefits of conducting plan implementation.

ESSN-9.2	Identify roles and responsibilities for plan implementation, to include available resources, administrative systems, and time lines.
ESSN-9.3	Describe the strategy and methods for plan implementation, to include: • Disseminating copies of the plan • Briefing and orienting users of the plan • Coordinating the plan with other planning efforts • Coordinating the plan with other training efforts
ESSN-10	Given a completed hazardous materials plan, describe an appropriate strategy and identify methods for evaluating and maintaining the plan.
ESSN-10.1	Identify the purpose and benefits of conducting plan evaluation and maintenance.
ESSN-10.2	Identify roles and responsibilities for plan evaluation and maintenance.
ESSN-10.3	Describe the strategy and methods for plan evaluation and maintenance, to include: • Monitoring changes, trends, and actual events impacting the plan • Developing, conducting, and evaluating exercises and drills • Periodically updating and revising the plan

Hazardous Materials
Planning Curriculum Guidelines:

Planning Specialties
Introduction

Introduction

Recognizing that many skills are needed to support the planning process beyond those involved in basic plan development, the Planning Specialties curriculum has been organized to articulate additional, often more advanced learning competencies. It is anticipated that state and local planning needs and training requirements will vary considerably in these specialty areas. Hence, the curriculum supports selective focused training by jurisdictions in only those specialty skill areas where training is needed at any given time.

The list of specialty areas included in the curriculum is intended to reflect the prevailing needs of state and local training organizations. It is anticipated that more specialty areas will be defined over time, and some may be eliminated or modified as needs change. Specialty skill training areas identified for the current edition of the *Guidelines* include the following:

- Commodity Flow Study
- Hazards Analysis
- Capability Assessment
- Planning for Protective Actions
- Plan Implementation and Maintenance
- Facility Planning
- Planning for Public Education

Other topics planned or under discussion include Organizing the Planning Process, Planning Information Management, Exercising the Plan, SOP Writing, Illicit Use of Hazardous Materials, Liability Issues in Hazardous Materials, Marketing the Plan, and Public Information/Education Programs. Recommendations or feedback on the selection of topic areas for inclusion in future editions of the *Guidelines* should be directed to William Lewis, Emergency Management Institute, FEMA.

Audience:

The training audience for the Planning Specialties curriculum includes jurisdiction and/or facility hazardous materials planning team members that have been assigned responsibilities requiring advanced level knowledge and skills, i.e., exceeding that needed to develop a basic plan as defined in Planning Essentials. Included are representatives of local government and response agencies, community services organizations, private sector facilities and transporters, and other businesses and industries. Since audience members will vary somewhat according to the topic, they are defined in more detail for each specialty area. However, a generic listing might include:

- Jurisdiction and facility planning team members
- LEPC and SERC members
- Facility owners and managers
- Representatives of government and response agencies
- Representatives of community support services and volunteer organizations
- Mitigation/prevention personnel
- Consultants and technical experts
- Emergency program managers

Methodology Recommendations

The typical training delivery format for Planning Specialties is a one to two day course led by an experienced instructor. However, more or less time may be appropriate, depending on the subject area, degree of complexity, and related planning requirements. Training managers may also wish to combine Planning Specialties modules for audiences that need training in more than one area, or add one or more modules to Planning Essentials. Other training considerations include the following:

- Audience members are assumed to already possess basic competencies in hazardous materials plan development. Otherwise, experience and expertise among audience members may vary significantly.

- Training should be tailored to audience needs, focusing on the specific jurisdiction's or facility's planning requirements and individual assignments in the planning process.

- Course materials should include local examples, and activities should be based on local issues and data to the extent possible.

- Where local teams are conducting complex studies, members should be trained concurrently, and training should permit group interactions and foster team building.

More information on training scope, audiences, and appropriate methodologies is presented on subsequent pages for each specialty topic area.

Hazardous Materials and Terrorist Incident Response Planning

Curriculum Guidelines:

Commodity Flow Study

General Training Considerations

Scope/Objectives of Training

Most communities, whether large or small, are origins, destinations, or through-routes for hazardous materials transportation. In order to plan and prepare for possible hazardous materials and terrorist transportation incidents , planners need basic data on the types and quantities of chemicals transported through the jurisdiction. The process of acquiring and analyzing this information, referred to here as a commodity flow study, is one of the first steps in preparing a community's integrated hazardous materials emergency plan. Results can be used to analyze current traffic patterns, focus planning efforts on existing needs, and reduce the potential for incidents to occur.

This training specialty area builds on Planning Essentials competencies to provide participants with the knowledge and skills they need to prepare a simple commodity flow study. Content areas covered by training should include the purpose and benefits of conducting commodity flow studies, an overview of appropriate data collection methods, generic steps in the process, related statistical concepts, and sources of additional assistance and information. Where appropriate, more specific models and procedures followed by the jurisdiction can be introduced. Applications and limitations of the study results in the planning process should also be reviewed.

Audience

Potential training audiences include all participants in the planing process that have been assigned responsibility for conducting a commodity flow study that exceeds the competencies covered under Planning Essentials. Possible audience members include:

– Community planning team members
– Facility planners and managers
– Response agency representatives
– Prevention personnel, transport inspectors
– Technical experts and consultants

Prerequisites or Presumed Prior Knowledge/Skills of Students

Students are assumed to possess Planning Orientation and Planning Essentials levels of competency in hazards analysis and related skills. Consideration should be given to students that have a defined responsibility for conducting a commodity flow study for a jurisdiction as a regular part of their job.

Typical Program Format

Seminar-type instructor-led program, approximately one to two days in length. Longer programs may be appropriate where more complex commodity flow studies are planned or when actual field surveys are included as training activities.

Methodology and Training Delivery Considerations

Training should provide students with knowledge of the steps and components of a generic commodity flow study, and skill in performing various data collection methods. Trainees must understand the significance and application of commodity flow study information, and develop the ability to recognize and develop useful and meaningful data on which to base subsequent emergency operations and prevention programmatic and organizational decisions.

Much of the subject matter in this specialty area can be introduced through self-study, but training should include formal classroom instruction with time spent in individual and small group work. Activities should focus on skill development in identifying, collecting, and interpreting various types of commodity flow data, and in using this information in the planning process. Limited field surveys, reviews of shipping papers, role plays of driver interviews, etc. are particularly appropriate for promoting learning. Realistic local situations and scenarios should be used as the basis for activities, when possible.

Integration of the information learned by trainees can be demonstrated in a post-class activity involving the development of a limited commodity flow study based on data from the jurisdiction or scenarios provided by the instructor. For this reason, members of jurisdictional planning teams should be trained together, if possible, using the planned study as the basis for activities. Content testing is appropriate for demonstrating knowledge of the steps involved in a commodity flow study and methods of data collection.

Objective Identification Legend

CFS-1

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as CFS-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
CFS-1	Given a jurisdiction with the need to develop an integrated hazardous materials emergency plan, describe the purpose and benefits of conducting a commodity flow study, including appropriate applications of the results in planning.
CFS-1.1	Describe the purpose and benefits of conducting a commodity flow study in hazardous materials planning.
CFS-1.2	Describe appropriate applications of the results of commodity flow studies in hazardous materials planning.
CFS-2	Given an assignment to conduct a commodity flow study for a jurisdiction, identify major steps in the process, such as the following: (1)Identify the specific purpose(s) of the study. (2)Review baseline information appropriate to the study. (3)Design the study. (4)Conduct field surveys. (5)Analyze the results. (6)Apply the results to the study purpose and objectives.
CFS-3	Given an assignment to conduct a commodity flow study for a jurisdiction, identify the specific purpose(s) of the study.
CFS-3.1	Assess the emergency management needs and other possible applications and uses for hazardous materials transportation data in the jurisdiction.
CFS-3.2	Identify the specific types of hazardous materials transportation data needed for the study.

Recommended Training

CFS-4	Given the specific purpose(s) of a commodity flow study for a jurisdiction, demonstrate the ability to identify and review existing baseline information appropriate to the study.
CFS-4.1	Describe common sources of existing information that can be used to identify roads available to hazardous materials transportation.
CFS-4.2	Describe common sources of existing information on vehicle traffic patterns, chemical flows, and accident histories in the jurisdiction.
CFS-5	Given the specific purpose(s) and baseline data of a commodity flow study for a jurisdiction, demonstrate the ability to design a field investigation appropriate to the study.
CFS-5.1	Compare baseline information with project goals to determine whether a field investigation should be undertaken.
CFS-5.2	Identify options and considerations for determining survey locations.
CFS-5.3	Identify options and considerations for determining survey times and repetitions.
CFS-5.4	Identify the personnel and other resource requirements associated with selected field survey methods.
CFS-6	Given an area to be surveyed and the commodity flow study design for a jurisdiction, demonstrate the ability to implement common data collection methods.
CFS-6.1	Describe common methods and demonstrate the appropriate use of placard surveys.
CFS-6.2	Describe common methods and demonstrate the appropriate use of shipping papers reviews.
CFS-6.3	Describe common methods and demonstrate the appropriate use of driver interviews.
CFS-6.4	Describe common methods and demonstrate the appropriate use of facility surveys.
CFS-6.5	Describe the advantages and disadvantages of various data recording procedures that can be used in field surveys.
CFS-7	Given hazardous materials transportation data for a jurisdiction, demonstrate the ability to apply appropriate sampling techniques to the collection and interpretation of the data.
CFS-7.1	Describe key statistical concepts (e.g., Poisson distribution, expected and observed value, confidence intervals) relevant to traffic flow analysis.
CFS-7.2	Make appropriate conclusions and inferences based on sample characteristics and collected data.

CFS-8	Given hazardous materials transportation data and analyses for a jurisdiction, demonstrate the ability to apply the results in planning.
CFS-8.1	Map or otherwise display and report the results of the commodity flow study to obtain a clear picture of hazardous materials transportation in the jurisdiction.
CFS-8.2	Compare the study results and project goals to identify action items and a schedule for implementing them through the jurisdiction's plan development and implementation process.

Hazardous Materials and Terrorist Incident Response Planning

Curriculum Guidelines:

Hazards Analysis and Threat Assessment

General Training Considerations

Scope/Objectives of Training

A hazards analysis and threat assessment includes (1) identifying hazards associated with the storage, handling, processing and transportation of hazardous materials, (2) identifying potential targets of terrorism within the jurisdictional area, (3) conducting a vulnerability analysis to identify people, property, and environments susceptible to damage should a hazardous materials release or related terrorist incident occur, and (4) conducting a risk analysis to determine the probability of various types of emergencies and estimates of resulting damage.

Training should provide the knowledge and skills necessary to conduct a comprehensive hazards analysis/ threat assessment for a jurisdiction or facility. Skill development should include the ability to assess the jurisdiction's or facility's hazards analysis/threat assessment needs, determine appropriate methods, collect and interpret data, and report the results. Specifically included is the use of tables and other tools for determining the level of concern, establishing hazard and vulnerability zones, and identifying related priorities. More sophisticated and technical approaches to hazards analysis may also be covered, if appropriate, or references provided for additional training and assistance.

Audience

Potential training audiences are all participants in the planing process that have been assigned responsibility for conducting a hazards analysis/threat assessment that exceeds the competencies covered under Planning Essentials. Possible audience members include:

– Community planning team members
– Facility planners and managers
– Response agency representatives
– Federal counter-terrorism planning team members
– Prevention personnel
– Technical experts and consultants

Prerequisites or Presumed Prior Knowledge/Skills of Students

Students are assumed to possess Planning Orientation and Planning Essentials levels of competency in hazards analysis. Consideration should be given to students that have a defined responsibility for conducting higher level hazards analyses for a jurisdiction or facility as a regular part of their job.

Typical Program Format

Seminar-type instructor-led program, approximately one to two days in length. Longer programs may be appropriate where more complex studies are planned or when actual field surveys are included as training activities. Training managers may wish to combine this instruction with a module on capability assessment for audiences that perform both tasks.

Methodology and Training Delivery Considerations

The successful accomplishment of training objectives should result in enhanced student proficiency in applying the principles of hazards analysis and threat assessment to a specific jurisdiction's or facility's planning needs and processes. Training should focus on developing knowledge of the steps and components of hazards analysis and threat assessment, and on developing skill in performing hazard identification, potential target identification, vulnerability analysis, and risk analysis. Trainees must understand the significance and application of hazards analysis and threat assessment information, and develop the ability to recognize and develop useful and meaningful data on which to base subsequent emergency operations planing and prevention programmatic and organizational decisions.

Much of the content for analyzing hazards and assessing threats can be introduced through self-study, but training should include formal classroom instruction with significant time spent in individual and small group work. Activities should focus on skill development in extracting hazard identification and vulnerability information from available data sources, using threat alert histories in identifying possible terrorist targets, determining vulnerable zones and potential terrorist targets from maps and hazard data, and performing the analyses leading to accurate risk determination. Content testing is appropriate for demonstrating knowledge of the steps involved in hazards analysis and threat assessment, listing types of hazard and threat information, and identifying the components of a completed hazards analysis and threat assessment.

Because of the interdisciplinary nature of hazards analysis and threat assessment work, training audiences should be heterogeneous and, whenever possible, small-group work should be conducted to encourage cross-disciplinary interactions. Integration of the information learned by the trainee can be demonstrated in a post-class activity involving the development of a limited hazards analysis and threat assessment using data from the trainee's home jurisdiction or facility, or scenarios provided by the instructor. Members of planning teams that are conducting a complex hazards analysis and threat assessments should be trained together, if possible, with student activities based on actual work responsibilities and assignments.

HAZAN-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as HAZAN-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended*** *Training Objectives*
HAZAN-1	Given an assignment to conduct a hazards analysis and threat assessment for a jurisdiction or facility, describe the process to be used for conducting the study.
HAZAN-1.1	Describe the purpose and benefits of conducting a hazards analysis and threat assessment, including appropriate applications of the results in planning.
HAZAN-1.2	Describe the basic steps in a hazards analysis and threat assessment (hazards identification, threat identificatoin, vulnerability analysis, risk analysis).
HAZAN-1.3	Identify types and sources of information commonly used in hazards analysis and threat assessment.
HAZAN-2	Given an assignment to conduct a hazards analysis and threat assessment for a jurisdiction or facility, demonstrate the ability to identify hazards and situations that pose a serious threat in the planning area.
HAZAN-2.1	Describe the process and data sources to be used for hazards and threat identification.
HAZAN-2.2	Identify the location of hazardous materials facilities and major transportation routes within the planning area.
HAZAN-2.3	Identify the types, quantities, and specific locations of hazardous materials used by facilities within the planning area.

Recommended Training

HAZAN-2.4	Identify the types and quantities of hazardous materials transported in or through the planning area.
HAZAN-2.5	Assess the storage conditions of hazardous materials in the planning area (e.g., containment, packaging, security, release detection).
HAZAN-2.6	Identify the nature of hazards (e.g., flammable, explosive, toxic) most likely to accompany hazardous materials spills or releases.
HAZAN-2.7	Identify types of terrorist targets for each of the following areas within a jurisdiction: transportation system and commuting routes, public works facilities, public gathering areas, high risk hazardous materials facilities and storage areas, communications systems, targets with high economic impact, and areas of symbolic or historical value.
HAZAN-3	Given the results of the hazard identification and threat assessment, demonstrate the ability to analyze and map the vulnerability of people, property, business interests, and environments in the planning area.
HAZAN-3.1	Describe the process and data sources to be used for vulnerability analysis.
HAZAN-3.2	Identify methods to screen and prioritize hazards for more in-depth analysis.
HAZAN-3.3	Identify the level of concern for chemical hazards.
HAZAN-3.4	Estimate the credible worst-case scenario for hazardous materials and terrorist incident threats.
HAZAN-3.5	Determine the extent of vulnerable zones for identified hazards using worst-case scenarios.
HAZAN-3.6	Map vulnerable zones, and identify conditions that influence the zone of impact.
HAZAN-3.7	Identify susceptible human populations, property, business interests, and environments in the vulnerable zone, including high-risk populations, critical facilities, and sensitive environments.
HAZAN-4	Given a hazard identification, threat assessment and vulnerability analysis for a community or facility, demonstrate the ability to assess the risk of injury or damage due to a hazardous materials release or terrorist incident in the planning area.
HAZAN-4.1	Describe the process and data sources to be used for risk assessment.
HAZAN-4.2	Estimate the probability of occurrence of worst-case scenarios, and describe unusual conditions, such as the possibility of simultaneous incidents.
HAZAN-4.3	Assess community and facility safeguards, response capabilities in place, and incident histories (as necessary).
HAZAN-4.4	Describe the type of harm to human populations and damage to property, business interests, and environments expected in worst-case situations.

HAZAN-4.5

Categorize, prioritize, and/or rank hazards and threats for planning, as appropriate.

HAZAN-5

Given the hazard and threat identification, vulnerability analysis, and risk assessment for a community or facility, demonstrate the ability to prepare a comprehensive hazard analysis and threat assessment report.

HAZAN-5.1

Identify and describe hazards, threats and related conditions in the planning area.

HAZAN-5.2

Describe the vulnerability of populations, property, business interests, and environments to hazardous materials and terrorist threats in the planning area.

HAZAN-5.3

Describe the risk of injury and/or damage from hazardous materials and terrorist incidents in the planning area, and prioritize risks for planning, as appropriate.

Hazardous Materials and Terrorist Incident Response Planning

Curriculum Guidelines:

Capability Assessment

General Training Considerations

Scope/Objectives of Training

A capability assessment provides information designed to help the planning team evaluate preparedness, prevention, and response resources and capabilities. It includes an assessment of fixed site business and industry resources, transportation resources, and community (response and government agency) resources that could be called upon in the event of a potential emergency identified in the jurisdiction's or facility's hazards analysis.

Training should provide the knowledge and skills necessary to conduct a capability assessment for a jurisdiction or facility. Skill development should include the ability to assess the jurisdiction's or facility's capability assessment needs, determine appropriate methods, collect and interpret data, and report the results. Specifically included is the use of checklists, criteria, surveys, and other methods to identify available resources, determine requirements for accessing them, evaluate deficiencies in existing plans and procedures, and assess the effectiveness of emergency response, prevention, and recovery efforts. The successful accomplishment of training objectives should result in enhanced student proficiency in applying general principles of capability assessment to specific jurisdiction or facility planning needs and processes.

Audience

Potential training audiences include all participants in a jurisdiction or facility planing process that have been assigned responsibility for conducting a capability assessment study. Possible audience members include:

– Community planning team members
– Facility planners and managers
– Response agency representatives
– Prevention personnel
– Technical experts and consultants

Prerequisites or Presumed Prior Knowledge/Skills of Students

Students are assumed to possess Planning Orientation and Planning Essentials levels of competency in capability assessment. Consideration should be given to students that have a defined responsibility for conducting a higher level capability assessment as a regular part of their job for a jurisdiction or facility.

Typical Program Format

Seminar-type instructor-led program, approximately one to two days in length. Longer programs may be appropriate where more complex studies are planned or when actual field surveys are included as training activities. Training managers may wish to combine this instruction with a module on hazard analysis for audiences that perform both tasks.

Methodology and Training Delivery Considerations

Training should focus on providing knowledge of the steps and components of a comprehensive capability assessment and on developing related skills. Trainees must understand the significance and application of capability assessment information, and develop the ability to recognize and develop useful and meaningful data on which to base subsequent emergency operations planing and prevention programmatic and organizational decisions.

Much of the content for assessing capabilities can be introduced through self-study, but training should include formal classroom instruction with significant time spent in individual and small group work. Activities should focus on skill development in extracting capability assessment information from available data sources, identifying and assessing existing resources, assessing the effectiveness of emergency management activities, and identifying and evaluating planning shortfalls.

Integration of the information learned by the trainee can be demonstrated in a post-class activity involving the development of a limited capability assessment based on the hazards analysis and resource data from the trainee's home jurisdiction or facility, or from scenarios provided by the instructor. Content testing is appropriate for demonstrating knowledge of the steps involved in capability assessment, listing types of community and facility resources, and identifying the components of a completed capability assessment.

CAP-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as CAP-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
CAP-1	Given an assignment to conduct a capability assessment for a jurisdiction or facility, describe the process to be used for conducting the study.
CAP-1.1	Describe the purpose and benefits of conducting a capability assessment, including appropriate applications of the results in planning.
CAP-1.2	Describe the advantages and disadvantages of alternative methods for conducting the capability assessment (checklists, criteria, surveys, expert panels, etc.).
CAP-1.3	Identify specific types and sources of information needed to conduct the capability assessment.
CAP-2	Given the process to be used for conducting a capability assessment for a jurisdiction or facility, assess the adequacy of existing resources to support preparedness, prevention/ mitigation, response, and short-term recovery activities.
CAP-2.1	Determine the type, amount, capabilities, and accessibility of existing facility resources.
CAP-2.2	Determine the type, amount, capabilities, and accessibility of existing transporter resources.
CAP-2.3	Determine the type, amount, capabilities, and accessibility of existing community resources.
CAP-3	Given hazardous materials and terrorist incident response plans and SOPs, a completed hazard and threat analysis, an evaluation of existing resources, critiques of incidents, exercises, and drills, and other pertinent information, demonstrate the ability to assess the jurisdiction's or facility's capability to prepare for, respond to, and recover from worst-case incidents identified in the hazard analysis.

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CAP-3.1	Evaluate response issues and concerns identified through surveys and reviews of hazardous materials incident critiques, exercises, and drills.
CAP-3.2	Assess the adequacy of the jurisdiction's or facility's concept of operations, including roles and functional assignments, for responding to and recovering from worst-case incidents.
CAP-3.3	Assess the adequacy of existing resources for implementing the concept of operations in worst-case incidents.
CAP-3.4	Assess the adequacy of organizational policies and SOPs for implementing the concept of operations in worst-case incidents.
CAP-3.5	Assess the level of competency of emergency personnel to respond in worst-case incidents identified in the hazard analysis..
CAP-4	Given hazardous materials and terrorist incident response plans and SOPs, a completed hazard and threat analysis, an evaluation of existing resources, critiques of incidents, exercises, and drills, and other pertinent information, demonstrate the ability to assess the jurisdiction's or facility's capability to prevent or mitigate the effects of identified risks.
CAP-4.1	Evaluate prevention issues and concerns identified through surveys or reviews of hazardous materials incident critiques, exercises, and drills.
CAP-4.2	Assess the adequacy of prevention measures, including roles and functional assignments, for preventing or mitigating the effects of identified risks.
CAP-4.3	Assess the adequacy of existing resources for implementing necessary prevention measures.
CAP-4.4	Assess the adequacy of organizational policies and SOPs for implementing necessary prevention measures.
CAP-4.5	Assess the level of competency of prevention personnel to implement necessary prevention measures.
CAP-5	Given the results of the capability assessment analysis, prepare a comprehensive written report.
CAP-5.1	Describe preparedness, mitigation/prevention, response, and short-term recovery capability shortfalls identified in the analysis.
CAP-5.2	Identify additional resources that may be needed to prepare for, prevent/mitigate, respond to, and recover from worst-case hazardous materials incidents.
CAP-5.3	Describe deficiencies in community and/or facility safety plans and procedures identified in the analysis, and recommend modifications, as appropriate. .

Hazardous Materials and Terrorist Incident Response Planning

Curriculum Guidelines:

Planning for Protective Actions

General Training Considerations

Scope/Objectives of Training:

Planning for protective actions addresses policy and procedures for providing personal protection to the public, including protection in place and evacuation. Considerations include public education, alert and warning systems, the availability of appropriate shelter, the nature and duration of hazardous materials releases, traffic flow and control, reception and care facilities, health and medical services, protection of water and sewage systems, ongoing incident assessment, and other emergency response functions and capabilities.

Training should provide a working knowledge of the benefits and limitations of various protection strategies, including evacuation, in-place protection, and a combination thereof. Participants should gain an understanding of the need for protective action planning and important planning considerations. They should develop the ability to implement a decision-making process for any given hazardous materials emergency or terrorist incident situation and respective protective action options, and learn strategies and techniques for communicating the desired protection action to the general public to elicit the best possible response.

Plans for protective actions must address roles, strategies, and procedures for a broad range of emergency preparedness and response activities. Depending on the jurisdiction's or facility's needs, planning may involve very complex analyses, decisions, and negotiations that must be addressed <u>before</u> incidents occur. Therefore, the goal of training is to give participants the knowledge and skills they need to assess existing capabilities in this area, identify needed resources, and establish systems for promoting effective response in any realistic hazardous materials incident scenario.

Audience:

The training audience includes decision makers, planning team members, SOP writers, and agency and organization representatives with responsibilities related to mass care and protective actions in hazardous materials emergencies. Possible audience members include:

- Community planning team members
- Local Emergency Planning Committees
- Government and response agency representatives
- Facility planners and managers
- Community support services and volunteer group representatives
- Incident Commanders
- Public Information Officers
- Warning Officers
- Emergency Management Officials

Prerequisites or Presumed Knowledge/Skills of Students:

Students should have mastered basic skills in hazardous materials and terrorism incident response planning, and have assigned responsibilities for hazardous materials and terrorist incident response planning for a jurisdiction or facility. They should understand basic concepts of the Incident Command System, public relations and education, and emergency information and warning.

Typical Program Format:

An instructor-facilitated one to two day program with lecture/discussion, student and/or tabletop exercises, and case study reviews. Longer programs may be appropriate where more complex studies, student activities, and field work are planned.

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Methodology and Training Delivery Considerations:

Planning for protective actions requires knowledge and skills in a broad range of disciplines and emergency response functions. Typically, many different government agencies, community organizations, and private sector groups are assigned related responsibilities under the emergency plan. For these reasons, the use of planning teams is particularly suited for this type of planning. Whenever possible, planning teams should be trained together to promote information sharing, inter-organizational understanding, and cooperation. Other considerations include:

– The training competencies identified for this curriculum area assume that a comprehensive hazards and threat analysis and capability assessment have been completed for the jurisdiction or facility. If this assumption is incorrect, training managers may wish to incorporate additional competencies from other planning specialty areas in the instruction.

– Instructional content should stress the interrelationships among planning processes, preparedness activities, response actions, and the public information and education components of emergency management.

– Training methodologies should emphasize small group interactions among various participants in the planning process. Hazardous materials and terrorist incident case examples should be incorporated into the course, using student activities or tabletop exercises to promote and evaluate skill/learning objectives.

– An instructional cadre concept, emphasizing diverse organizational interests and expertise, is particularly appropriate for this type of training.

Objective Identification Legend

EVAC-1

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as EVAC-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
EVAC-1	Given a hazards and threat analysis and capability assessment for a jurisdiction or facility, demonstrate the ability to develop decision-making criteria for implementing protective actions.
EVAC-1.1	Describe the purpose and benefits of various protective action strategies, including evacuation, in-place sheltering, water supply protection, sewage system protection, and relocation.
EVAC-1.2	Compare the advantages and disadvantages of evacuation and in-place protection options for mass care in hazardous materials emergencies.

EVAC-1.3 Identify factors to consider in selecting a protective action strategy in a hazardous materials or terrorist incident situation, including:

- The nature of the threat
- The population at risk
- Time factors involved
- Weather conditions
- Communications
- Response capabilities

EVAC-1.4 Identify and assess resources available for implementing various protective actions, including capabilities of organizations assigned related responsibilities under the plan.

EVAC-1.5 Develop decision-making criteria for implementing protective actions that address evacuation (precautionary, general, and selective), in-place sheltering, and other options in emergency situations identified in the hazards analysis.

EVAC-2 Given the assignment to plan for protective actions for a jurisdiction or facility, demonstrate the ability to assess existing systems, strategies, and procedures for notifying, warning, and informing the public about protective action decisions.

EVAC-2.1 Identify factors that influence the public's understanding of and response to protective actions in hazardous materials emergencies.

EVAC-2.2 Assess existing public education programs for informing the public about protective actions in the event of a hazardous materials emergency, including citizen roles and responsibilities.

EVAC-2.3 Assess existing warning and emergency public notification systems for implementing protective actions in a hazardous materials emergency.

EVAC-3 Given a hazards and threat analysis and capability assessment for a jurisdiction or facility, demonstrate the ability to assess existing systems, strategies, and procedures for evacuating populations at risk in a hazardous material or terrorist incident.

EVAC-3.1 Identify eight considerations when planning an evacuation, as follows:

(1)Emergency scene access and evacuation routes
(2)Areas of responsibility
(3)Geographical area, size and type
(4)Evacuation area
(5)Weather conditions
(6)Transportation
(7)Resisters
(8)Mass care centers and shelters

EVAC-3.2 Identify four constraints to an effective evacuation, as denoted in the Hans and Sells Study conducted for the U.S. Environmental Protection Agency, as follows:

(1)Time delay
(2)Notification time
(3)Mobilization time
(4)Travel time

EVAC-3.3	Identify six steps for implementing the evacuation process, as follows: (1)Form work groups (2)Track personnel assignments (3)Use map coordinates for making assignments (4)Issue evacuation warnings (5)Identify relocation shelters (6)Use the three-phase notification process
EVAC-3.4	Assess systems, strategies, and procedures for moving people out of risk areas (availability of vehicles, evacuation routes and alternatives, controlling traffic, special populations, etc.)
EVAC-3.5	Assess preparedness for reception and care of evacuees (shelter locations, supplies, notifying family members, health and medical care, mutual aid agreements, etc.)
EVAC-3.6	Assess decision-making criteria and procedures for re-entry after an evacuation.
EVAC-4	Given a hazards and threat analysis and capability assessment for a jurisdiction or facility, demonstrate the ability to assess existing systems, strategies, and procedures for implementing in-place sheltering and other protective actions in a hazardous materials or terrorist incident.
EVAC-4.1	Assess systems, strategies, and procedures for initiating and implementing in-place protection.
EVAC-4.2	Assess systems, strategies, and procedures for initiating and implementing water supply protection.
EVAC-4.3	Assess systems, strategies, and procedures for initiating and implementing sewage system protection.
EVAC-4.4	Assess systems, strategies, and procedures for monitoring toxic releases, continually assessing the potential for injury and damage, notifying the public as necessary, and terminating response activities.
EVAC-5	Given an assessment of the jurisdiction's or facility's capabilities to implement protective action options in hazardous materials or terrorist incidents, demonstrate the ability to develop related emergency plans and procedures.
EVAC-5.1	Describe potential problems and capability shortfalls for implementing protective actions in worst-case hazardous materials or terrorist incidents.
EVAC-5.2	Identify additional resources that may be needed to prepare for and implement protective actions in worst-case hazardous materials incidents.
EVAC-5.3	Identify recommended changes to hazardous materials and terrorist incident response plans (addressing, for example, sections on the concept of operations, roles and responsibilities, direction and control, warning systems and emergency public notification, resource management, health and medical, personal protection of citizens, ongoing incident assessment, and human services).
EVAC-5.4	Describe modifications to jurisdiction and/or facility policies and procedures that are required to facilitate the recommended plan changes.

**Hazardous Materials
Planning Curriculum Guidelines:**

Plan Implementation and Maintenance

General Training Considerations

Scope/Objective of Training

Training in this curriculum area will provide students with the knowledge, skills, and practical tools they need to successfully implement a completed hazardous materials response plan, anticipate future outcomes, monitor and evaluate the plan's effectiveness, and revise it as appropriate to improve the jurisdiction's or facility's emergency operations and prevention/mitigation capabilities. Instruction builds on Planning Essentials competencies to help participants develop the feedback loop necessary for long-term plan maintenance and enhancement.

The content of training addresses (1) plan implementation, including promulgation and dissemination of the plan, orientation of plan users, and integration of multi-jurisdictional planning efforts; (2) validation of the plan, including methods of plan review, plan testing, and exercising; and (3) plan maintenance, including development of strategies and processes to identify, illuminate, and correct problems with the plan. Other subject areas potentially include environmental scanning, management audits, performance audits, and other long-term and strategic planning concepts.

Training focuses on the role of the planning manager or administrator in establishing systems and strategies for plan implementation and maintenance. This person may also participate in (and need training in) the actual writing and development of the plan, as defined in Planning Essentials and other Planning Specialties areas. Furthermore, the planning manager or administrator may function as the jurisdiction's or facility's Exercise Manager/Officer. However, advanced competencies in exercise design and development will be covered in a separate Planning Specialty area in subsequent editions of these *Guidelines*.

Audience

The training audience includes all personnel involved in the implementation, validation, and maintenance of a completed hazardous materials plan for their respective jurisdiction or facility. Audience members potentially include planners and decision makers for agencies and organizations represented in the plan, community leaders, and others interested in improving hazardous materials preparedness. Possible audience members are:

- Community planning team members
- Local Emergency Planning Committee members
- Government and response agency representatives
- Facility planners and managers
- Community support services and volunteer group representatives
- Exercise program managers and exercise officers
- Emergency Management Officials

Prerequisites or Presumed Prior Knowledge/Skills of Students

Students should possess Planning Orientation and Planning Essentials competencies and previous experience in community or organizational planning. They should have job responsibilities directly related to the management and administration of hazardous materials plans and planning processes for a jurisdiction or facility.

Typical Program Format

One to two days of classroom instruction with an emphasis on activities designed to help students develop strategies and mechanisms to assess, evaluate, and refine existing hazardous materials plans. Job aids to facilitate later work may be desirable. Training program managers may wish to combine this instruction with more in-depth materials on exercise design and development for audiences that perform both roles.

Methodology and Training Delivery Considerations

- Ideally, training audiences should be heterogeneous, reflecting the wide range of personnel involved in the integrated hazardous materials planning process. If possible, individuals who work together as members of a planning team should be trained together.

- Training methodologies should emphasize small group interactions and practical activities based on actual plans and realistic situations. Since teamwork and continuity are important in plan implementation and maintenance, it is recommended that student groupings be maintained throughout training.

- Generic case studies or scenarios should be available for use with audiences from diverse communities and organizations. The instructor should be able to flexibly tailor, update, or substitute these materials, depending on audience needs.

- Training emphasizes skills and attitudes needed for students to become effective long-term community change agents. Emphasis will be placed on methods and techniques for effecting meaningful change.

PI&M-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as PI&M-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
PI&M-1	Given the goals and objectives of the integrated hazardous materials planning process for a jurisdiction or facility, develop a strategy for plan implementation.
PI&M-1.1	List organizations and key personnel who should participate in plan implementation, including: • Planning team members • Organizations, groups, and facilities assigned responsibilities under the plan • Local, state, and federal oversight agencies • Community support services organizations affected by the plan
PI&M-1.2	Establish objectives for plan review and validation as part of the plan development process.
PI&M-2	Given a completed integrated hazardous materials plan for a jurisdiction or facility, develop strategies to ensure proper promulgation and dissemination of the plan.

Recommended Training

PI&M-2.1	Identify the steps necessary to ensure proper promulgation of the plan.
PI&M-2.2	Determine the information needs of various groups, and develop strategies to orient them to their roles and assignments under the plan.
PI&M-2.3	Develop strategies to orient the public on the plan, including clarifying technical information as necessary to promote public understanding.
PI&M-3	Given an approved integrated hazardous materials plan for a jurisdiction or facility, develop strategies to ensure coordination with multi-jurisdictional planning efforts.
PI&M-3.1	Identify and assess options for coordinating and integrating the plan within the jurisdiction and/or facility.
PI&M-3.2	Develop strategies to communicate the substance of the plan to other jurisdictions, including surrounding communities, state offices, and federal (national/regional) personnel involved in related planning efforts.
PI&M-3.3	Develop strategies to establish communication links with local, state, and federal organizations to obtain feedback on emergency management program changes that may affect the plan.
PI&M-4	Given an approved integrated hazardous materials plan for a jurisdiction or facility, develop strategies to ensure that organizations and personnel are capable of carrying out their assigned responsibilities.
PI&M-4.1	Develop strategies to ensure that each organization develops the SOPs necessary to facilitate the accomplishment of assigned tasks under the plan.
PI&M-4.2	Develop strategies to assess related training needs.
PI&M-4.3	Identify training programs and assistance available in the public and private sectors.
PI&M-5	Given implementation of an approved integrated hazardous materials plan for a jurisdiction or facility, develop strategies for monitoring changes and trends that impact the plan or planning process.
PI&M-5.1	Identify changes and trends that could impact the plan or planning process, including but not limited to: • Economic • Legal • Political • Technological • Social • Demographic
PI&M-5.2	Identify strategies for collecting and assessing information from reviews or critiques of actual hazardous materials incidents affecting the jurisdiction.

PI&M-5.3 Identify strategies to ensure that various organizations with a role under the plan provide feedback as changes occur that may affect the plan.

PI&M-6 Given implementation of an approved integrated hazardous materials plan for a jurisdiction or facility, participate in the design and development of an exercise program that is useful for evaluating and updating the plan.

PI&M-6.1 Describe five types of exercises and their appropriate use in plan evaluation, to include:

- Drill
- Orientation
- Table top
- Functional
- Full Scale

PI&M-6.2 Identify the goals and objectives of the hazardous materials exercise program and its relationship to the overall planning process.

PI&M-6.3 Identify methods to be used for determining hazardous materials exercise needs, addressing at a minimum:

- Number and type of exercises to be conducted
- Functions to be tested (preparedness, response, recovery, and mitigation/ prevention)
- Exercise goals and objectives
- Appropriate scenarios

PI&M-6.4 Identify exercise criteria, resources, and reference materials.

PI&M-6.5 On specific exercises, establish effective policies and plans for working with the Exercise Manager, organizational participants, and others to:

- Control the exercise
- Recruit and brief participants
- Record and evaluate exercise play
- Critique exercise results and identify follow-up actions

PI&M-7 Given changes and trends that impact the plan or planning process, incident critiques, exercise results, expert opinion, and other information, develop strategies for conducting periodic reviews and updates of the plan.

PI&M-7.1 Determine whether goals and objectives established in the plan have been achieved.

PI&M-7.2 Evaluate changes and trends, incident critiques, exercise results, expert opinion, and other information to assess the need for plan revisions.

PI&M-7.3 Identify strategies for making the needed revisions to the plan and for implementing the plan revisions.

PI&M-7.4 Identify strategies and timetables for reviewing and updating the plan on a periodic basis.

PLANNING Training Issues | Planning Orientation Training Guidance | Planning Essentials Training Guidance | Planning Specialties Introduction | Commodity Flow Studies | Hazard Analysis | Capability Assessment | Planning for Protective Actions | Plan Implementation & Maintenance | Facility Planning | Planning for Public Education | Appendix A Planning Guide Summaries | Appendix B Planning Models | Appendix C Planning for Terrorist Incidents | Appendix D NRT ICP Guidance
Planning Specialties Training Guidance

Hazardous Materials and Terrorism Incident Response Planning

Curriculum Guidelines:

Facility Planning

General Training Considerations

Scope/Objectives of Training

Facility Planners develop, validate, and maintain emergency response plans and safety plans for any facility subject to federal contingency planning regulations, as well as other facilities that wish to improve emergency preparedness through planning. They also develop procedures to ensure compliance with federal, state, and local mandates for participation in community planning and right-to-know activities. In this context, the term "facility" is meant to have a wide connotation and may include, but is not limited to, any mobile or fixed onshore or offshore building, structure, installation, equipment, pipe, or pipeline.

The Facility Planning specialty area provides participants with the knowledge and skills they need to develop a basic hazardous materials and terrorist threat emergency plan for a facility. The primary training audience is facility planners and planning team members. Training objectives cover a broad range of generic competencies, including the ability to function effectively in a team environment, assist in or conduct a basic hazards and threat analysis and capability assessment, work with others to analyze options and draft sections of the plan, and participate in plan implementation, evaluation, and maintenance.

The legislative and regulatory basis for this training can be found primarily in the requirements specified in OSHA 1910.120 for development of employers' emergency response plans, SARA Title III for development of planning jurisdictions' emergency response plans, and various federal agency regulations for the development of facility and transporter emergency response plans. The competencies defined here incorporate generic concepts and processes derived from various sources in the planning literature. Several of the most important reference documents, and more specific models for planning, are described in the Appendices. The training objectives are intended to be comprehensive, i.e., to address the requirements of all identified audience members; thus, training developers and instructors will need to tailor these objectives to meet local audience interests, needs, and planning processes.

Audience

The training audience for Facility Planning includes planning team members who have a defined responsibility in researching, preparing, implementing, and maintaining hazardous materials and terrorist threat facility plans. These persons generally represent an organizational or functional specialty in an integrated planning process for the facility. Audience members may include industry owners and executives, business planners, production/process managers, functional managers (e.g., communications, public information, emergency response, etc.), safety officers, technical experts, and others employed by the facility. Personnel who have responsibilities for reviewing and approving facility plans and/or enforcing compliance with existing community regulations and standards may also benefit by training.

Prerequisites or Presumed Prior Knowledge/Skills of Students

Training covers basic skills, with an emphasis on the ability to interpret and use information provided by various technical specialists in developing the plan. More advanced planning skills are addressed under other Planning Specialties. Audience members are assumed to already possess training competencies covered under Planning Orientation, as well as an expertise in the professional discipline that the student represents on the planning committee. It is further assumed that managerial, administrative, and logistic requirements for organizing the planning process, including staff recruitment and assignments, have already been met.

Typical Program Format

Training can typically be accomplished in two to four days of classroom instruction led by an experienced facilitator. Breaking training into modules (e.g., Hazards Analysis and Threat Assessment) that are delivered at different times is also possible, and this approach may be beneficial if timed to coincide with planning team assignments. However, team building is very important in the planning process, so continuity of student groupings throughout training is recommended.

Methodology and Training Delivery Considerations

It is recognized that the planning needs of facilities, and the resulting training needs of planning team members, can vary greatly, depending on such factors as business size, demographics, product mix, hazards, local resources, and planning preferences. However, training described here is intended to address the generic training requirements of all hazardous materials facility planners. Training managers, course developers, and instructors may need to tailor these materials to meet the unique needs and interests of different audiences, incorporating elements covered in other Planning Specialties, as appropriate. Other training considerations include the following:

- Training should focus on the actual development of facility plans, with the work product and participation in the group planning process used to demonstrate student mastery of the objectives.
- Audiences should be heterogeneous, reflecting the diverse groups and professional disciplines represented in the planning process. It is highly recommended that team members who will work together in subsequent planning efforts be trained together.
- Course methodology should emphasize group interactions, team building, and resolution of interpersonal conflicts, as well as the development of the plan product itself.
- Course materials can be multi-tracked by type of plan (OSHA, EPA, etc.) to facilitate tailoring the instruction to the needs of different audiences.
- If possible, instruction should address practical strategies for consolidating planning requirements (i.e. merging several requirements into one plan development effort) to foster greater planning efficiency.
- Instruction should emphasize the need for on-going planning commitments by the team and the organizations they represent.
- Instruction should emphasize the need for ongoing evaluation at each step in the planning process.
- Instructors should emphasize that steps in the planning process, although taught sequentially, may actually be performed simultaneously.

Objective Identification Legend

FACIL-1

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as FACIL-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
FACIL-1	Given an assignment as a facility planning team member, describe an appropriate planning strategy and team member responsibilities in the process.
FACIL-1.1	Describe the benefits of a team approach to planning, and identify skills necessary to participate in the team planning process.
FACIL-1.2	Identify individual roles and responsibilities in the facility planning process, to include work expectations, administrative support systems, and time lines.

Recommended Training

FACIL-1.3	Identify the need to coordinate planning with outside groups (e.g., local government, surrounding jurisdictions, state offices, federal/regional offices such as EPA and FEMA, RRTs, and CAER.)
FACIL-1.4	Demonstrate understanding of the planning process mission statement, goals, and objectives.
FACIL-1.5	Describe the expected results of the planning process, to include required planning elements and plan format.
FACIL-1.6	Identify resources needed to conduct the planning process, including personnel, budgets, and technical capabilities, and solicit these resources within the company.
FACIL-2	Given an assignment as a facility planning team member, demonstrate the ability to conduct a review of federal, state, and local authorities applicable to the planning process.
FACIL-2.1	Describe the purpose and benefits of completing a review of existing plans and authorities.
FACIL-2.2	Identify methods and procedures for reviewing plans and authorities (collecting and organizing information, identifying and clarifying issues, identifying incompatibilities and shortfalls, etc.), including associated costs and staffing requirements.
FACIL-2.3	Identify planning regulatory requirements that apply to the facility, to include consideration of: • SARA Title III • EPA's Oil Pollution Prevention Regulation (SPCC and Facility Response Plan Requirements)—40 CFR part 112.7(d) and 112.20 to 112.21 • MMS's Facility Response Plan Regulation—30 CFR part 254 • RSPA's Pipeline Response Plan Regulation—49 CFR part 194 • USCG's Facility Response Plan Regulation—33 CFR part 154, subpart F • EPA's Risk Management Programs Regulation—40 CFR part 68 • OSHA's Emergency Action Plan Regulation—29 CFR 1910.38(a) • OSHA's Process Safety Standard—29 CFR 1910.119 • OSHA's HAZWOPER Regulation—29 CFR 1910.120 • EPA's Resource Conservation and Recovery Act Contingency Planning Requirements—40 CFR part 264, subpart D, 40 CFR part 265, subpart D, and 40 CFR part 279.52 State and local policies, codes, ordinances, etc.
FACIL-2.4	Describe the advantages and disadvantages of all-hazard planning and hazard-specific planning.
FACIL-3	Given an assignment as a facility planning team member, demonstrate the ability to conduct background research appropriate to the planning requirement.

FACIL-3.1	Identify critical internal and external products, services, and operations that impact the facility plan, including: • Internal products and services and the facilities and equipment needed to produce them • External products and services provided by suppliers, especially sole source vendors • Services such as electrical power, water, sewer, gas, telecommunications, and transportation • Operations, equipment, and personnel vital to the continued functioning of the facility
FACIL-3.2	Identify, gather, and review copies of existing hazardous materials and terrorist incident response plans (community emergency plans, mitigation/prevention plans, response agency SOPs, facility plans, etc.).
FACIL-3.3	Review critiques of actual incidents, exercises, and drills conducted by the facility or by the community with participation by the facility.
FACIL-3.4	Review important changes and trends impacting the facility.
FACIL-3.5	Conduct surveys, interviews, etc. to gather expert opinion on planning needs, as required.
FACIL-3.6	Identify and summarize related planning issues, priorities, concerns, and challenges.
FACIL-4	Given the planning process to be used by the facility, identify the purpose, benefits, methods, expected results, and participant roles in hazards analysis and capability assessment.
FACIL-4.1	Describe the purpose and benefits of conducting a hazards and threat analysis.
FACIL-4.2	Describe the purpose and benefits of conducting a capability assessment.
FACIL-4.3	Describe the methods to be used and the expected results of the facility's hazards and threat analysis and capability assessment processes.
FACIL-4.4	Identify organizational and team member responsibilities in the facility's hazards and threat analysis and capability assessment processes, including the roles of various technical specialists.
FACIL-5	Given the facility's production processes,potential hazards, and potential terrorist target areas, demonstrate the ability to identify, collect, and interpret hazards and threat analysis and capability assessment data needed for planning.
FACIL-5.1	Collect or assist in collecting data, as identified in *Technical Guidance for Hazards Analysis*.
FACIL-5.2	Identify types of emergencies that have occurred in the community, at the facility, and in similar facilities.

FACIL-5.3	Identify geographic factors that could contribute to potential emergencies.
FACIL-5.4	Identify types of emergencies that could occur from technological process or system failures.
FACIL-5.5	Identify types of emergencies that could occur as a result of human error.
FACIL-5.6	Identify types of emergencies that could result from the design or construction of the facility and production processes.
FACIL-5.7	Identify types of emergencies that could result from terrorist acts or other deliberate criminal sabotage.
FACIL-5.8	For each potential emergency, identify possible complications and relationships to other emergency events, and estimate the probability of occurrence.
FACIL-5.9	Identify and evaluate internal and external resources and capabilities that could be applied in an emergency.
FACIL-5.10	Conduct an insurance review to identify and evaluate facility insurance coverage and benefits in various types of emergency situations.
FACIL-5.11	Review and interpret the data.
FACIL-5.12	Identify, map, and prioritize hazards, terrorist targets, risk areas, and vulnerable zones, and identify capability shortfalls and excesses (gap analysis).
FACIL-6	Given the results of the facility's hazards and threat analysis and capability assessment, demonstrate the ability to identify issues and solutions to be addressed in the plan, and assignments for developing the plan.
FACIL-6.1	Identify issues and solutions to be addressed in the facility plan by examining existing plans, hazards and threat analysis results, capability assessment results, and other pertinent information.
FACIL-6.2	Identify facility plan development tasks and assignments.
FACIL-7	Given identified issues and solutions to be addressed in the facility plan, participate as assigned in developing or updating the hazardous materials and terrorist incident emergency operations plan, to address preparedness, response and short-term recovery.
FACIL-7.1	Identify the planning elements necessary to comply with regulatory requirements, standards, and guidelines.
FACIL-7.2	Develop or update the emergency operations plan to meet the required planning elements.
FACIL-8	Given identified issues and solutions to be addressed in the facility plan, participate as assigned in developing or updating a comprehensive prevention/mitigation section in the plan.

FACIL-8.1	Identify prevention/mitigation strategies and techniques to address the identified issues and solutions.
FACIL-8.2	Develop or update the plan to meet all identified prevention/mitigation planning needs.
FACIL-9	Given a draft facility hazardous materials plan, participate as assigned in the plan review and appraisal process.
FACIL-9.1	Describe the purpose and benefits of reviewing the facility plan.
FACIL-9.2	Conduct an internal review of the draft facility plan to assess adequacy and completeness.
FACIL-9.3	Facilitate an external review of the draft facility plan, which may include peer review, management review, and local, state and federal review.
FACIL-9.4	Make necessary revisions, and promote formal plan promulgation.
FACIL-10	Given an approved hazardous materials facility plan, describe appropriate strategies and identify methods for implementing the plan.
FACIL-10.1	Describe the purpose and benefits of implementing the plan.
FACIL-10.2	Describe the strategy and methods to be used for implementing the plan, to include: • Disseminating copies of the plan • Briefing and orienting users of the plan • Integrating the plan with other plans and work processes within the facility
FACIL-10.3	Identify options and develop strategies for coordinating the plan with multi-jurisdictional planning efforts.
FACIL-10.4	Identify options and develop strategies for ensuring that personnel are adequately trained to carry out their assigned responsibilities under the plan.
FACIL-10.5	Identify roles and responsibilities for implementing the plan, to include available resources, administrative systems, and time lines.
FACIL-11	Given an approved hazardous materials facility plan, describe appropriate strategies and identify methods for evaluating and maintaining the plan.
FACIL-11.1	Describe the purpose and benefits of evaluating and maintaining the plan.
FACIL-11.2	Identify options and develop strategies for monitoring changes and trends affecting the facility and/or jurisdiction.
FACIL-11.3	Identify options and develop strategies for critiquing actual incidents and accidents that occur, and for identifying and implementing remedial actions.

Recommended Training

FACIL-11.4

Identify options and develop strategies for developing, conducting, and evaluating exercises and drills.

FACIL-11.5

Identify options and develop strategies for conducting an annual audit of the facility plan and/or periodically updating and revising the facility plan, as necessary.

FACIL-11.6

Identify roles and responsibilities for evaluating and maintaining the facility plan, to include available resources, administrative systems, and time lines.

FACIL-11.7

Work with planning team members, facility managers, and other facility and community representatives to test planning concepts and measures (e.g., through tabletop exercises and drills), as necessary.

Hazardous Materials and
Terrorist Incident
Response Planning

Curriculum Guidelines:

Planning for Public Education

General Training Considerations

Note: There are several aspects and potential training requirements associated with hazardous materials and terrorist threat public education. These include training for Public Information Officers (PIOs) and others who design and develop related programs, strategies, and outreach materials; training for media representatives and others who influence the perceptions of the public; and training for planners in "marketing" the plan to gain public support for the planning process. The Planning Specialty area described here identifies general competencies for individual members of the public.

Scope/Objectives of Training

Training in this curriculum area provides an overview of the hazardous materials and terrorist threat emergency management system, with an emphasis on the citizen's role in that system. No skill development is attempted. Training should result in a positive attitudinal change, an improved awareness of threats to personal and community safety, an enhanced understanding of the need for and benefits of jurisdictional and facility planning and emergency management, and motivation to improve personal and community preparedness.

Benefits to be derived from training the general public include a greater understanding of and support for the jurisdiction's emergency management system and capabilities; improved citizen understanding of appropriate actions to take in hazardous materials and terrorist incident emergency situations; heightened cooperation with responders and prevention/mitigation personnel; and enhanced citizen planning and preparedness for potential incidents in the home or neighborhood.

Audience

The audience for public education training includes all persons who have a "stake" in the hazardous materials and terrorist threat emergency management system, although they have no defined role in the development and implementation of emergency operations and mitigation/prevention plans. Potential audience members include the general public, community groups, volunteer groups, business/industry associations, employee groups, and others with a self-interest in improving community and individual/family preparedness.

Prerequisites or Presumed Prior Knowledge/Skills of Students

Participants are assumed to have an interest in hazardous materials and terrorist threats facing the community, as well as the jurisdiction's ability to provide effective hazardous materials and terrorist threat emergency management. However, no prior knowledge of community plans and systems is required to participate in training.

Typical Program Format

A short (one to two hours or as need is expressed by the customer) facilitator-led presentation or seminar.

Methodology and Training Delivery Considerations

Training should emphasize opportunities for interaction with audience members to identify and address individual perceptions and concerns. Whenever possible, use of dynamic media (video, slides, computer simulations, CD-ROM, etc.) is encouraged to promote interest and motivate support. Depending on audience needs and time, simple activities, exercises, or role plays emphasizing local examples and realistic personal situations may be appropriate.

The instructor should be able to discuss a broad range of topics of potential interest to audience members, including the community's readiness to cope with terrorist threats, community and household hazardous materials threats; requirements of the Emergency Planning and Community Right to Know Act; pertinent jurisdiction and facility plans and capabilities; technical resources and ways to access community information (MSDS forms, chemical inventories, release reports, etc.), and materials available from EPA, DOT, FEMA, NIEHS, and other federal, state, and local sources.

Objective Identification Legend

EDUC-1

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as EDUC-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
EDUC-1	Given residency in a specific jurisdiction, identify the purpose, benefits, and components of the jurisdiction's hazardous materials and terrorist threat emergency management system.
EDUC-1.1	Describe the hazardous materials threat within the jurisdiction, to include the routine use of chemicals by the general public from everyday sources.
EDUC-1.2	Describe the terrorist threat within the jursidiction and discriminate between real hazards and misperceptions of hazards currently held in general public opinion within the jursidiction.
EDUC-1.3	Identify major legislation affecting the jurisdiction's hazardous materials emergency management system, including the Emergency Planning and Community Right-to-Know Act.
EDUC-1.4	Describe the jurisdiction's hazardous materials emergency management system.
EDUC-1.4.1	Describe the four phases of the comprehensive emergency management system (preparedness, response, recovery, and mitigation/prevention).
EDUC-1.4.2	Explain the purpose and participants in the jurisdiction's integrated response system.
EDUC-1.4.3	Explain the purpose and participants in the jurisdiction's prevention and mitigation system.
EDUC-1.4.4	Describe general requirements for facility planning, safety management, and emergency response.
EDUC-1.5	Identify the purpose and participants in the jurisdiction's hazardous materials and terrorist threat planning process.
EDUC-1.5.1	Identify the jurisdiction's LEPC planning district and planning requirements.

Recommended Training

EDUC-1.5.2	Identify major steps and participants in the hazardous materials and terrorist incident planning process, to include hazards analysis, capability assessment, plan development, and plan evaluation.
EDUC-1.5.3	Identify major components in the jurisdiction's hazardous materials and terrorist incident response plan.
EDUC-2	Given residency in a specific jurisdiction, describe the citizen's role in the jurisdiction's hazardous materials and terrorist threat emergency management system.
EDUC-2.1	Identify the personal and community benefits of citizen participation in the jurisdiction's hazardous materials and terrorist threat emergency management system.
EDUC-2.2	Identify ways to participate in and contribute to the jurisdiction's hazardous materials and terrorist threat emergency management system (e.g. provide feedback, serve as resource, attend meetings, join committees)
EDUC-2.3	Describe the citizens' role in individual and family preparedness.
EDUC-2.3.1	Identify steps in conducting a personal hazards analysis, to include threats to the neighborhood.
EDUC-2.3.2	Identify components of a personal and family preparedness plan.
EDUC-2.3.3	Identify steps in testing and maintaining personal/family preparedness plans.
EDUC-3	Given residency in a specific jurisdiction, identify personal actions to promote hazardous materials and terrorist threat emergency management.
EDUC-3.1	Identify available sources of assistance and information and requirements for accessing them.
EDUC-3.2	Develop an action plan for promoting hazardous materials and terrorist threat emergency management and personal/family preparedness.

Hazardous Materials and Terrorist Incident Response Planning

Curriculum Guidelines:

Appendix A: Planning Guide Summaries

Appendix A

Planning Guide Summaries

This appendix provides content summaries of key reference documents used in the preparation of the *Hazardous Materials Planning Curriculum Guidelines*. These materials include the *Guide for All-Hazard Emergency Operations Planning* (FEMA SLG 101), *Hazardous Materials Emergency Planning Guide* (NRT-1), *Technical Guidance for Hazards Analysis* (EPA/FEMA/DOT), *Handbook of Chemical Hazard Analysis Procedures* (FEMA/DOT/EPA), and *Emergency Management Guide for Business & Industry* (FEMA 141). More information on the planning models described in these materials is presented in Appendix B.

Federal Emergency Management Agency, *Guide for All-Hazard Emergency Operations Planning*, SLG 101, September 1996.

The Guide is designed as a "toolbox" of ideas and advice, not a sample emergency operations plan (EOP). It is intended primarily for use by personnel responsible for EOP development and maintenance in state and local emergency management agencies. It establishes no requirements, and its recommendations may be used, adapted, or disregarded.

This SLG replaces Civil Preparedness Guide (CPG) 1-8, *Guide for the Development of State and Local Emergency Operations Plans* (dated September 10, 1990); CPG 1-8A, *Guide for the Review of State and Local Emergency Operations Plans,* (dated October 1992); and CPG 1-10, *Guide for the Development of a State and Local Continuity of Government Capability* (dated July 27, 1987), which have been rescinded.

The document is organized as follows:

- Chapter 1 explains what an EOP is at the state and local levels, why the EOP is a necessary part of a comprehensive approach to emergency management, and how the EOP relates to other aspects of the comprehensive, risk-based, all-hazard approach.

- Chapter 2 describes the approach FEMA recommends for a step-by-step process of risk-based, all-hazard emergency operations planning (see Appendix B for more detail).

- Chapter 3 suggests how to format the results of the planning process in a written EOP. Components discussed include the Basic Plan, functional annexes, hazard-specific appendices, SOPs, and checklists.

- Chapter 4 lists and discusses elements of the Basic Plan, and provides detailed examples of the types of tasking that should be assigned to agencies, organizations, and individuals under the plan.

- Chapter 5 explains the purpose of functional annexes, and provides a brief description of eight core functions: Direction and Control, Communications, Warning, Emergency Public Information, Evacuation, Mass Care, Heath and Medical Services, and Resource Management.

- Chapter 6 notes unique aspects of certain hazards, including associated regulatory requirements. It suggests how to address hazardous materials in the all-hazard EOP rather than in a stand-alone plan. The chapter is not meant to replace hazard-specific planning guidance issued by the National Response Team.

- Chapter 7 contains information on integrating State EOPs with the Federal Response Plan, so that all levels of government can provide a coordinated response to communities in need.

National Response Team, *Hazardous Materials Emergency Planning Guide*, NRT-1, March 1987.

This guidance is intended to help local communities prepare for potential incidents involving hazardous materials. It describes how to form a local planning team, find a team leader, identify and analyze hazards, identify existing response equipment and personnel, write a plan, and keep the plan up to date. The information can be used both by local communities developing their own plan, and by local emergency planning committees formed in accord with the "Emergency Planning and Community Right-to-Know Act of 1986."

State officials seeking to develop a state emergency plan that is closely coordinated with local plans can adapt this guidance to their purposes. Likewise, officials of chemical plants, railroad yards, and shipping and trucking companies can use the guide to coordinate their own hazardous materials emergency planning with that of the local community.

The guidance deals specifically with response to hazardous materials incidents—both at fixed facilities (manufacturing, processing, storage, and disposal) and during transportation (highways, waterways, rail, and air). Plans for responding to radiological incidents and natural emergencies such as hurricanes, floods, and earthquakes are not the focus of this guidance, although most aspects of plan development and appraisal are common to these emergencies.

The guide is intended to focus community activity on emergency preparedness and response; provide communities with information useful in organizing the planning task; furnish criteria to determine risk and to help communities decide whether they need to plan for hazardous materials incidents; help communities conduct planning that is consistent with their needs and capabilities; and provide a method for continually updating a community's emergency plan.

The document is organized as follows:

Chapter 1: Introduction
Chapter 2: Selecting and Organizing the Planning Team
Chapter 3: Tasks of the Planning Team
Chapter 4: Developing the Plan
Chapter 5: Hazardous Materials Planning Elements
Chapter 6: Plan Appraisal and Continuing Planning

Several appendices provide helpful information for community planning. In particular, Appendix A includes a detailed summary of Title III of SARA, and Appendix D presents criteria that can be used to assess a state or local hazardous materials emergency response preparedness program.

U.S. Environmental Protection Agency, Federal Emergency Management Agency, and U.S. Department of Transportation, *Technical Guidance for Hazards Analysis*, December 1987.

The purpose of this guide is to help local emergency planning committees (LEPCs) conduct site-specific hazards analyses for airborne releases of extremely hazardous substances (EHSs), as required by Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA). Although these substances may also threaten property and the environment, this guide is primarily concerned with lethal effects of airborne substances on humans.

This document represents a joint effort by EPA, FEMA, and DOT to provide coordinated and coherent technical guidance. Although the guide can be useful to all community and industry planners, it is intended especially for LEPCs established under the provisions of SARA. The three steps of hazards analysis—hazards identification, vulnerability analysis, and risk analysis—provide a decision-making process for the LEPCs to follow as they undertake the development of comprehensive emergency plans mandated by SARA Title III.

This document is organized as follows:

Federal Emergency Management Agency, U.S. Department of Transportation, and U.S. Environmental Protection Agency, *Handbook of Chemical Hazard Analysis Procedures*.

The *Handbook of Chemical Hazard Analysis Procedures* has several objectives, one of which is to expand *NRT-1* and the *Technical Guidance on Hazards Analysis* documents by including information for explosive, flammable, reactive, and otherwise dangerous chemicals. Although *NRT-1* was aimed at addressing planning for all types of hazardous materials, SARA Title III required local planners to focus on a specific initial list of acutely toxic chemicals (referred to as Extremely Hazardous Substances) due to their high inhalation toxicity when airborne, and this was the primary focus of the supplemental guidance document. By introducing additional methodologies on how to plan for these and other dangerous chemicals, this handbook serves as a stepping stone from *NRT-1* and the *Technical Guidance on Hazards Analysis* to a more comprehensive approach for emergency planning.

Beyond providing additional methodologies for assessing the potential impacts of hazardous materials releases, this handbook also expands the three-step hazards analysis approach (hazard identification, vulnerability analysis, and risk analysis) presented in *NRT-1* and its supplement by introducing a four-step approach involving hazard identification, consequence analysis, probability analysis, and risk analysis. In addition, it provides a tutorial on hazardous chemicals, suggestions for applying hazard analysis results to writing and updating an emergency plan, and an expanded discussion of issues relating to sheltering-in-place (in-place protection) and evacuation.

The document is organized as follows:

Chapter 3: Actions Upon Release to the Environment
Chapter 4: Fire Hazards of Chemical Substances
Chapter 5: Explosion Hazards of Chemical Substances
Chapter 6: Toxicity Hazards of Chemical Substances
Chapter 7: Reactivity Hazards of Chemical Substances
Chapter 8: Hazardous Material Classification Systems
Chapter 9: Overview of the Hazard Analysis Process
Chapter 10: Hazard Identification Guidelines
Chapter 11: Probability Analysis Procedures
Chapter 12: Consequence Analysis Procedures
Chapter 13: Formulation of a Planning Basis
Chapter 14: Use of Hazard Analysis Results in Emergency Planning

Appendices:

Appendix A: A Tutorial on Fundamental Mathematical Skills
Appendix B: Technical Basis for Consequence Analysis Procedures
Appendix C: Overview of "Shelter-in-Place" Concepts
Appendix D: Chemical Compatibility Chart
Appendix E: Guide to Installation of the ARCHIE Computer Program
Appendix F: Basis of Probability Analysis Procedures

Federal Emergency Management Agency, *Emergency Management Guide for Business and Industry,* FEMA 141, October 1993.

This guide provides step-by-step advice on how to create and maintain a comprehensive emergency management program. It can be used by manufacturers, corporate offices, retailers, utilities, or any organization where a sizable number of people work or gather. It applies equally to businesses large or small, whether they operate from a high-rise building or an industrial complex, and whether they own, rent or lease property.

Users of the document need not have in-depth knowledge of emergency management. All that is required is the authority to create a plan and a commitment from the chief executive officer to make emergency management part of the corporate culture.

Businesses that already have a plan can use this guide as a resource to assess and update the plan. The guide is organized as follows:

Section 1: Four Steps in the Planning Process—how to form a planning team; how to conduct a vulnerability analysis; how to develop a plan; and how to implement the plan. The information can be applied to virtually any type of business or industry.

Section 2: Emergency Management Considerations—how to build such emergency management capabilities as life safety, property protection, communications, and community outreach.

Section 3: Hazard-Specific Information—technical information about specific hazards the facility may face.

Section 4: Information Sources—where to turn for additional information.

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Appendix B: Planning Models

Appendix B
Planning Models

Various explanations of the planning process can be found in the literature, including those described in the *Guide for All-Hazard Emergency Operations Planning* (FEMA SLG 101), *Hazardous Materials Emergency Planning Guide* (NRT-1), *Technical Guidance for Hazards Analysis* (EPA/FEMA/DOT), *Handbook of Chemical Hazard Analysis Procedures* (FEMA/DOT/EPA), and *Emergency Management Guide for Business & Industry* (FEMA 141). These approaches to planning, which are briefly described here, incorporate the generic functional requirements of planning, although the steps and procedures may be defined somewhat differently. Jurisdictions and facilities should select and/or modify these models to best meet their unique planning needs and preferences.

Federal Emergency Management Agency, *Guide for All-Hazard Emergency Operations Planning*, SLG 101, September 1996.

Chapter 2 of this Guide, The Planning Process, describes principles and major steps recommended for developing an all-hazard plan for protecting lives and property within the jurisdiction. In particular, the benefits of a team approach to planning are emphasized, including the role of the Chief Executive Official (CEO). Steps in the development and continual refinement of an emergency operations plan (EOP) are summarized as follows:

I. **Research**—This phase involves reviewing the jurisdiction's planning framework, analyzing the hazards faced by the jurisdiction, determining the resource base, and noting characteristics of the jurisdiction that could affect emergency operations. Steps in research include:

A. Review applicable laws, regulatory requirements, local plans, mutual aid agreements, and existing guidance.

B. Conduct a Hazard/Risk Analysis
1. Identify hazards
   a. List hazards that concern emergency management
   b. Determine whether these hazards have occurred or could occur
2. Profile hazards and their potential consequences
   a. Develop information on each hazard (frequency, magnitude, location, etc.)
   b. Develop information on the potential consequences of the hazard
3. Compare and prioritize risks
4. Create and apply scenarios

C. Determine the resource base—list and quantify resources available for emergency response and recovery. Compare them with those needed for an effective emergency response to determine shortfalls.

D. Note special facets of the planning environment—geographic and topographic features that may affect operations, transportation routes, special populations, demographic and other trends, etc.

II. **Development**—During this phase, the EOP is written through steps similar to these: developing a rough draft of the basic plan, functional annexes, and hazard-specific appendices; conducting preliminary briefings and interviews; conducting initial planning meetings and establishing committees for parts of the EOP; working with committees on successive drafts; preparing necessary graphics, and producing and circulating a final draft for planning team review and comment; holding meetings to obtain feedback and concurrence from organizations with identified responsibilities under the plan; obtaining official promulgation of the EOP; and printing and distributing the EOP.

III. **Validation**—During this phase, the EOP is checked for conformity to applicable regulatory requirements and the standards of federal and state agencies. Recommended steps include conducting tabletop exercises with key representatives of tasked organizations as a practical means to help validate the plan; consulting with and participating in plans reviews with the next level of government; and using functional and full-scale emergency management exercises to determine if an EOP is understood and "works."

IV. **Maintenance**—As problems emerge, situations change, gaps become apparent, and requirements are altered, the plan must be continually adapted to remain useful and up-to-date. Possible steps include:

A. Remedial Action Process designed to (1) capture information from exercises, post-disaster critiques, self-assessments, audits, administrative reviews, and the like which may indicate deficiencies; (2) bring together members of the planning team to discuss problems and to consider and assign responsibility for remedies; and (3) tracking and following up on assigned actions.

B. Revision Process for review and modification of the EOP on at least an annual basis.

C. Implementing Documents to ensure that each tasked organization or individual develops the SOPs necessary to facilitate the accomplishment of assigned tasks.

Attachment C of the Guide, Hazardous Materials, provides additional information on plan requirements for locating hazardous materials at fixed facilities and on transport routes, estimating vulnerable zones, determining vulnerability, and assessing risk. Planning considerations unique to hazardous materials are described under the following major headings:

- Direction and control
- Emergency public information
- Evacuation
- Mass care
- Health and medical
- Resource management

National Response Team, *Hazardous Materials Emergency Planning Guide*, NRT-1, March 1987.

This guidance presents a comprehensive approach to hazardous materials planning. However, it is emphasized that every community must plan according to its own situation. Small communities with few planning resources, or communities with few or no threatening hazards, can choose the planning elements appropriate to their circumstances. Steps in the planning process can be summarized as follows:

I. Organizing the Planning Process
  A. Selecting the planning team
  B. Selecting the team leader
  C. Organizing for planning team responsibilities, including staffing, managing the planning tasks, and the use of computers

II. Review of Existing Plans
  A. Reviewing applicable state and local emergency plans
  B. Consulting with state and local agencies and volunteer organizations, regional offices of federal agencies, local industry and industrial associations, the RRT and OSC, etc.

III. Hazards Analysis
- A. Hazards Identification
- B. Vulnerability Analysis
- C. Risk Analysis

IV. Capability Assessment—sample questions are presented to help the planning team evaluate preparedness, prevention, and response resources and capabilities in the following three categories:
- A. Facility resources
- B. Transporter resources
- C. Community resources

V. Developing the Plan
- A. Developing or revising a hazardous materials appendix to a multi-hazard EOP
- B. Developing or revising a plan covering only hazardous materials

Planning elements and plan requirements that should be considered in this phase of the process are described in detail, including the following fourteen response functions:
- Initial Notification of Response Agencies
- Direction and Control
- Communication (among Responders)
- Warning Systems and Emergency Public Notification
- Public Information/Community Relations
- Resource Management
- Health and Medical
- Response Personnel Safety
- Personal Protection of Citizens
- Fire and Rescue
- Law Enforcement
- Ongoing Incident Assessment
- Human Services
- Public Works

VI. Plan Appraisal and Continuing Planning
- A. Plan Review and Approval
  1. Internal review
  2. External review
- B. Keeping the plan up-to-date
- C. Continuing planning
  1. Exercises
  2. Incident review
  3. Training

U.S. Environmental Protection Agency, Federal Emergency Management Agency, and U.S. Department of Transportation, *Technical Guidance for Hazards Analysis*, December 1987.

This guidance is compatible with and recommends the same approach to hazardous materials planning as NRT-1. However, significantly more detail is presented on the Hazards Analysis step of the process. The hazards analysis is separated into two phases. The first phase is the initial screening of all facilities reporting Extremely Hazardous Substances (EHSs) on their premises in excess of their threshold planning quantities (TPQs). The initial screening is performed to establish priorities among reporting facilities using credible worst case assumptions. The second phase represents a reassessment by order of priority of the potential hazards posed by the reporting facilities. This is accomplished through the reevaluation of the assumptions used for the initial screening.

PLANNING Training Issues | Planning Orientation Training Guidance | Planning Essentials Training Guidance | Planning Specialities Introduction | Commodity Flow Studies | Hazard Analysis | Capability Assessment | Planning for Protective Actions | Plan Implementation & Maintenance | Facility Planning | Planning for Public Education | Planning Specialities Training Guidance | Appendix A Planning Guide Summaries | Appendix B Planning Models | Appendix C Planning for Terrorist Incidents | Appendix D NRT ICP Guidance

Both the initial screening and the reevaluation phases utilize the three basic steps of hazards analysis: hazards identification, vulnerability analysis, and risk analysis. Steps in the process are summarized as follows:

Initial Screening

I. Hazards Identification

A. List facilities that have reported EHSs in the community in excess of the TPQ.
B. Contact each facility on the list for information on the EHSs present.
C. Obtain information on transportation routes of EHSs, if possible.
D. Obtain information on hazardous materials, facilities, and transportation routes (other than for those with EHSs above the TPQ) listed by SERCs (optional).

II. Vulnerability Analysis

A. Estimate the vulnerable zone for screening using credible worst case assumptions.
B. Identify characteristics of human populations within the estimated vulnerable zone.
C. Identify critical facilities within the estimated vulnerable zone.

III. Risk Analysis

A. Collect information obtained in hazards identification and vulnerability analysis.
B. Make rough estimate of risks based on the likelihood of a release and severity of consequences.
C. Identify those facilities with higher priority due to the estimated risks they pose.

Planning for Facilities by Priority

IV. Hazards Identification

A. Contact each facility on the list and other expert sources for additional information.
B. Obtain additional information on typical transportation conditions, if possible.

V. Vulnerability Analysis

A. Reestimate the vulnerable zone using reevaluated assumptions from the facility and other expert sources.
B. Identify characteristics of human populations within the estimated vulnerable zone.
C. Identify critical facilities within the estimated vulnerable zone.

VI. Risk Analysis

A. Collect all information obtained in hazards identification and vulnerability analysis in a table.
B. Obtain additional information on community and facility safeguards, response capabilities, and accident records.
C. Make a judgment of the probability of release and severity of consequences.
D. Organize all information (from A, B, and C) in a matrix format.
E. Rank risks.
F. Develop or revise emergency plans for higher priority facilities.

Federal Emergency Management Agency, U.S. Department of Transportation, and U.S. Environmental Protection Agency, *Handbook of Chemical Hazard Analysis Procedures*.

This guide presents four basic steps for conducting a hazard analysis, and a related fifth step that takes advantage of the knowledge gained during the effort to develop a comprehensive emergency plan. These steps include:

I. Hazard Identification—location, identification, and characterization of potential spill sources and accident sites in the jurisdiction or locality of concern. This step essentially concludes with the identification and/or postulation of fundamental accident scenarios requiring further consideration and analysis. Results from the probability analysis which follows can often help in further refining these scenarios. Methods discussed include:

- Enforcement of right-to-know laws
- Use of fire department and building inspection records
- Industry questionnaires
- Meetings with business organizations and trade groups
- Meetings with individual business personnel
- Queries of rail, marine, and pipeline transportation companies
- Truck traffic surveys
- Use of permit records
- Use of the "Yellow Pages"
- Access to detailed chemical property data and hazard information

II. Probability Analysis—evaluation of the likelihood of individual accident scenarios. This step permits examination and/or prioritization of potential accident scenarios in terms of their probability of occurrence. Categories of activities discussed include:

- Bulk transportation by highway
- Bulk transportation by rail
- Bulk transportation by barge or other marine vessel
- Transportation by pipeline
- Bulk storage, processing, or handling at fixed facilities
- Transportation of packaged hazardous materials
- Transportation by air

III. Consequence Analysis—evaluation of the consequences and impacts associated with the occurrence of postulated accident scenarios. This step provides an understanding of the nature and outcome of an accident and permits examination and/or prioritization of scenarios in terms of their potential impact on people and property. The Automated Resource for Chemical Hazard Incident Evaluation (ARCHIE) computer program and a set of hazard assessment procedures and models are discussed.

IV. Risk Analysis—combination of results from the accident probability and consequence analysis efforts to provide a measure of overall risk associated with the specific activity or activities. The effort permits examination and/or prioritization of scenarios in terms of *overall* risk. Steps include:

- Definition of annual accident probability categories
- Definition of accident severity categories
- Application of screening guidelines

V. Formulation of a Planning Basis—use of the results of the above activities during actual development and preparation of an emergency plan. The material includes discussion of 43 separate topics in 13 subject areas, as follows:

- Notification
- Command and Communications
- Evacuation
- Fire response
- Health Care
- Personal Protection
- Public Relations
- Spill Containment and Cleanup
- Spill Documentation
- Spill Monitoring
- Post-Spill Recovery
- Training
- Waste Disposal

Federal Emergency Management Agency, *Emergency Management Guide for Business & Industry*, FEMA 141, October 1993.

This document emphasizes the emergency planning and management needs of business and industry. Four steps are identified in the planning process, as follows:

I. Establish a Planning Team
   A. Form the team
   B. Establish authority
   C. Issue a mission statement
   D. Establish a schedule and budget

II. Analyze Capabilities and Hazards
   A. Where do you stand right now?
      1. Review internal plans and policies
      2. Meet with outside groups
      3. Identify codes and regulations
      4. Identify critical products, services, and operations
      5. Identify internal resources and capabilities
      6. Identify external resources
      7. Do an insurance review

   B. Conduct a vulnerability analysis
      1. List potential emergencies
      2. Estimate probability
      3. Assess the potential human impact
      4. Assess the potential property impact
      5. Assess the potential business impact
      6. Assess internal and external resources
      7. Add the columns

III. Develop the Plan
- A. Identify challenges and prioritize activities
- B. Write the plan
- C. Establish a training schedule
- D. Coordinate with outside organizations
- E. Maintain contact with other corporate offices
- F. Review, conduct training and revise
- G. Seek final approval
- H. Distribute the plan

IV. Implement the Plan
- A. Integrate the plan into company operations
- B. Conduct training (including exercises and drills)
- C. Evaluate and modify the plan

The guide also identifies planning considerations that are unique to hazardous materials, as well as core operational considerations of emergency management, in the following categories:

- Direction and Control
- Communications
- Life Safety
- Property Protection
- Community Outreach
- Recovery and Restoration
- Administration and Logistics

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Appendix C: Terrorist Incident Response Planning Models

Appendix C

Terrorism Incident Response Planning Models

Terrorism and weapons of mass destruction (WMD) are the subject of much-needed attention, both in the news media and by government officials at all levels of emergency response. WMDs are "weapons or devices that are intended, or have the capability, to cause death or serious bodily injury to a significant number of people, through the release, dissemination, or impact of toxic poisonous chemicals; disease organisms; or radiation or radioactivity." While major metropolitan areas across the United States have done WMD planning since the mid-1990s, when the Nunn-Lugar-Domenici provision of the National Defense Authorization Act of 1997 legislation first provided funding for the planning, the events of September 11, 2001 have released a torrent of money to combat terrorism. Some communities have found it easier to use this money to buy specialized equipment rather than do spend the money on intensive planning efforts required at the local level. "It's easier to show the County Commissioners new decontamination equipment than convince them that the same amount of money spent on a WMD plan is well worth the investment," said one county planner.

A January 2002 study by the National Association of Counties (NACo) and the National Association of County/City Health Officials (NACCHO) found that more than 90% of the 300 responding public health departments reported that their counties were ill-prepared to respond to any sort of bioterrorist event. Using a scale of 1 to 5, with 1 - "no plan in place," and 5 - "having a well understood and tested plan in place," counties were asked to rate their levels of preparedness. Only 3 percent of the jurisdictions ranked themselves at 5.

Local jurisdictions know they must plan how to respond themselves because multiple strikes in various locations may make it impossible for neighboring communities to assist. State and federal response resources are likely to be hours, if not days, away. WMD event-specific factors include:

- planning for more extensive and longer term mutual aid operations
- planning more extensive casualty care operations
- preparing to fit local response operations into a larger federal response environment than would occur in hazardous materials incidents
- preparing for more complex technical operations in the face of more esoteric and unusual chemical and biological threats
- preparing emergency communications systems to accommodate a much larger volume of traffic and greater number of users
- planning for more extensive notification requirements and more far-reaching resource request coordination
- preparing for sustaining critical government operations in the face of infrastructure damage akin to that experienced in large disasters
- preparing for managing public communications in an environment of high public concern and hysteria

Communities and states have already completed much of the first steps toward a WMD response plan by going through the State Domestic Preparedness Equipment Program for the Office of Domestic Preparedness (ODP). Each community followed a needs assessment process that indicated how terrorism funds could best be applied against a domestic preparedness strategy for the entire state. The steps are listed below:

Step 1 – Identification and Coordination of Jurisdictions
Step 2 – Risk Assessment Process
Step 3 – Capabilities and Needs Assessment
Step 4 – Jurisdiction Prioritization Matrix
Step 5 – Three-year Projection Forms
Step 6 – Additional Training Information
Step 7 – Emergency Response Team Survey
Step 8 – Recommendations for State and Local Response to WMD Terrorism Incidents
Step 9 – Statewide Domestic Preparedness Strategy

Planning for Response to Terrorist Incidents

The process for planning for terrorist incidents is evolving. Two basic approaches to WMD planning are commonly used today.

The first approach is an all hazards, functional planning approach which often uses the existing Community Emergency Operations Plan (EOP) as the guiding plan, with a separate annex to anticipate and exercise unique responses for the requirements of a terrorist incident. In this approach, the threat of a terrorist incident is treated as a subset of the many other hazards that a community must prepare for.

The second approach is terrorist threat specific, and treats the threat of a terrorist incident as a separate entity requiring unique and separate planning and preparation for response. A prime example is the Metropolitan Medical Strike Team Model. Terrorist threat specific planning can provide greater flexibility in terms of methods for assessing worst-case scenarios and allows closer focus on terrorist threats, but also can be more resource intensive and can require additional response planning teams and documentation duplicative of other response planning occuring in the jurisdiction.

This appendix provides a brief discussion of both approaches, followed by a response resource guide describing many of the additonal response resources available to local response to terrorist incidents, to be considered in response planning.

1. All-Hazards, Functional Planning Approach

Community EOP with Terrorism Annex

The first approach is that the roles, responsibilities, and principles of planning for WMD incidents are very similar at the local level to those for hazardous materials incidents and other emergencies that affect communities on a regular basis. A comprehensive Community Emergency Operations Plan (EOP) that has been thoroughly reviewed, is well understood by all response and support agencies, and that has been exercised completely will work whether an incident is a hazardous materials incident or a WMD attack.

Federal Response Plan

The all-hazard approach is mirrored in the Federal Response Plan (FRP), which describes the mechanisms and structures that the federal government will use to mobilize resources and conduct activities to assist State and local response efforts. The FRP uses a functional approach to group the types of federal assistance that a state is most likely to need under 12 Emergency Support Functions (ESF). The FRP describes how each of the signatory agencies contributes to the response efforts. It was developed under the provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288, as amended).

The Terrorism Annex to the FRP describes the policies, situation, planning assumptions, concept of operations, and responsibilities for handling a WMD incident. Many states and communities use this same approach when planning how to tailor their own response to a terrorist event.

The following planning assumptions have been drawn from the Terrorism Incident Annex to the Federal Response Plan:

- No single agency at the local, State, Federal, or private-sector level possesses the authority and expertise to act unilaterally on many difficult issues that may arise in response to a threat or act of terrorism, particularly if WMD are involved.

- An act of terrorism, particularly an act directed against a large population center within the United States involving WMD, may produce major consequences that would overwhelm the capabilities of many local and State governments almost immediately.

- Major consequences involving WMD may overwhelm existing Federal capabilities as well, particularly if multiple locations are affected.

- Local, State, and Federal responders will define working perimeters that may overlap. Perimeters may be used to control access to the area, target public information messages, assign operational sectors among responding organizations, and assess potential effects on the population and the environment. Control of these perimeters may be enforced by different authorities, which will impede the overall response if adequate coordination is not established.

- If appropriate personal protective equipment is not available, entry into a contaminated area (i.e., a hot zone) may be delayed until the material dissipates to levels that are safe for emergency response personnel. Responders should be prepared for secondary devices.

- Operations may involve geographic areas in a single State or multiple States, involving responsible FBI Field Offices and Regional Offices, as appropriate. The FBI and FEMA will establish coordination relationships as appropriate, based on the geographic areas involved.

- Operations may involve geographic areas that spread across U.S. boundaries. The Department of State is responsible for coordination with foreign governments.

The FRP may be implemented concurrently with the:

- National Plan for Telecommunications Support in Non-Wartime Emergencies, which provides a basis for ESF #2
- National Oil and Hazardous Substances Pollution Contingency Plan, known as the National Contingency Plan (NCP), which provides the basis for ESF #10
- Federal Radiological Emergency Response Plan (FRERP), which details the Federal response to a peacetime radiological emergency.
- Presidential Decision Directive 39 (PDD-39) and PDD-62 that set forth U.S. counterterrorism policy

The FRP Terrorism Incident Annex (called for in PDD-39) describes the concept of operations for a unified response to a terrorism incident involving two or more of the following plans: the FRP, the Federal Bureau of Investigation (FBI) Weapons of Mass Destruction (WMD) Incident Contingency Plan, and the Department of Health and Human Services (HHS) Health and Medical Services Support Plan for the Federal Response to Acts of Chemical/Biological Terrorism (discussed in the next section).

The Community Emergency Operations Plan (EOP)

Many community EOPs, which are developed using this same approach, consist of a basic plan, functional annexes, and hazard-specific appendices. These are supplemented, as needed, by standard operating procedures (SOPs) and checklists for implementation of the plan.

Federal agencies, including the United States Fire Administration (USFA) and the Environmental Protection Agency (EPA), remind local LEPCs to be sure they update their emergency plans before adding information about response to a WMD incident.

FEMA's Guide for All-Hazard Emergency Operations Planning and the National Response Team's Hazardous Materials Emergency Planning Guide (NRT-1) state that the decision to develop a hazard-specific appendix (including WMD-specific) should be based on special planning requirements not common to other hazards addressed in the functional annex, and on regulatory considerations that may require extensive, detailed planning that is inappropriate for inclusion in the annex.

According to the latest FEMA Guidance for All-Hazard Emergency Operations Planning, the situation section for a Terrorism Incident Annex (TIA) should discuss what constitutes a potential or actual WMD incident. It should present a concise, clear, and accurate overview of potential events and discuss a general concept of operations for response. Any information already included in the EOP need not be duplicated in the TIA. The situation overview should include as much information as possible that is unique to WMD response actions, including maps, environment, population, and provisions for working with Federal crisis and consequence management agencies.

Assumptions for working with levels beyond the county or local jurisdiction should include:

- The first responder or health and medical personnel will, in most cases, initially detect and evaluate the potential or actual incident, assess casualties (if any), and determine whether assistance is required.
- If so, State support will be requested and provided. This assessment will be based on warning or notification of a WMD incident that may be received from law enforcement, emergency response agencies, or the public.
- The incident may require Federal support. To ensure that there is one overall Lead Federal Agency (LFA), the Federal Emergency Management Agency (FEMA) is authorized to support the Department of Justice (DOJ) as delegated to the Federal Bureau of Investigation [FBI] until the Attorney General transfers the overall LFA role to FEMA.
- In addition, FEMA is designated as the lead agency for consequence management within the United States and its territories. FEMA retains authority and responsibility to act as the lead agency for consequence management throughout the Federal response. In this capacity, FEMA will coordinate Federal assistance requested through State authorities using normal FRP mechanisms.
- Federal response will include experts in the identification, containment, and recovery of WMD (chemical, biological, or nuclear/radiological). See Appendix ?, a brief description of some of the Federal resources available.
- Federal consequence management response will entail the involvement of FEMA, additional FRP departments and agencies, and the American Red Cross, as required.

In addition to the documents discussed above, information to assist with this planning can be found in the following FEMA documents:

- Introduction to State and Local EOP Planning Guidance
  Federal FY 2002 supplemental funding totaling $100 million is being provided to state and local governments to update their all-hazards Emergency Operations Plans (EOP), to include a focus on WMD incidents. The purpose of this guidance is to help state and local governments fine-tune their EOPs and address critical planning considerations to include interstate and intrastate mutual aid agreements, resource typing, resource standards, protection of critical infrastructure, inventory of critical response equipment and teams, continuity of operations and family and community preparednes
- Managing the Emergency Consequences of Terrorist Incidents – Interim Guidelines
  This is an interim planning guide that is designed to provide state and local emergency management planners with a framework for developing supplemental emergency operations plans that address the consequences of a terrorist attack involving weapons of mass destruction. It provides a consistent planning approach that encourages the efficient integration of state, local and federal terrorism response activities and provides the most current information regarding planning and operational challenges faced by communities that have dealt with terrorist events.

- Tool Kit for Managing the Emergency Consequences of Terrorist Incidents
  This tool kit provides forms, checklists and charts to facilitate state and local planning for a terrorist incident. It includes a capability assessment survey, a checklist of functional responsibilities and emergency public information activities as well as tools for direction and control, managing resources and disseminating warnings.
- CONPLAN – Federal Interagency Domestic Terrorism Concept of Operations Plan
  The CONPLAN provides overall guidance to federal, state and local agencies concerning how the federal government would respond to a potential or actual terrorist threat or incident that occurs in the United States, particularly one involving WMD.
- Hazardous Materials Planning Guide 2001 Update
  This 2001 update of the National Response Team's Hazardous Materials Emergency Planning Guide (NRT-1) provides guidance on developing state and local emergency response plans for hazardous materials events. It can be found under "New Publications." The National Response Team is made up of 16 federal agencies, each with responsibilities and expertise in emergency response to hazardous chemical releases, oil discharges and other toxic spills.
- Comprehensive HazMat Emergency Response – Capability Assessment Program (CHER-CAP)
  CHER-CAP is a comprehensive preparedness program offered by FEMA to local communities and Tribal governments to address HazMat incidents. It is designed to help communities better understand HazMat risks, identify planning deficiencies, update plans, train first responders and identify systemic strengths and needed improvements.
- CSEPP (Chemical Stockpile Emergency Preparedness Program) Planning Guidance
  The primary strategic document providing state, local and Army installation planners with guidelines for formulating and coordinating emergency plans and the associated emergency response systems for chemical events that may occur at the chemical agent stockpile storage locations in the continental United States.

2. Terrorist Threat-Specific Planning Approach

The Metropolitan Medical Strike Team Model

The second approach is exemplified by the Metropolitan Medical Strike Team Model (MMST). The first MMSTs were established as prototypes in Arlington County in the metropolitan area of Washington, DC and in preparation for the 1996 Centennial Olympic Games in Atlanta. More than 120 cities and metropolitan areas have used the funds provided by the Department of Health and Human Services (DHHS) to plan and equip systems with specially trained first responders, special pharmaceuticals and decontamination equipment, on-site health care, and enhanced emergency medical transportation and emergency room capabilities.

This approach was developed from the Domestic Preparedness Program of the Nunn-Lugar-Domenici legislation, which also called for the Army's Chemical and Biological Defense Command (CBD-COM) to design a train-the-trainer program to build on the existing knowledge and capabilities of local first responders—fire, law enforcement, and medical personnel and hazmat technicians—who would face a WMD incident during the first hours.

MMSTs are designed to provide initial, on-site response and provide for transportation of decontaminated patients to hospital emergency rooms in the event of a terrorist attack. They are also capable of providing medical and mental health care to victims of such attacks and moving victims to other regions if local health care resources are overrun. MMSTs consist of fire service, EMS, physicians, nurses, and law enforcement officials. The team is divided into three groups which rotate assignments. Therefore, one task force is always on duty, the second is on standby and the third is off.

When an accident involving hazardous materials occurs, whether transportation or fixed-facility, parameters exist. Terrorism exists without parameters. While those who use the MMST model acknowledge that a nuclear or chemical WMD event is, inherently, a hazmat incident, their approach states that "there are significant differences between the two types of incident that influence a civil jurisdiction's response planning, organization, training, equipment, operational procedures, and coordination requirements."

An introduction to San Jose's Response Plan for Terrorist Incidents involving WMD Nuclear, Biological, or Chemical Agents (NBC) states that such a terrorist incident may be characterized by:

- The use of WMD designed to inflict mass casualties
- The high lethality of biological or chemical agents
- The extremely toxic environment resulting from NBC/WMD
- The initial ambiguity in determining what type of NBC weapon or agent is involved
- The potential for a combination of weapons/agents each presenting different response requirements, i.e., explosives and chemical agents or simultaneous explosives, chemical agents, and radioactive material dispersal
- The narrow window-of-response time to administer lifesaving antidotes for chemical agents and antibiotics for biological agents
- The need for immediate medical treatment for mass casualties
- The need for immediately available specialized pharmaceuticals
- The need for specialized WMD/NBC detection equipment
- The need for a timely, efficient, and effective mass decontamination system
- The need for an organized, trained, and equipped health and medical services emergency response unit to immediately augment the local HAZMAT/EMS response
- The need for pre-event coordination with hospitals and medical treatment centers to establish medical treatment protocols, stock appropriate pharmaceuticals, and determine treatment procedure requirements and
- The need to accomplish advance planning and coordination to respond to each of the needs identified above

Following is the MMST Model Table of Contents, showing how the plan is organized:

- Introduction
- Mission, Concept of Operations, Organization, and NDMS Interface
- Training (DRAFT)
- NBC use Indicators and Response Concerns for First Responders
- Operations Management Guide:
  - Describes each of the four phases in which NBC terrorism preparedness and response activities are categorized: awareness, alert, warning, and response
  - Lists the indications of a Terrorist Incident involving NBC/WMD and outlines the operational considerations
  - Describes coordination of response efforts and use of ICS for initial command and control, and expansion of ICS to unified command
- Operational Checklists
- Bioterrorism Response Plan: Recognition and Evaluation
- Bioterrorism Response Plan: Casualty Management Strategy
- Bioterrorism Response Plan: Site Management Strategy
- Bioterrorism Response Plan: Site Management Strategy Table
- Bioterrorism Response Plan: Non-Site Management Strategy
- Mass Fatality Management
- Recovery Plan
- Supplemental Planning Guide - Health & Medical Services
- Supplemental Planning Guide - Law Enforcement
- Appendix A - Incident Exposure Report
- Appendix B - Patient Decontamination Procedure
- Appendix C - Technical Decontamination Procedure
- Appendix D - Emergency Decontamination Procedure
- Appendix E - Equipment Cache Requirements
- Appendix F - Pharmaceutical Support

Hazardous Materials and Terrorist Incident Response Planning

Curriculum Guidelines:

Appendix D: National Response Team's Integrated Contingency Plan Guidance

Note: This material was published in the Federal Register on Wednesday, June 5, 1996, and is reprinted in its entirety in this appendix. Page numbers shown are those from the Federal Register publication.

Hazardous Materials and Terrorist Incident Prevention

Curriculum Guidelines

Hazardous Materials

Prevention Training Guidelines

Prevention Training Issues

General Training Issues

INTRODUCTION

Since most hazardous materials accidents are caused by human activities, communitites and emploers can influence the probability of incidents and the magnitude of their effects by emphasizing **prevention** in hazardous materials emergency management. As defined here, prevention is a "*proactive attitude, effort, and process for eliminating or reducing the effects of hazardous materials events in advance of occurrence."* In other words, prevention focuses on helping communities and citizens avoid becoming disaster victims in the first place, and reducing the impact of incidents when they occur.

Hazardous materials prevention includes efforts to eliminate or reduce risk due to either accidental releases of hazardous materials or exposure to toxic substances. Basic prevention strategies can be broadly summarized as follows:

- Improve methods and procedures for storing, transporting, handling, and processing hazardous materials.

- Promote compliance with safety codes, regulations, and statutes.

- Develop and enforce land use plans that regulate the location of sites with hazardous chemicals.

- Increase public and community awareness and support for prevention.

Well-designed prevention programs have been shown to reduce loss of life, property, and environmental damage from disasters. The Occupational Safety and Health Administration (OSHA) concludes that "a strong correlation (exists) between the application of sound management practices in the operation of safety and health programs and a low incidence of occupational injuries and illnesses. Where effective safety and health management is practiced, injury and illness rates are significantly less than rates at comparable worksites where safety and health management is weak or non-existent" (*Safety and Health Program Management Guidelines; Issuance of Voluntary Guidelines*).

As noted by the Federal Emergency Management Agency (FEMA), "experience has shown again and again that lives can be saved, damage to property can be reduced significantly, and economic recovery can be accelerated by consistently building safer and stronger buildings, strengthening existing infrastructures, enforcing building codes, and making the proper preparations BEFORE a disaster occurs. More important, mitigation investments by...businesses and citizens...will enhance and strengthen the economic structure, stability, and future of (the) community regardless of when a disaster may strike" (*Project Impact Guidebook)*.

In recent years, both government and industry have made significant strides in hazardous materials prevention. However, more must be done to encourage a change from the traditional focus on disaster preparedness and response to a new emphasis on accident prevention. This shift in perspective by business leaders and emergency management professionals will require adjustments in corporate and community attitudes about prevention, improvements in safety management methods and technologies, better access to information and research, and a strengthened cooperation between government agencies and hazardous materials end users.

One of the most effective ways of promoting this transition is through prevention training and education programs. Training helps employees understand the nature and causes of potential safety problems, apply safe work practices and procedures, and participate in the design of effective prevention programs. For this reason, federal and state agencies have consistently identified training as a critical component in all prevention activities.

This document identifies training requirements for public and private sector personnel who have a role in hazardous materials prevention. The information is organized into three sections:

- A narrative overview describing the nature of hazardous materials prevention, related programs, and training activities.
- A description of prevention training audience categories and training requirements presented in the form of detailed instructional objectives.
- Appendices that summarize prevention laws, regulations, programs, and other information helpful to training managers.

HAZARDOUS MATERIALS PREVENTION

The Philosophy of Prevention

Hazardous materials prevention is based on the concept that the majority of accidents don't just happen—they are caused. While the use of chemicals may involve risk, the factors that precipitate most accidents are at some point under an organization's or an individual's control. Therefore, most chemical accidents and the damage they cause are by definition preventable.

Hazardous materials prevention is not new. For many years, federal and state governments have issued regulations governing workplace safety, transportation safety, and environmental safety. Communities have assessed local hazards, managed land use, enforced safety codes, and conducted public education activities. Businesses have implemented safety programs to protect worker health and minimize the potential for accidental releases of and exposures to toxic substances.

The benefits to communities and employers of well-designed prevention programs have proven to be significant. These benefits include reductions in hazardous materials incidents and accidents; fewer deaths and injuries to workers and citizens; improvements in employee skills, productivity, and morale; lower insurance and operating costs; decreased damage and cleanup costs; elimination of regulatory penalties; and protection against litigation. As FEMA notes in its Strategic Plan (FY 1998-2007), "no other approach is as effective over the long term."

Although the concept of prevention is well established, the practice of making safety a primary focus of production and emergency management may be new to some organizations. Prevention requires identifying safety as a basic goal and priority of hazardous materials operations. The objective is accomplished through formal programs that incorporate a systematic analysis of potential hazards, a comprehensive effort to eliminate or minimize risk, and activities that foster a safety culture among workers and the public.

A key element of this new emphasis on prevention is the concept of a **public/private sector partnership** to promote hazardous materials safety. Increasingly, communities, businesses, and professional associations recognize the mutual benefits of cooperation and coordination in prevention program planning and development. For example, FEMA's concept of ***Disaster Resistant Communities*** aims to bring together private industry, insurance providers, mortgage lenders, the real estate industry, homebuilding associations, citizens, and others to create model communities in high-risk areas. Other federal initiatives strive to promote understanding and cooperation between government and industry, and to simplify unnecessarily burdensome and confusing regulations.

Everyone who can affect hazardous materials prevention has a role in this partnership. The federal government establishes minimum safety standards, provides incentives and guidelines for compliance, conducts inspection and enforcement activities, and supplies assistance and resources, including training. State governments serve as a conduit for federal programs, and provide supplementary programs, regulations, and assistance. Local jurisdictions identify and assess hazards, develop prevention strategies and plans that address community needs, and implement programs to enforce safety standards and protect the public health.

General Training Issues

Although government plays a key role in prevention, organizations that process, store, handle, and transport hazardous materials are in the best position to actually eliminate or mitigate against accidents. Employers in both the public and private sectors are ultimately responsible for the safety of chemical operations and for coordinating prevention activities within the community. They accomplish these goals through programs and activities that are appropriate to the hazards involved and in full compliance with legal requirements.

The general public also has a role in hazardous materials prevention. With adequate information, community groups, professional associations, and individual citizens can provide valuable support and resources to government prevention programs and initiatives. They also contribute to hazardous materials prevention by preparing individual and family preparedness plans that address household chemicals, and by maintaining safe homes and workplaces.

In addition to the concept of a public/private partnership, other aspects of this new philosophy on prevention include the following:

- A focus on safety must be evident during the complete life cycle of hazardous materials, from design and testing to production, storage, transportation, use, treatment, and disposal. This approach implies methods to systematically evaluate entire operations, as well as comprehensive programs that address all phases of production and transportation operations.

- Organizations that use hazardous materials should first attempt to eliminate the *possibility* of accidents or exposures by substituting inherently safer technologies or less hazardous substances in existing operations. If this approach is not feasible, other measures should be considered to reduce the *probability* or *severity* of accidents.

- Communities and employers should recognize that costs for prevention may not be extensive, and many measures will pay for themselves over time. Costs and benefits should be established early in the planning process, even though it may be difficult to estimate savings that accrue by avoiding accidents and exposures.

- Safety management techniques and technologies are continually evolving. When possible, communities and professional associations should promote activities that foster research, information sharing, technology transfer, and the development of a supportive regulatory and economic environment for organizational innovation.

Prevention Legal Authorities

Hazardous materials safety efforts have expanded over the last two decades with the addition of numerous laws, regulations, and standards. These legal authorities address separate pieces of the hazardous materials problem, and are administered by different agencies at all levels of government.

On the community level, planning for prevention is often considered a natural extension of state and local governments' responsibility for developing emergency operations plans. In effect, planning team members "piggyback" and expand on the hazards analysis conducted for response planning to prepare prevention strategies and plans. These materials are often incorporated as an annex to the community's emergency operations plan. A number of federal laws, regulations, and guidelines apply to this process. (For more information, see the *Hazardous Materials Planning Curriculum Guidelines*.)

- Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)
- OSHA Hazardous Waste Operations and Emergency Response (29 CFR 1910.120)
- Resource Conservation and Recovery Act (RCRA)
- FEMA Emergency Operations Plan Requirements (44 CFR Part 302)
- Guide for All-Hazard Emergency Operations Planning (FEMA SLG 101)
- Hazardous Materials Emergency Planning Guide (NRT-1)
- Technical Guidance for Hazards Analysis (EPA/FEMA/DOT)
- Handbook of Chemical Hazard Analysis Procedures (FEMA/DOT/EPA)

Public and private sector facilities that store, handle, or transport certain types and quantities of hazardous materials are also subject to federal contingency planning regulations. Although different requirements may apply to different facilities and operations, the National Response Team's Integrated Contingency Plan (ICP) Guidance provides a format for complying with the various planning regulations in one functional emergency response plan. Annex 7 of the ICP addresses prevention-based requirements that are specified in the regulations or that may impact response activities. (For more information, see the *Hazardous Materials Planning Curriculum Guidelines*.)

Federal statutes, regulations, and national codes that specifically address hazardous materials prevention safety are listed below and described further in Appendix A:

- Hazardous Materials Transportation Act
- Hazardous Materials Transportation Uniform Safety Act
- Hazardous Materials Regulations (49 CFR Parts 171-180)
- The Occupational Safety and Health Act of 1970
- OSHA Process Safety Management of Highly Hazardous Chemicals (29 CFR 1910.119)
- OSHA Hazard Communication Standard (29 CFR 1910.1200/1926.59)
- OSHA Safety and Health Program Management Guidelines (Federal Register 54(18):3908-3916, January 26, 1989)
- The Clean Air Act Amendments of 1990 (Public Law 101-549)
- EPA Accidental Release Prevention Requirements: Risk Management Programs Under Clean Air Act, Section 112(r)(7) (40 CFR Part 68)

In addition to these authorities, the *Occupational Safety and Health Act of 1970* encourages states to develop and operate their own job safety and health plans. States with plans approved under section 18(b) of the law must adopt standards and enforce requirements that are at least as effective as federal requirements. Many local jurisdictions also adopt specific policies, regulations, and codes that affect hazardous materials prevention requirements. As a result, agencies and facilities with a role in hazardous materials prevention are encouraged to thoroughly research state and local authorities during program analysis and planning.

Finally, jurisdictions adopt and enforce standards and codes that define safe practices and procedures in the use of hazardous materials. These codes may govern design and construction of buildings, fire prevention, land use planning (zoning and occupancy), employee safety, accident prevention, public health, environmental quality, and related areas. Several important national codes developed by cognizant professional associations are described in Appendix A.

Prevention Programs

The key to prevention programs is improving the safety of methods used to store, transport, handle, and process hazardous materials. This is true whether the requirement exists in business and industrial operations or in government managed facilities (water treatment plants, sewer systems, utilities, etc.). Broad strategies and methods for accomplishing this goal include:

1. Use of less hazardous alternatives. Examples of this approach include the use of inherently safer technologies, substitution of non-toxic or less toxic materials, reassessment of plant layout to isolate hazardous substances, and reduction of chemical stockpiles through efficient management of inventory.

2. Engineering controls. Examples of engineering controls commonly used in hazardous materials operations include ventilation systems, containment systems, detection and monitoring systems, robotic controls, physical barriers, isolation controls, electrical protection, sprinklers, and pollution control technologies.

3. Safety information. Accurate safety information must be accessible by all end users, including secondary processors, distributors, transporters, contractors, and workers. Tactics used to

accomplish this objective include employee training, labeling and placarding, and process safety information management systems. Establishing an effective labor-management dialogue on safety is also important.

4. Standard operating guidelines (SOGs). These guidelines distill the analysis conducted during the hazard assessment, systems design, and safety planning phases into job-specific procedures and worker performance standards and expectations. Development and enforcement of SOGs define and implement safe working practices for each hazardous materials application.

5. Administrative actions. Personnel management systems and procedures often have great potential for enhancing prevention, often at little cost. Examples include reducing employee shift length, cross-training, or rotating employees to keep them alert; improving security and access control systems; modifying maintenance and housekeeping schedules and procedures; identifying safety as a factor in organizational goals and objectives, worker performance reviews, and management incentives; and integrating planning with the community and local health care facilities.

6. Personal protective equipment. When exposure is less controllable, adequate personal protective equipment (PPE) and related training must be made available. Examples of PPE include chemical resistant gloves, aprons, face shields, respiratory protection, etc.

Although prevention is first and foremost a responsibility of hazardous materials users, government oversight agencies, insurance companies, professional associations, community groups, and others can do much to promote safety. Examples of activities used to motivate and support facilities and transporters in prevention include:

- Legislation, regulations, and standards that clarify prevention requirements and programmatic guidelines
- Community right-to-know policies and information management systems
- Land use planning and zoning (set back, density, relocation, land acquisition, etc.)
- Plans review and permitting programs for building and operational systems designs
- Inspections and enforcement of hazardous materials and other safety codes
- Environmental and hazard monitoring systems
- Public education and information activities
- Disaster insurance (premium reductions, criteria for coverage, etc.)
- Tax incentives/disincentives and financial resources
- Methods to foster improved public/private sector coordination and cooperation
- Research and information dissemination

Obviously, the concept of prevention covers a broad spectrum of strategies and tactics conducted by many different types of organizations. The nature of prevention programs is equally diverse, depending on such factors as the mission of the organization, the types and quantities of chemicals involved, financial and personnel resources, legal requirements, etc. However, all prevention programs should be based on a thorough hazard assessment, and include a comprehensive and systematic program planning process appropriate to the organization's needs.

Exhibit 1, *Prevention Program Model*, identifies common functional elements of prevention programs. These elements are derived from a review of federal regulations and guidelines (see Appendix A), with emphasis on OSHA's *Process Safety Management Standard*. Although each organization will tailor this program model to its own needs, the exhibit demonstrates the potential scope of prevention activities. The model also is useful as a conceptual framework for program planning and for identifying training audiences and instructional requirements.

Exhibit 1
PREVENTION PROGRAM MODEL

1.0 Prevention Program Analysis and Planning
- 1.1 Review of Authorities and Statutory Mandates
- 1.2 Hazards Analysis
- 1.3 Program Planning
- 1.4 Program Implementation, Evaluation, and Maintenance
- 1.5 Interagency Coordination and Cooperation

2.0 Employee Participation, Education, and Training
- 2.1 Employee Participation
- 2.2 Employee Education and Training

3.0 Process Design, Plans Review, and Construction
- 3.1 Facility and Systems/Process Design and Construction
- 3.2 Transportation and Storage Design and Construction
- 3.3 Plans Review and Permitting

4.0 Safety Systems
- 4.1 Pre-Startup Safety Reviews
- 4.2 Maintenance/Mechanical Integrity
- 4.3 Management of Change

5.0 Process Operations
- 5.1 Systems/Process Safety Information
- 5.2 Operating Guidelines and Practices
- 5.3 Contractor Safety

6.0 Compliance
- 6.1 Safety Inspections, Investigations, and Enforcement
- 6.2 Compliance and Safety Audits
- 6.3 Recordkeeping and Reporting

7.0 Public Information and Education
- 7.1 Public Awareness/Prevention Communication
- 7.2 Family and Individual Preparedness

General Training Issues

PREVENTION TRAINING AND EDUCATION

Rationale for Prevention Training and Education

Of all prevention strategies, training and education programs may be the most effective. Well-designed training programs significantly reduce the number and severity of incidents arising from process operations, and help prevent small problems from leading to a catastrophic release. The Department of Transportation notes simply that “training is the best means of preventing hazardous materials accidents” (*Training For the Safe Transportation of Hazardous Materials*, RSPA, 1997).

Why is training so effective? Studies have identified as among the barriers to effective prevention programs:

- Inadequate information about chemical hazards, the causes of accidents, safer technologies, and related costs.
- A lack of managerial awareness and expertise about preventive measures and regulatory requirements.
- Organizational obstacles based on corporate attitudes.
- Limited communications among public officials, employers, and workers.
- Inadequate employee and citizen knowledge about safety and prevention.

An effective method for addressing all of these problems is training and education programs targeted to the various groups with a role in prevention. Training programs increase employee awareness of hazards and help workers understand the nature and causes of potential problems. They provide opportunities for individuals to learn and practice safety systems and procedures in a risk-free environment. And they contribute to the development of a safety culture within the organization that motivates worker participation in hazard identification, program planning, safety audits, incident reviews, and other prevention activities.

Training is also critical for public officials, executives, managers, and others not directly involved in hazardous materials operations. Promoting change within organizations is most effective when the process starts at the top. Shifting the traditional focus from productivity and emergency preparedness to prevention requires changing the mindset of decision-makers in government, business, and industry. The same is true for design professionals and technical experts—architects, engineers, consultants, etc.—that plan operational systems and contribute to policy development.

Recognizing the importance and benefits of prevention training, OSHA, DOT, EPA, and other federal agencies have identified training requirements and guidelines for hazardous materials employers. General requirements are summarized in Appendix B; training managers may need to research more specific mandates for different industrial sectors and employer types.

Prevention Training Challenges

Although hazardous materials prevention training is mandated by law, and the potential benefits are well established, too few organizations place an adequate emphasis on this safety strategy. Several reasons exist for this state of affairs:

1. The benefits of prevention are often poorly understood and difficult to quantify. As a result, some organizations place a low priority on prevention initiatives, including training. This is especially true in smaller commercial operations, where safety information is limited and resources are tight.

2. Traditionally, employee training has focused on improving productivity, with prevention viewed as an adjunct to workers’ primary job responsibilities. Thus, prevention training is not usually identified as a separate requirement or curriculum area, with the attention and resources it deserves.

3. Workplace safety is not identified as a separate competency in many professional schools of business management, architecture, engineering, public administration, etc. Opportunities to deliver prevention training to these key audiences may be limited.

4. An emphasis on hazardous materials safety as a primary objective of training is relatively new. Few course materials exist, and instructional guidelines for training managers, course developers, and instructors may be lacking or inadequate.

5. Prevention covers a very broad range of possible subject areas and audiences. The resulting scope of training program requirements can be overwhelming for some communities and facilities.

6. Prevention training is often highly technical and complex. Opportunities should be provided for students to practice key skills in a realistic but safe environment. As a result, training delivery often benefits by the use of specialized facilities and equipment that are beyond the resources of some organizations.

7. Recruitment for training activities can be difficult because organizations and audience members may place a low priority on prevention, or view prevention as an ancillary duty to primary work responsibilities.

How individual training managers deal with these challenges will depend on the organizational situation they face—management priorities, training requirements, safety concerns, resources, etc. However, three general principles can be stated: (1) educational activities designed to heighten the awareness of decision-makers about the organizational benefits of prevention should be considered early in program planning; (2) a comprehensive prevention training needs assessment should be prepared to identify priorities, appropriate training methodologies, and techniques for demonstrating competence; and (3) whenever possible, employee participation should be encouraged in the training development process.

THE PREVENTION CURRICULUM GUIDELINES

Organization of the Curriculum

The ultimate goal of the Prevention Curriculum is to improve safety in hazardous materials operations, thereby reducing the probability and severity of accidents and exposures. This goal is accomplished by enhancing participants' motivation and ability to develop and implement effective prevention programs and activities within their organizations. Instruction is intended to supplement, not replace, other job-specific education and training that audience members receive in their primary work functions.

The Prevention Curriculum addresses the training needs of two broad audience groups: persons who conduct hazardous materials operations, whether in the public or private sectors; and persons responsible for government and other oversight and enforcement programs to protect worker and citizen health. At this time, the general public is not identified as a curriculum audience, although personnel responsible for public information and education activities are included.

The Prevention Curriculum is organized into seven audience categories based on commonalties in knowledge and skill requirements. These categories are briefly described below; more detailed information on each is presented in the following sections.

Prevention Awareness describes the introductory training requirements of all audiences in the Hazardous Materials Prevention Curriculum. Instruction is intended to give participants general knowledge about prevention that can serve as a foundation for subsequent job-specific training. The audience includes anyone who has responsibilities in hazardous materials prevention or could influence prevention efforts at state and local levels. Participants are provided with 1) an introduction to basic prevention terminology and concepts, 2) an explanation of individual and organizational roles in prevention, and 3) an overview of common prevention methods and activities.

Prevention Policy Development describes the training requirements of persons who direct, manage, or own organizations that use hazardous materials—chief executives and senior managers from a broad spectrum of government, private sector, and non-profit organizations. In this role, audience members oversee the development and maintenance of the prevention program, and direct staff and others who implement the program on a day-to-day basis. They have the organizational authority to develop and enforce prevention program policies and to budget and expend related funds.

Prevention Program Management describes the training requirements of persons who develop or manage prevention programs and related activities for organizations that use hazardous materials. Individuals in this category are responsible for ensuring worker and public safety in hazardous materials operations, and for implementing the organizational policy and direction established by senior managers. The training audience consists of supervisory-level personnel in hazardous materials facilities and transport operations, both public and private. Since training requirements will depend on the size and nature of the operations, the audience is further subdivided as follows:

- Smaller/Less Complex Operations describes the training needs of persons that manage smaller and/or less complex hazardous materials operations, such as retail outlets, small energy distributors, trucking firms, and so forth.

- Larger/More Complex Operations describes the training needs of persons that manage prevention programs for larger producers, processors, and distributors of hazardous materials, including those subject to OSHA's *Process Safety Management (PSM) Standard*.

Community Prevention Program Management describes the training needs of persons who develop and manage state and local government hazardous materials prevention programs and activities (community hazards analysis, prevention planning, land use planning, construction plans review, inspection and codes enforcement, public education, etc.). The training audience includes government officials and others with supervisory-level responsibilities in community hazardous materials prevention—state environmental agency prevention managers, HMEP program managers, local response agency (fire, law enforcement, emergency medical services) prevention managers, hazardous materials planners, zoning board members, codes enforcement managers, emergency management program directors, and other community representatives.

Prevention in Operations describes the training requirements of persons who regulate, respond to, supervise or operate systems or processes that involve the use of hazardous materials. These employees are responsible for ensuring that hazardous materials prevention activities and safety requirements defined in safety management plans and SOGs are properly implemented and enforced. The training audience includes employees of public, private, and non-profit facilities, including large and small operations at industrial plants, commercial establishments, trucking and other transport companies, government agencies, health care operations, utilities, and many other types of organizations.

Design and Plans Review describes the training needs of persons who oversee and participate in the design, planning, approval, and construction of hazardous materials operations (plants, buildings, processing systems, equipment, etc.). Individuals performing this function are responsible for incorporating the requirements and recommended practices contained in prevention codes and standards into detailed plans, specifications, instructions, and other documents. The training audience includes members of the design team and community officials who oversee the process. A secondary audience includes persons that implement the approved design (procurement personnel, contractors, vendor representatives, production operators, etc.)

Inspection and Enforcement describes the training needs of persons who monitor, inspect, and evaluate safety in hazardous materials operations. In this role, audience members 1) identify risks and prevention opportunities associated with specific operations, and 2) assess and enforce compliance with established authorities and codes. The audience includes inspectors and enforcement officials from community agencies (fire service, police, health agency, etc.), and individuals with similar roles in public, private, and non-profit organizations (safety officers, production managers, shift supervisors, insurance company representatives, consultants, etc.).

Use of the Guidelines

The following section of the *Prevention Curriculum Guidelines* identifies training requirements for each audience category defined above. This analysis is presented in the form of detailed terminal and enabling instructional objectives that define basic competencies audience members need to successfully perform their prevention responsibilities. Narrative information describing each curriculum area—purpose of training, target audiences, subject matter content, and recommended training methodologies—is included.

The training requirements identified here are compatible with the prevention philosophies and strategies contained in federal regulations and guidelines (see Appendix A) and other respected studies. However, the curriculum model is necessarily general in nature. State and local training managers will have to match the unique roles and responsibilities of their personnel with the categories in the model, or tailor the model to meet their specific needs. Assistance in this process will be addressed in the *Guidelines for Training Program Management* section of subsequent editions of this manual.

To minimize confusion, some important terminology is clarified below.

- "Accidental releases," "accidents," "incidents," and "events" are used interchangeably to define emergency situations that have the potential for adverse effects on human health, property, and the environment.

- The terms "operations" and "system/process" are broadly defined to mean any activity involving a hazardous chemical, including the storage, manufacturing, processing, handling, on-site movement, or transportation of such materials.

- "Hazards assessment" and "hazards analysis" are used interchangeably to describe the general process of identifying, categorizing, and assessing the risk of hazardous materials accidents and exposures. The specific approach used for this process will depend upon organizational needs, resources, and preferences.

- "Risk" means the potential losses associated with a hazard and is defined in terms of expected probability, frequency, magnitude, severity, exposure, and consequences.

- "Facility" is broadly defined to include the buildings, containers, and equipment that house a hazardous materials operation or system/process .

Hazardous Materials

Prevention Training Guidelines

Prevention Awareness

General Training Considerations

Introduction

Prevention Awareness describes the introductory training requirements of all audiences in the Hazardous Materials Prevention Curriculum. Instruction in this area is intended to give participants a general knowledge base about prevention that can serve as a foundation for subsequent job-specific training.

The goal of Prevention Awareness training is to enhance participants' understanding of the importance and benefits of prevention, and to motivate them to seek additional information and assistance as needed. This goal is accomplished by providing students with 1) an introduction to basic prevention terminology and concepts, 2) an explanation of individual and organizational roles in prevention, and 3) an overview of common prevention methods and activities.

(Note: As defined here, Prevention Awareness is a common training requirement for all audiences, not a unique audience category. This material would typically be included in training delivered to each of the audiences described in the following sections. It is presented as a separate category to minimize redundancy and to facilitate use for mixed audiences, non-hazmat workers, and the general public.)

Audience

The training audience for Prevention Awareness includes everyone that has responsibilities in hazardous materials prevention or could influence prevention efforts at the state and local levels. Specifically included are employees of hazardous materials facilities, transportation workers, and personnel in agencies and organizations that implement the community's prevention policies and plans. Other workers and the general public will also benefit by awareness training in prevention. Potential audiences include union members, employee groups, civic organizations, volunteer agencies, activist groups, etc.

Training Requirement

Prevention Awareness training includes generic information about prevention and the community's prevention system. Also included is a general orientation to the student's work requirements and expectations. More specific knowledge and skills are defined for different audience groups in subsequent sections of these *Guidelines*.

At the conclusion of training, participants should be able to describe the hazardous materials prevention system as it applies to them, their responsibilities in that system, and ways to get further assistance. Possible content areas include:

Relevant technological hazards
Applicable laws, regulations, and codes
Common prevention strategies and activities
Community and organizational plans, roles, and activities
Sources of prevention information and training

Methodology Recommendations

Prevention Awareness training can usually be delivered in one to three hours of classroom instruction. Content is typically presented as an introductory module in a broader training program for a specific audience group, although stand-alone training is possible. This type of awareness-level training can also be presented through the use of written materials and instructional media, a strategy that is particularly cost-effective for large and dispersed audiences. Other recommendations and considerations include the following:

- Training should emphasize the jurisdiction's strategies and methods for creating a disaster resistant community, and encourage the coordination and cooperation of government agencies and private sector organizations in hazardous materials prevention.

General Training Considerations

- Heterogenous audiences for Prevention Awareness training provide the opportunity for cross-disciplinary information sharing and networking among participants.

- Appropriate instructional methodologies include case studies, discussions, and small group activities to promote participant interaction and individual action planning.

- Although the bulk of Prevention Awareness training is by definition generic, some tailoring of course materials to specific audiences may be beneficial to account for differences in community hazards, prevention strategies and systems, job requirements, etc.

- The use of instructional media (videotapes, slides, graphics, etc.) to enhance the impact and efficiency of training is particularly appropriate for this audience.

Recommended Training
Prevention Awareness

Two types of statements are used to describe training requirements recommended for Prevention Awareness. Terminal objectives identify broad job competencies. Enabling objectives describe instructional accomplishments intended for a training (generally a classroom) environment. Together, these statements define generic training needs for all audience members. Hazardous materials training managers are encouraged to expand upon and refine this material to clarify the training requirements of specific audience groups.

The training objectives presented in the next section are consistent with federal requirements and national standards established for hazardous materials prevention. Included are FEMA and NRT prevention program planning guidelines for communities and facilities, DOT Transportation Regulations, various OSHA worker safety guidelines, EPA Accidental Release Prevention Requirements, and guidance disseminated by the chemical industry.

PAWR-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as PAWR-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended*** *Training Objectives*
PAWR-1	Given the hazards in a specific jurisdiction, describe the purpose and benefits of hazardous materials prevention.
PAWR-1.1	Define hazardous materials prevention, and describe the benefits of hazardous materials prevention programs.
PAWR-1.2	Define Comprehensive Emergency Management (CEM) and the integrated approach to hazardous materials prevention.
PAWR-1.3	Describe the nature of technological hazards facing the community.
PAWR-1.4	Describe the concept of disaster resistant communities.
PAWR-2	Describe relevant aspects of a hazardous materials prevention system.
PAWR-2.1	Identify key legislation, regulations, and policies governing hazardous materials prevention.

PAWR-2.2 Identify the roles and general responsibilities of federal, state, and local government agencies and private sector organizations in hazardous materials prevention.

PAWR-2.3 Describe the prevention planning process and participants.

PAWR-2.4 Identify the roles and general responsibilities of workers and citizens in hazardous materials prevention.

PAWR-2.5 Describe major prevention strategies, activities, and how these should be developed in the emergency operations plan and prevention plans.

PAWR-3 Given this model hazardous materials prevention program, describe common prevention activities.

PAWR-3.1 Describe activities associated with Prevention Program Analysis and Planning:

- Review of authorities and statutory mandates
- Hazard analysis
- Program planning
- Program implementation, evaluation, and maintenance
- Interagency coordination and cooperation

PAWR-3.2 Describe prevention activities associated with Employee Participation, Education, and Training:

- Employee participation
- Employee education and training

PAWR-3.3 Describe prevention activities associated with Design, Plans Review, and Construction:

- Facility and systems/process design and construction
- Transportation and storage design and construction
- Plans review and permitting

PAWR-3.4 Describe prevention activities associated with Safety Systems:

- Pre-startup safety reviews
- Maintenance/mechanical integrity
- Management of change

PAWR-3.5 Describe prevention activities associated with Operations:

- System/Process safety information
- Operating guidelines and practices
- Contractor safety

PAWR-3.6 Describe prevention activities associated with Compliance and Enforcement:

- Safety inspections, investigations, and enforcement
- Compliance and safety audits
- Record keeping and reporting

PAWR-3.7 Describe prevention activities associated with Public Information and Education:

- Public awareness/prevention communication
- Family and individual preparedness

Hazardous Materials

Prevention Training Guidelines

Prevention Policy Development

General Training Considerations

Introduction

Prevention Policy Development describes the training requirements of persons who direct or manage organizations that have defined responsibilities in hazardous materials prevention. In this role, audience members initiate and oversee the development and maintenance of the prevention program's mission statement, policies, strategies, goals, objectives, plans, activities, and administrative systems.

In their jobs, audience members direct staff and others who manage and implement prevention programs and activities. Tasks include initiating and directing the development of prevention programs, setting related policy, establishing priorities based on cost/benefit analyses and other information, allocating staff and resources, approving and monitoring plans, supporting program implementation and evaluation, and ensuring interagency liaison and coordination.

Training Audience

The training audience for Prevention Policy Development consists of chief executives and senior managers from a broad spectrum of public, private, and nonprofit organizations. Potential audience members include city and county elected and appointed officials, SERC and LEPC members, facility owners and managers, police and fire chiefs, planning commissioners, school boards, managers of financial institutions, hospital administrators, media executives and station managers, and officers of professional groups, fraternal organizations, and unions.

The training audience should reflect persons who have the organizational authority to develop and enforce prevention program policy and to budget and expend related funds. Some students, especially in smaller jurisdictions and organizations, will also have responsibility for supervising and implementing specific prevention programs and activities. Individuals with dual responsibilities may need additional training, described under Prevention Program Management, below.

Training Requirement

Persons responsible for Prevention Policy Development represent a broad range of organizations, with very different prevention program needs and resources. Thus, the job requirements of individual audience members may differ, sometimes dramatically. However, all students will benefit by awareness-level training in hazardous materials prevention concepts, techniques, and applications. Many also need training that is specific to their unique organizational and prevention program responsibilities (e.g., type of operations, legal and regulatory requirements, management systems, etc.).

As a prerequisite for training, students are assumed to already possess the management skills, technical support, and resources they need to carry out their assigned organizational responsibilities. Thus, the goal of training is to motivate effective prevention program leadership, promote prevention program excellence, and contribute to the development of a disaster resistant community by providing students with a heightened awareness of:

- The risks posed by hazardous materials to the community and the organization.
- The benefits of prevention programs and activities.
- Strategies and options for hazardous materials prevention.
- Organizational and individual roles and responsibilities in hazardous materials prevention.
- Related administrative and resource requirements.

Training Methodology Recommendations

Generic training that is appropriate for all audience members can usually be accomplished in one to three hours. Content should emphasize 1) the jurisdiction's strategy for developing and implementing prevention programs that contribute to the development of a disaster resistant community, and 2) the organization's and student's role in that system. Audiences should be heterogeneous whenever possible, reflecting the contribution of different types of organizations to the community's hazardous materials prevention system.

General Training Considerations

More training may be necessary to address the unique needs of different audience members, covering, for example, specific organizational hazards, regulatory requirements, prevention program activities, etc. If so, training managers should group students and tailor training accordingly. Instruction must be presented in such a way that nonspecialists can acquire the information they need to make informed management-level decisions.

Other training methodology recommendations and considerations include the following:

- Training should emphasize the jurisdiction's strategies and methods for developing a disaster resistant community, and encourage the coordination and cooperation of government agencies and private sector organizations in hazardous materials prevention.

- Instructional methodologies should include discussions and small group activities that promote participant interaction and support the resolution of conflicts.

- Course materials for heterogeneous audiences should include examples of prevention activities from various types of organizations, e.g., government agencies, public utilities, chemical transporters, industrial production facilities, hospitals, sewage treatment facilities, truck stops, and pipelines.

- The use of instructional media (videotapes, slides, overhead transparencies, etc.) to enhance the impact and efficiency of training is particularly appropriate for this audience.

- Special efforts may be needed to recruit students due to the nature of their organizational positions and the low priority sometimes afforded prevention programs and training.

Recommended Training

Prevention Policy Development

Two types of statements are used to describe training requirements recommended for Prevention Policy Development. Terminal objectives identify broad job competencies. Enabling objectives describe instructional competencies that lead to proficiency in the terminal objective. Together, these statements identify generic training needs for all audience members. Hazardous materials training managers are encouraged to refine this material as necessary to clarify the training requirements of different audience groups (e.g., large chemical facility executives, LEPC members, hospital administrators, etc.).

The training objectives presented in the next section are consistent with federal requirements and national standards. Included are FEMA and NRT planning guidelines for communities and facilities, DOT Transportation Regulations, various OSHA worker safety guidelines, EPA requirements, and guidance disseminated by the chemical industry.

PLCY-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as PLCY-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
PLCY-1	Given an over view of prevention concepts and activities (see *Prevention Awareness*), analyze the organization's prevention program mission, policies, goals, objectives, strategies, activities, and plans.
PLCY-1.1	Describe guidelines for researching and assessing hazardous materials prevention authorities and statutory mandates.
PLCY-1.2	Describe guidelines for identifying and analyzing technological hazards, vulnerabilities, and risks.
PLCY-1.3	Describe guidelines for developing or refining the organization's hazardous materials prevention program mission statement and policies.
PLCY-1.4	Describe guidelines for developing or refining the prevention program's short- and long-term goals, measurable objectives, and evaluation criteria.
PLCY-1.5	Describe guidelines for identifying and analyzing prevention program strategies and activities.
PLCY-1.6	Describe guidelines for preparing and coordinating short- and long-range prevention program plans.

PLCY-1.7 Describe common prevention program implementation shortfalls and opportunities.

PLCY-2 Given the program strategy and plans, identify administrative systems and resources needed to implement the program.

PLCY-2.1 Describe guidelines for determining the scope of the prevention program's administrative and resource requirements.

PLCY-2.2 Describe guidelines for assessing existing personnel, available resources, organizational capabilities, competing requirements, and staffing alternatives.

PLCY-2.3 Describe possible funding resources and alternatives.

PLCY-2.4 Describe methods to assess organizational impacts (economic, legal, public relations, etc.) resulting from different resource allocation strategies and program outcomes.

PLCY-3 Given implementation of the organization's prevention program, support and sustain evaluation and maintenance of the program.

PLCY-3.1 Describe guidelines for monitoring program activities and measuring progress in implementing prevention strategies.

PLCY-3.2 Describe guidelines for evaluating and refining program systems, strategies, plans, budgets, procedures, etc. to enhance prevention.

PLCY-3.3 Describe guidelines for ensuring long-term compliance with legal requirements and maintaining interagency liaison and coordination.

PLCY-4 Given a review of prevention program needs, identify additional sources of information, assistance, and training.

PLCY-4.1 Assess individual and organizational needs for additional information, assistance, and training.

PLCY-4.2 Identify and describe methods to research and evaluate information, assistance, and training available through government and private sector sources.

Prevention Training Issues
Prevention Awareness
Prevention Policy Development
Community Prevention Program Management
Prevention in Operations
Design & Plans Review
Inspection & Enforcement
Appendix A: Prevention Authorities
Appendix B: Training Mandates
Appendix C: Federal Programs
Appendix D: OSHA 1910.119

Hazardous Materials

Prevention Training Guidelines

Community Prevention Program Management

General Training Considerations

Introduction

Community Prevention Program Management describes the training requirements of persons who develop and manage state and local government hazardous materials prevention programs and activities. These activities include community hazard analysis, prevention planning, land use planning, construction plans review, inspection and codes enforcement, public education, and other efforts designed to enhance worker and public safety and contribute to the development of a disaster resistant community. (Note: Governmental entities may also be involved in hazardous materials operations—the processing, storage, handling, or transport of regulated chemicals—for example in waste water treatment plants, utilities, medical care facilities, military applications, etc. Training requirements for managers of these types of operations is covered under *Prevention Program Management*.)

Persons performing Community Prevention Program Management are responsible for implementing the organizational policy and direction established by senior managers (see *Prevention Policy Development*). Tasks include conducting and/or supervising staff and consultants (e.g., architects, engineers, and other technical specialists) in the following types of prevention activities:

- Assisting senior managers in writing prevention policy, establishing prevention goals, designing related administrative systems, assessing budgets, promoting interagency coordination, developing evaluation criteria, and so forth.

- Researching and assessing prevention legal requirements, technological hazards, potential incident impacts, and organizational capabilities.

- Analyzing prevention strategies and options (i.e., activities designed to prevent and mitigate hazardous materials incidents).

- Determining prevention training needs, developing course materials, managing training programs, and delivering instruction.

- Developing prevention program staff plans and schedules, negotiating subcontractor arrangements, assigning personnel, monitoring and evaluating performance, and tracking expenditures.

- Implementing specific prevention activities, monitoring progress, evaluating outcomes, and recommending changes to improve safety and program effectiveness.

Training Audience

The training audience for Community Prevention Program Management consists primarily of government officials and others with supervisory-level responsibilities in community hazardous materials prevention. Potential audience members include state environmental agency prevention managers, Hazardous Materials Emergency Preparedness (HMEP) program managers, local response agency (fire, law enforcement, emergency medical services) prevention program managers, hazardous materials planners, zoning board members, codes enforcement managers, emergency management program directors, and other representatives of community organizations that have a defined role in hazardous materials prevention.

Training Requirement

Candidates for instruction in this curriculum area are assumed to already possess basic management skills and expertise in their areas of responsibility (fire prevention, code enforcement, plans review, etc.). Thus, the goal of training is to improve leadership and enhance safety programs by providing students with supplementary knowledge and skills in hazardous materials incident prevention and related activities.

The job and training requirements of individual audience members will vary depending on their roles and responsibilities. For example, the needs of agency officials in large metropolitan areas and rapidly growing jurisdictions may exceed those in smaller, rural, and established communities. However, all audience members will benefit by generic training in hazardous materials prevention concepts, techniques, and applications. Possible content areas include:

- The prevention program manager's role and responsibilities.
- The organization's prevention mission and policies.
- State-of-the-art prevention program strategies, concepts, and techniques.
- Methodologies to enhance program planning, implementation, monitoring, and evaluation.
- Problem solving methods and techniques.

For instruction to be most effective, audience members should be grouped to the extent possible by prevention program type and the technical requirements of the job. Training can then address any specialized knowledge and skills needed by different groups. Possible content areas for advanced training include legislative and regulatory requirements, hazard analysis techniques, planning strategies, and prevention applications.

Training Methodology Recommendations

General training in Community Prevention Program Management can usually be accomplished in one to three days of instruction. More time may be appropriate for audiences with greater needs. Instructional methodologies should emphasize case studies and examples relevant to the audience. Participant activities should highlight innovative approaches to prevention and practical solutions to common problems. Other training methodology recommendations and considerations include the following:

- Training should emphasize the jurisdiction's strategies and methods for creating a disaster resistant community, and encourage the coordination and cooperation of government agencies and private sector organizations in hazardous materials prevention.

- Student activities should encourage participant interaction and provide ample opportunities for practice and application of acquired skills. Checklists, job aids, and other practical tools should be included in the course materials.

- Activities should focus on the development of useful work products (e.g., hazards analyses, work plans, program strategies, etc.) under classroom conditions that are as realistic as possible. Methods to transfer learning back to the job should be emphasized.

- Instructors need significant practical experience and technical expertise in prevention programs relevant to the audience's needs. Familiarity with state and local program requirements and systems is also important.

Recommended Training

Community Prevention Program Management

Two types of statements are used to describe training requirements recommended for Prevention Program Management. Terminal objectives identify broad job competencies. Enabling objectives describe instructional competencies that lead to proficiency in the terminal objective. Together, these statements identify generic training needs for all audience members. Hazardous materials training managers are encouraged to refine this material as necessary to clarify the training requirements of different audience groups (e.g., retail operations, health care facilities, etc.).

The training objectives presented in the next section are consistent with federal requirements and national standards. Included are FEMA and NRT planning guidelines for communities and facilities, DOT Transportation Regulations, various OSHA worker safety guidelines, EPA requirements, and guidance disseminated by the chemical industry.

COMM-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as COMM-1.1) indicate enabling objectives supporting the primary objective.

Identification — ***Recommended*** *Training Objectives*

COMM-1 Given an overview of prevention concepts and activities (see *Prevention Awareness*) and a specific state or local jurisdiction, describe the community's hazardous materials prevention system.

COMM-1.1 Describe general prevention planning guidelines and roles for state and local jurisdictions contained in the following authorities (see *Hazardous Materials Planning Curriculum Guidelines* for more information):

- Robert T. Stafford Disaster Relief and Emergency Assistance Act
- Title III of the Superfund Amendments Reauthorization Act (SARA)
- Guide for All-Hazard Emergency Operations Planning (SLG-101)
- Hazardous Materials Emergency Planning Guide (NRT-1)
- OSHA 29 CFR 1910.120 and EPA 40 CFR
- State and local laws and regulations

COMM-1.2 Describe general prevention guidelines and roles contained in:

- State and local legislation, regulations, and policies
- State and local emergency operations and prevention plans
- State and local planning and zoning ordinances
- State and local building, fire, hazardous materials, health, and other codes

COMM-2 Given the community's hazards analysis, identify related prevention program considerations and priorities. (See *Hazardous Materials Planning Curriculum Guidelines* for more information.)

COMM-2.1 Describe the hazards identified in the community's hazards analysis.

COMM-2.2 Describe guidelines and methods for evaluating and refining the community's hazards analysis, if appropriate.

COMM-2.3 Describe guidelines and methods for identifying planning considerations and prioritizing prevention activities to reflect the community's hazard analysis.

COMM-3 Given a community's hazards analysis, identify and assess options for promoting prevention through plans review and permitting programs.

COMM-3.1 Describe community systems and roles for promoting prevention through plans review and permitting programs.

COMM-3.2 Identify hazardous materials regulations, codes, and standards applicable to various design scenarios.

COMM-3.3 Describe guidelines, methods, and procedures for conducting hazardous materials prevention plans reviews and permitting activities, addressing such factors as:

- Consultation with facility management and design team members
- Review of design specifications, plans, and supporting documents
- Construction permitting and licensing (approval)
- Construction monitoring and consultation
- Inspection of new or modified facilities and operations
- Operational permits

COMM-3.4 Describe the essential elements and management requirements of hazardous materials prevention plans review and permitting programs.

COMM-3.5 Describe staffing strategies and recommended personnel qualifications for hazardous materials prevention plans review and permitting programs.

COMM-3.6 Describe guidelines and methods for determining administrative and resource requirements for hazardous materials prevention plans review and permitting programs.

COMM-4 Given a community's hazards analysis, identify and assess options for promoting prevention through inspections and enforcement activities.

COMM-4.1 Describe community systems and roles for conducting hazardous materials inspections and enforcement activities.

COMM-4.2 Describe key authorities governing the processing, storage, handling, and transport of hazardous materials, including:

- OSHA's General Safety and Health Provisions (29 CFR 1910.20)
- OSHA's Process Safety Management Standard (29 CFR 1910.119)
- The Clean Air Act Amendments (1990)
- EPA's Accidental Release Prevention Requirements (40 CFR Part 68)
- OSHA's Hazard Communication Standard (29 CFR 1910.1200)
- DOT's Hazardous Materials Regulations (49 CFR Parts 171-179)
- NRT's Integrated Contingency Plan Guidance

COMM-4.3 Describe guidelines, methods, and information sources for gathering hazardous materials data on facilities and operations, categorizing risks, and establishing priorities among inspection and enforcement requirements.

COMM-4.4 Describe guidelines, methods, and procedures for conducting hazardous materials inspections, addressing such factors as:

- Developing required forms, checklists, questionnaires, etc.
- Scheduling and planning site visits
- Briefing management and operating personnel
- Gathering inspection data
- Assessing the adequacy of plans, permits, process safety information, operating procedures, training, safety systems, etc.
- Identifying deficiencies and concerns
- Documenting and reporting results

COMM-4.5 Describe guidelines, methods, and procedures for enforcing compliance with hazardous materials inspection results (consultation, violation notices, citations, personnel actions, audits, legal actions, etc.).

COMM-4.6 Describe the essential elements and management requirements of hazardous materials inspection and enforcement programs.

COMM-4.7 Describe staffing strategies and recommended personnel qualifications for hazardous materials inspection and enforcement programs.

COMM-4.8 Describe guidelines and methods for determining administrative and resource requirements for hazardous materials inspection and enforcement programs.

COMM-5 Given a community's hazards analysis, identify and assess options for promoting prevention through incident record keeping, reporting, and investigations.

COMM-5.1 Describe community systems and roles for promoting prevention through incident record keeping, reporting, and investigations.

COMM-5.2 Describe appropriate data gathering forms and procedures for promoting incident reporting and record keeping.

COMM-5.3 Describe staffing strategies and recommended personnel qualifications for the hazardous materials incident investigation team, including requirements for training.

COMM-5.4 Describe strategies to ensure that hazardous materials prevention concepts and techniques are adequately considered during incident investigations.

COMM-5.5 Describe strategies for ensuring that hazardous materials incident investigation findings and recommendations are addressed, that corrective measures are adequately documented, and that results are considered in prevention program planning.

COMM-5.6 Describe guidelines and methods for determining administrative and resource requirements for hazardous materials investigations.

COMM-6 Given a community's hazards analysis, identify and assess options for promoting public information and education on hazardous materials prevention.

COMM-6.1 Describe community systems and roles for conducting hazardous materials public awareness/risk communication activities.

COMM-6.2 Describe community systems and roles for conducting individual and family preparedness public education activities in hazardous materials prevention.

COMM-6.3 Describe guidelines and methods for determining audience needs for hazardous materials public information and education activities.

COMM-6.4 Identify and assess communication strategies (media, participants, etc.) for hazardous materials public information and education programs.

COMM-6.5 Identify and assess existing materials and sources of assistance for hazardous materials public information and education programs.

COMM-6.6 Describe the essential elements and management requirements of hazardous materials public information and education programs.

COMM-6.7 Describe staffing strategies and recommended personnel qualifications for hazardous materials public information and education programs.

COMM-6.8 Describe guidelines and methods for determining administrative and resource requirements for public information and education programs and activities.

COMM-7 Given an analysis of prevention program risks, authorities, and activity options, prepare a hazardous materials prevention program management plan. (See *Hazardous Materials Planning Curriculum Guidelines* for more information.)

COMM-7.1 Describe guidelines and methods for preparing and formatting a hazardous materials prevention program management plan.

COMM-7.2 Describe guidelines for developing an organizational strategy for program activities that addresses:

- Short- and long-term goals, measurable objectives, and evaluation criteria.
- Analysis of program activities and options.
- Resources and administrative support systems and procedures.
- Staffing assignments and contractor requirements.

COMM-7.3 Describe guidelines and methods for coordinating the planning process and communicating results to community officials.

COMM-8 Given a hazardous materials prevention program management plan, conduct and/or supervise the implementation, monitoring, evaluation, and continual refinement of the prevention program.

COMM-8.1 Describe strategies and methods for implementing prevention program elements, activities, and procedures.

COMM-8.2 Describe strategies and methods for monitoring, evaluating, and continually refining prevention program elements, activities, and procedures.

COMM-8.3 Describe common shortfalls and opportunities in implementing, evaluating, and maintaining hazardous materials prevention programs.

Hazardous Materials

Prevention Training Guidelines

Prevention in Operations

General Training Considerations

Introduction

Prevention in Operations describes the training requirements of persons who supervise or operate processes that involve the storage, transport, handling, manufacture, or use hazardous materials. These employees are responsible for ensuring that hazardous materials prevention activities and safety requirements defined in system/process safety management plans and standard operating guidelines (SOGs) are properly implemented and enforced.

The job requirements and training needs of operations personnel will vary significantly, depending on the size and nature of the operation, the type of hazards involved, the prevention strategy adopted by the facility, and the duties of the employee. However, generic roles and responsibilities can be defined as follows:

- Assist the prevention program manager identify hazardous materials risks, prevention opportunities, and safe operating practices and procedures for specific processes/operations.

- Implement, monitor, and enforce safe working practices and procedures for specific operations.

- Participate in record keeping, reporting, safety reviews, compliance audits, incident investigations, inspections, evaluations, and other prevention program activities.

Training Audience

The training audience for Prevention in Operations consists of employees of public, private, and non-profit facilities. In this context, the terms “facility” and “process” are broadly defined, specifically to include large and small operations at industrial plants, commercial establishments, trucking and other transport companies, government agencies, health care operations, utilities, and many other types of organizations.

The training audience includes a broad spectrum of facility workers, from supervisors of huge chemical production systems to fork lift operators. Audience members include production managers, shift supervisors, line operators, general laborers, hazardous materials transport employees, and many process-specific job titles.

Training Requirement

As a prerequisite of training, students are assumed to already know how to carry out their basic work responsibilities. Thus, the goal of training is to promote hazardous materials incident prevention and employee safety by enhancing participants’ ability and motivation to 1) identify and apply safe working practices and procedures on the job, 2) ensure compliance with established prevention program requirements, and 3) contribute as assigned to related program activities (hazard analysis, planning, record keeping, incident critiques, audits, etc.).

A safety management plan and job-specific SOGs, prepared under the direction of the prevention program manager, should exist for all hazardous materials activities. Instruction in Prevention in Operations therefore emphasizes the knowledge and skills students need to apply these established systems and procedures under varying conditions and in a wide range of routine and non-routine work situations. Specifically included is the ability to implement SOGs that define the student’s prevention responsibilities, and to recognize and report potential safety problems.

Training must be highly specific to each student’s needs, which, in turn, depend on their unique job requirements (type of operations, work responsibilities, associated hazards, prevention strategies, etc.). Therefore, instruction emphasizes the transfer of **operations-specific** knowledge and skills that students need to implement the organization’s prevention program and avoid accidents. General training in prevention concepts and techniques is provided as necessary to support this primary goal.

Training Methodology Recommendations

All students will benefit by awareness-level training in hazardous materials prevention and an understanding of the organization's prevention program. Audience members also need technical knowledge and skills that are specific to their jobs. For this latter type of training, audience members should be grouped to the extent possible by process, hazard, and job type. Training can then be more effectively tailored to the needs of different workers.

Participants should be given opportunities to apply and practice job-specific operating procedures and safety systems under different work conditions and situations. For classroom activities, case studies and scenarios can be used. However, hands-on use of equipment under realistic working conditions and on-the-job training are encouraged. Activities should highlight creative approaches to prevention program requirements and practical solutions to common problems. Drills or exercises under simulated emergency or non-routine situations are also useful.

The scope and duration of training will vary depending on the nature and complexity of related SOGs and safety systems. Checklists, job aids, and other practical tools that can be used at the work site should be included in course materials whenever possible.

Recommended Training

Prevention in Operations

Two types of statements are used to describe training requirements recommended for Prevention in Operations. Terminal objectives identify broad job competencies. Enabling objectives describe instructional competencies that lead to proficiency in the terminal objective. Together, these statements identify generic training needs for all audience members. Hazardous materials training managers are encouraged to refine this material as necessary to clarify the training requirements of different audience groups.

The training objectives presented in the next section are consistent with federal requirements and national standards. Included are FEMA and NRT planning guidelines for communities and facilities, DOT Transportation Regulations, various OSHA worker safety guidelines, EPA requirements, and guidance disseminated by the chemical industry.

PrOPS-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as PrOPS-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
PrOPS-1	Given an overview of prevention concepts and activities (see *Prevention Awareness)*, describe employee safety requirements.
PrOPS-1.1	Describe general safety and health provisions protecting worker safety.
PrOPS-1.2	Describe general guidelines for employee participation in hazardous materials prevention activities.
PrOPS-1.3	Describe general guidelines for employee training in workplace safety and health.
PrOPS-1.4	Describe general guidelines for maintaining and accessing process safety information.
PrOPS-2	Given the organization's hazardous materials prevention program, describe elements of the program that affect operations.
PrOPS-2.1	Describe the organization's hazardous materials prevention mission and policies.

PrOPS-2.2 Describe the organization's hazardous materials emergency response capabilities and systems.

PrOPS-2.3 Describe components and relevant aspects (policies, activities, roles, etc.) of the organization's hazardous materials prevention program.

PrOPS-3 Given an operation's hazards assessment and safety plan, describe prevention strategies.

PrOPS-3.1 Identify specific hazards and risks associated with the operation.

PrOPS-3.2 Describe and demonstrate the ability to access and use process safety information to enhance prevention.

PrOPS-3.3 Describe organizational strategies and safe work practices designed to address all identified hazards.

PrOPS-4 Given an operation's work situation and scenarios, describe and apply standard operating guidelines (SOGs) that relate to safe working practices.

PrOPS-4.1 Describe the role of SOGs in hazardous materials safety and prevention programs.

PrOPS-4.2 Demonstrate the ability to apply SOGs that define safe operations (e.g., routine and non-routine operating procedures and practices, contractor safety).

PrOPS-4.3 Demonstrate the ability to apply SOGs for safety systems (e.g., pre-startup safety reviews, maintenance/mechanical integrity, management of change).

PrOPS-4.4 Demonstrate the ability to apply SOGs for compliance and enforcement activities (e.g., safety inspections and enforcement, compliance safety audits, incident record keeping, reporting, and investigations).

PrOPS-5 Given the organization's hazardous materials prevention program, participate as assigned in various program activities.

PrOPS-5.1 Demonstrate the ability to participate as assigned in prevention program analysis and planning activities.

PrOPS-5.2 Demonstrate the ability to participate as assigned in prevention training activities.

PrOPS-5.3 Demonstrate the ability to participate as assigned in the design of new or modified facilities, systems, or processes.

PrOPS-5.4 Demonstrate the ability to participate as assigned in monitoring, evaluating, and continually refining prevention program activities.

Hazardous Materials

Prevention Training Guidelines

Design and Plans Review

General Training Considerations

Introduction

Design and Plans Review describes the training requirements of persons who oversee and participate in the design, planning, approval, or construction of operations that produce, use, store, or transport hazardous materials. Audience members are responsible for incorporating the requirements and recommended practices contained in applicable prevention codes and standards into detailed blueprints, drawings, plans, specifications, instructions, and other documents. In this role, they conduct and/or supervise staff, consultants, and subcontractors in the following types of activities:

- Clarifying the technical and prevention requirements of design projects, including associated hazardous materials risks.
- Conducting a search and analysis of applicable regulations, codes, and standards to identify prevention requirements, opportunities, and recommended practices.
- Briefing and/or training design staff, construction managers, vendor representatives, consultants, and others on prevention opportunities and initiatives.
- Preparing and reviewing design plans, specifications, and support documents that incorporate and clarify prevention requirements.
- Consulting and coordinating with community and facility representatives to enhance the hazardous materials operations plans review process.
- Monitoring procurement and construction to ensure that hazardous materials operations plan requirements are met and related problems are resolved.
- Identifying hazardous materials prevention requirements for management systems and standard operating procedures for planned operations.
- Advising prevention managers, operators, and others on ways to implement, evaluate, and maintain the new facilities, systems, and processes.

Training Audience

The training audience for Design and Plans Review is composed of persons in governmental, private, industry, or non-profit organizations that develop or review the technical content of hazardous materials design plans and operational specifications. This category includes members of the facility design team and community officials who oversee the process—design project managers, prevention program managers, production managers, construction managers, community plans reviewers, zoning and planning board members, architects, engineers (mechanical, structural, chemical, electrical, civil, etc.), draftsmen, safety experts, consultants, subcontractors, and other technical specialists.

A secondary audience includes persons that implement the approved design. This group will benefit by more limited training that focuses on the specific design project and is intended to heighten awareness of related prevention concepts and techniques. Included in this category are facility procurement personnel, construction contractors, vendor representatives, community and facility inspectors, codes enforcement officials, and production operators.

Training Requirement

As a prerequisite of training, audience members are assumed to already possess the basic knowledge and skills they need to carry out their primary job responsibilities (architecture, engineering, plans review, prevention program management, etc.). Thus, the goal of training is to promote safety in hazardous materials operations by enhancing the participant's ability and motivation to 1) identify opportunities to reduce accidents and recommended practices in proposed designs, and 2) ensure that requirements for hazardous materials incident prevention are incorporated in design plans and specifications.

General Training Considerations

Training should stress the importance of the design and plans review function in prevention, and provide students with a solid grounding in related codes and standards. Instruction should also give students advanced knowledge and skills in the following areas:

- Identifying, interpreting, and applying specific prevention code items, concepts, and techniques to varying design requirements and problems.
- Assessing hazardous materials risks and prevention opportunities associated with alternative design strategies.
- Preparing and/or evaluating design plans and other documents that contribute to hazardous materials prevention.
- Providing guidance and direction to community and facility representatives to encourage the safe and effective implementation of hazardous materials operational designs.

Training Methodology Recommendations

Design and Plans Review is a highly technical and complex process involving a wide variety of possible design requirements, parameters, and variables. Training managers and course developers are encouraged to limit the scope of training to the extent possible by grouping students according to the prevention requirements of their jobs and then focusing training accordingly. All students will benefit by some basic training in hazardous materials codes, standards, and design principles. More advanced training can then be classified into five categories:

1) General—the ability to apply the broad range of hazardous materials authorities and codes to any facility or operations design.

2) Project-specific—the ability to identify and apply only those prevention requirements that are relevant to a specific facility or operations design.

3) Operations-specific—the ability to apply the broad range of hazardous materials authorities and codes to a certain type of facility or operations design (e.g., refineries, retail outlets).

4) Code-specific—the ability to apply a specific prevention code (fire, building, health, etc.) to any facility or operations design.

5) Operations and code-specific—the ability to apply a specific prevention code to a certain type of facility or operations design.

The amount of time planned for instruction will depend on the needs of the audience and the scope of training. Participants will greatly benefit by opportunities to practice and apply skills acquired during training. For example, activities can be designed to permit students, organized in teams, to research and apply prevention codes to realistic design scenarios. Actual design problems from the participants' communities and organizations is preferable for this purpose. Training should also address management and political considerations in project planning.

Other training methodology recommendations and considerations include the following:

- Instructors need significant experience and technical expertise in design, plans review, prevention techniques, and state and local prevention authorities.
- Participant activities should emphasize the development of practical work products and methods to transfer learning back to the job, including checklists, job aids, and other design and planning tools.
- If possible, training should encourage interagency cooperation and information sharing among public and private sector participants.

Recommended Training
Design and Plans Review

Two types of statements are used to describe training requirements recommended for Design and Plans Review. Terminal objectives identify broad job competencies. Enabling objectives describe instructional competencies that lead to proficiency in the terminal objective. Together, these statements identify generic training needs for all audience members. Hazardous materials training managers are encouraged to refine this material as necessary to clarify the training requirements of different audience groups.

The training objectives presented in the next section are consistent with federal requirements and national standards. Included are FEMA and NRT planning guidelines for communities and facilities, DOT Transportation Regulations, various OSHA worker safety guidelines, EPA requirements, and guidance disseminated by the chemical industry.

D/PR-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as D/PR-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
D/PR-1	Given an overview of prevention concepts and activities (see *Prevention Awareness*), describe community and organizational prevention systems for design and plans review.
D/PR-1.1	Describe the purpose, structure, and content of state and authorities and codes that govern hazardous materials design and plans review, including those addressing: • Buildings, construction, and fire prevention • Community planning, zoning, and occupancy • Employee safety and accident prevention • Health and environmental concerns
D/PR-1.2	Describe organizational prevention policies, strategies, and systems for hazardous materials design and construction.
D/PR-1.3	Describe community and organizational prevention policies, strategies, and systems for hazardous materials plans review and approval.
D/PR-2	Given a range of representative design scenarios, design and/or evaluate plans for proposed projects to ensure that prevention requirements are met.
D/PR-2.1	Demonstrate the ability to research and analyze state and local authorities that govern hazardous materials design.

D/PR-2.2 Describe information sources on state of the art prevention technologies and recommended practices in hazardous materials design.

D/PR-2.3 Assess strategies for briefing and educating design staff members, including ways to:
- Identify the knowledge requirements of design staff members.
- Train staff on standard and non-standard code items.
- Maintain current knowledge of prevention codes.

D/PR-2.4 Demonstrate the ability to identify and assess hazards associated with alternative design strategies.

D/PR-2.5 Demonstrate the ability to identify design strategies that optimize safety and prevention opportunities.

D/PR-2.6 Demonstrate the ability to prepare and/or evaluate design plans, specifications, and supporting documents that incorporate and clarify prevention requirements.

D/PR-2.7 Assess strategies for coordinating activities among facility, community, and design team representatives to enhance prevention.

D/PR-3 Given an approved design, assist in promoting prevention through the effective implementation and maintenance of the project.

D/PR-3.1 Assess strategies for preparing contractor and vendor documents that incorporate and clarify the prevention requirements of the design plan.

D/PR-3.2 Assess strategies for assisting construction personnel and vendor representatives to interpret the project's prevention requirements.

D/PR-3.3 Assess strategies for monitoring procurement and construction activities to ensure that prevention requirements are met.

D/PR-3.4 Assess strategies for assisting prevention program managers and operators to develop and implement safe operational systems and employee work procedures.

D/PR-3.5 Assess strategies for assisting prevention program managers and operators to safely activate, integrate, evaluate, and maintain the new facility, system, or process.

Hazardous Materials

Prevention Training Guidelines

Inspection and Enforcement

General Training Considerations

Introduction

Inspection and Enforcement describes the training needs of persons who monitor, inspect, and enforce safety compliance in operations that produce, use, store, or transport hazardous materials. In this role, audience members 1) identify hazardous materials risks and prevention opportunities associated with specific facility and transportation operations, and 2) assess and enforce compliance with established prevention authorities and codes.

The specific job requirements of Inspection and Enforcement personnel will vary depending on the size and nature of operations involved, the prevention strategy of the organization, assigned responsibilities, etc. However, a generic list of job responsibilities would include the following:

- Assess the adequacy of hazardous material prevention plans and programs prepared by facilities and transport companies.
- Assess the adequacy of safety systems and response capabilities in facilities and transport companies.
- Ensure that equipment is properly installed and maintained.
- Ensure that operating procedures are safe and effectively implemented.
- Ensure that operations and maintenance personnel are adequately trained.
- Brief community and facility officials of safety deficiencies and opportunities, and promote cooperation and coordination among decision makers.
- Monitor efforts to resolve problems, and implement policies and procedures designed to enforce compliance with applicable authorities and codes.
- Participate in safety reviews, compliance audits, incident investigations, and other types of prevention activities.

Training Audience

The training audience for Inspection and Enforcement includes inspectors and officials from community agencies (e.g., fire service, police, health agency, etc.) that are responsible for prevention, enforcement, and compliance programs and activities in the jurisdiction. Included are representatives of agencies that develop and enforce codes in all related areas: buildings, transportation, employee safety, fire, health, and so on.

The training audience also includes inspectors and enforcement personnel from public, private, and non-profit facilities that store, handle, transport, or use hazardous materials. In business and industry, the role may be filled by prevention program managers, safety officers, production managers, shift supervisors, or others assigned the responsibility. Representatives of insurance companies, consultants, safety experts, and others also perform the function in certain situations.

Training Requirement

As a prerequisite of training, students are assumed to already possess basic knowledge and skills in inspection and enforcement. Therefore, the primary goal of training is to promote hazardous materials prevention and safety by enhancing the participant's ability and motivation to 1) identify safety deficiencies and opportunities associated with the hazardous materials operations, 2) assess compliance with applicable prevention authorities and codes, and 3) monitor and enforce compliance according to established policies and protocols.

General Training Considerations

Inspection and Enforcement is a technical and complex process, potentially involving the application of a broad range of prevention authorities and codes to many different types of hazardous materials operations. All students will benefit by basic training in hazardous materials prevention and related authorities and codes. Training managers and course developers are encouraged to limit the scope of more advanced instruction to the extent possible by grouping students according to their job requirements and then focusing training accordingly. More advanced technical training can be classified into five categories:

1) General—the ability to apply the broad range of hazardous materials authorities and codes to any facility/process or operations.

2) Project-specific—the ability to identify and apply only those prevention requirements that are relevant to a specific facility/process or operations.

3) Operations-specific—the ability to apply the broad range of hazardous materials authorities and codes to a certain type of facility/process or operations (e.g., refineries, retail outlets).

4) Code-specific—the ability to apply a specific prevention code (fire, building, health, etc.) to any facility/process or operations.

5) Process- and code-specific—the ability to apply a specific prevention code to a certain type of facility/process or operations.

However training is targeted, participants will benefit by generic instruction in hazardous materials prevention and an understanding of the organization's prevention, inspection, and enforcement programs. Course content should then emphasize the knowledge and skills students need to apply established authorities, systems, and procedures in representative hazardous materials and transport operations.

Training Methodology Recommendations

As described above, training requirements for different audience members may vary significantly. Therefore, students should be grouped whenever possible by job categories that reflect their inspection and enforcement responsibilities. Training can then be more effectively tailored to the specialized needs of different employees.

Instructional methodologies should emphasize opportunities for students to interpret and practice applying prevention codes and program requirements to different types of operations and under different types of conditions. Participant activities should also address management and political considerations. Examples and realistic scenarios are appropriate for this purpose. Practice should highlight creative approaches and practical solutions to common problems.

The scope and duration of training will vary, depending on the nature and complexity of organizational inspection and enforcement procedures, hazardous materials operations, and related authorities and codes. Checklists, job aids, and other practical tools that can be used on site should be included in course materials whenever possible.

Recommended Training
Inspection and Enforcement

Two types of statements are used to describe training requirements recommended for Inspection and Enforcement. Terminal objectives identify broad job competencies. Enabling objectives describe instructional competencies that lead to proficiency in the terminal objective. Together, these statements identify generic training needs for all audience members. Hazardous materials training managers are encouraged to refine this material as necessary to clarify the training requirements of different audience groups.

The training objectives presented in the next section are consistent with federal requirements and national standards. Included are FEMA and NRT planning guidelines for communities and facilities, DOT Transportation Regulations, various OSHA worker safety guidelines, EPA requirements, and guidance disseminated by the chemical industry.

IN/ENF-1

Objective Identification Legend

This is the identification of the objective used in this document. It matches the identification code used in course assessment references. (See the Training Program Management section of this document.) Decimal numbers (such as IN/ENF-1.1) indicate enabling objectives supporting the primary objective.

Identification	***Recommended** Training Objectives*
IN/ENF-1	Given an overview of prevention concepts and activities (see *Prevention Awareness*), describe aspects of the hazardous materials prevention system.
IN/ENF-1.1	Describe state and local laws, regulations, and policies that govern hazardous materials inspections and enforcement.
IN/ENF-1.2	Describe prevention strategies, activities, and roles specified in emergency operations and prevention plans.
IN/ENF-1.3	Describe strategies and plans for conducting hazardous materials inspections and enforcement activities.
IN/ENF-1.4	Describe administrative systems and roles for conducting hazardous materials inspections and enforcement activities.
IN/ENF-2	Given key prevention authorities and a range of representative inspection scenarios, identify hazardous materials safety deficiencies and opportunities.

IN/ENF-2.1 Describe the purpose, structure, and content of key federal authorities governing the production, storage, handling, and transport of hazardous materials, including:
- OSHA's General Safety and Health Provisions (29 CFR 1926.20)
- OSHA's Process Safety Management Standard (29 CFR 1910.119)
- EPA's Accidental Release Prevention Requirements (40 CFR Part 68)
- OSHA's Hazard Communication Standard (29 CFR 1910.1200)
- DOT's Hazardous Materials Regulations (49 CFR)
- NRT's Integrated Contingency Plan Guidance

IN/ENF-2.2 Describe the purpose, structure, and content of state and local hazardous materials prevention ordinances, codes, and standards addressing:
- Buildings, construction, and fire prevention
- Community planning, zoning, and occupancy
- Employee safety and accident prevention
- Health and environmental concerns

IN/ENF-2.3 Demonstrate the ability to 1) research and apply prevention authorities and codes to representative hazardous materials operations and situations, and 2) identify related safety deficiencies and opportunities.

IN/ENF-3 Given prevention strategies and plans, conduct hazardous materials inspections and enforcement activities as assigned.

IN/ENF-3.1 Demonstrate the ability to gather data, categorize risks, identify violations, and establish priorities among inspection requirements.

IN/ENF-3.2 Demonstrate the ability to implement hazardous materials inspection procedures, addressing such factors as:
- Forms, checklists, questionnaires, etc.
- Scheduling and planning inspections
- Briefing facility managers, operating personnel, transporters, etc.
- Gathering inspection data and identifying violations
- Identifying safety deficiencies and concerns
- Documenting and reporting results

IN/ENF-3.3 Demonstrate the ability to implement enforcement procedures (consultation, violation notices, citations, personnel actions, audits, legal actions, etc.) designed to ensure compliance with inspection results.

Hazardous Materials

Prevention Training Guidelines

Appendix A: Hazardous Materials Prevention Authorities and Statutory Mandates

HAZARDOUS MATERIALS PREVENTION AUTHORITIES AND STATUTORY MANDATES

FEDERAL TRANSPORTATION AUTHORITIES

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act (Public Law 93-633 as amended) is the basic statute pertaining to the transportation of hazardous materials in the United States. The law strengthened regulatory and enforcement activities by providing the Secretary of Transportation with broad authority to set regulations for all modes of transportation. Specifically, the Act:

- Authorized DOT to issue regulations related to placarding, handling, packing, repacking, marking, routing, and labeling;
- Expanded the regulated community to include container manufacturers;
- Authorized establishment of a shipper registration program;
- Provided DOT with authority to conduct surveillance activities and assess penalties; and
- Defined the relationship between federal, state, and local government regulations.

HMTA requires the training of all hazardous materials employees in order to reduce incidents by improving safety awareness. It separated the National Transportation Safety Board from the DOT structure, making it an independent body reporting directly to Congress.

Hazardous Materials Transportation Uniform Safety Act

In 1990, Congress enacted the Hazardous Materials Transportation Uniform Safety Act (HMTUSA, Public Law 101-65 as amended). The statute required that DOT issue rules to:

- Regulate hazardous materials transport in intrastate commerce;
- Create shipping manifests;
- Regulate training for handlers of hazardous materials;
- Require certain hazardous materials carriers to hold safety permits;
- Issue procedures and waivers for preemptions;
- Develop and implement a grant program for local emergency planning and first responder training, and develop a national curriculum;
- Improve hazardous materials identification systems;
- Determine the costs and benefits of a continually monitored emergency response telephone system; and
- Require certain shipper and carrier registration fees.

HMTUSA also required DOT and other organizations to conduct certain studies related to hazardous materials transportation. The law amended HMTA to require the Secretary of Transportation to participate in international forums that establish or recommend mandatory standards and requirements for the transportation of hazardous materials in international commerce.

Haz Mat Prevention Authorities and Statutory Mandates

Hazardous Materials Regulations

To ensure public safety and minimize risks posed by hazardous materials in transportation, Congress requires the Secretary of Transportation to prescribe regulations for safe transportation of hazardous materials. The *Hazardous Materials Regulations* (49 CFR Parts 171-180) govern the classification, shipper and carrier operations, hazard communication requirements, and packaging and container specifications for the various modes of transportation (air, water, rail, and highway). Related training and incident reporting requirements are also defined. In addition, the regulations explain DOT policies on hazardous materials inspections and enforcement, which focus on compliance with classification, description, marking, labeling, and packaging requirements.

The Hazardous Materials Regulations consist of the following Parts:

- Part 171: General Information, Regulations and Definitions
- Part 172: Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
- Part 173: Shippers—General Requirements for Shipment and Packagings
- Part 174: Carriage By Rail
- Part 175: Carriage By Aircraft
- Part 176: Carriage By Vessel
- Part 177: Carriage By Public Highway
- Part 178: Specifications For Packagings
- Part 179: Specifications For Tank Cars
- Part 180: Continuing Qualifications and Maintenance of Packagings

FEDERAL WORKER PROTECTION AUTHORITIES

Occupational Safety and Health Act of 1970

The *Occupational Safety and Health Act of 1970* (Public Law 91-596, as amended) was designed to assure safe and healthful employment conditions for all workers in the United States. The Act mandates that each employer provide a place of employment that is free from recognizable hazards which may cause death or physical harm. It establishes authority and procedures for the development, promulgation, and enforcement of occupational safety and health standards, including those dealing with toxic materials and harmful physical agents.

Among other purposes, the Act establishes conditions for:

- Encouraging employers and employees in their efforts to reduce occupational safety and health hazards, and to develop and refine related safety programs.

- Authorizing the Secretary of Labor to set mandatory occupational safety and health standards and guidelines for businesses.

- Establishing procedures for inspections, investigations, and enforcement of the standards, including variations, citations, penalties, etc.

- Providing for research in the field of occupational safety and health, and for the development of innovative methods, techniques, and approaches to reduce injuries and exposures on the job.

- Providing grants to encourage states to assume the fullest responsibility for the administration and enforcement of their occupational safety and health laws.

- Establishing medical criteria and reporting procedures to help achieve the objectives of the Act.

Standards promulgated under the Act are intended to address "the use of labels or other appropriate forms of warning as are necessary to insure that employees are apprised of all hazards to which they are exposed, relevant symptoms and appropriate emergency treatment, and proper conditions and precautions of safe use or exposure." Where appropriate, standards should also prescribe suitable protective equipment, controls or technological procedures, methods for monitoring and measuring employee exposure, and the type and frequency of medical examinations or other tests for persons who may become exposed to hazards.

Process Safety Management

OSHA's *Process Safety Management of Highly Hazardous Chemicals* standard (29 CFR 1910.119) contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, fire, or explosion hazards. Its major objective is to prevent unwanted releases of hazardous chemicals especially into locations which could expose employees and others to serious hazards. The standard covers processes involving listed (highly hazardous) chemicals at specified quantities and flammable liquids or gases in quantities of 10,000 pounds or more (except products used solely for heating or fuel).

The Process Safety Management Standard addresses requirements and nonmandatory guidelines in the following areas, each of which is explained in more detail in Appendix D:

- Employee involvement
- Process safety information
- Process hazard analysis
- Operating procedures and practices
- Employee training
- Contractors
- Pre-startup safety reviews
- Mechanical integrity
- Nonroutine work authorizations
- Managing change
- Investigation of incidents
- Emergency Preparedness
- Compliance audits

Hazard Communication

OSHA's *Hazard Communication Standard* (29 CFR 1910.1200/1926.59) is designed to ensure that the hazards of all chemicals used in the workplace are properly evaluated, and that the resulting information is transmitted to employers and employees. This knowledge will help employers provide safer workplaces, and help employees protect themselves. The result should be a reduction in chemical source illnesses and injuries.

The standard's design is simple. Chemical manufacturers and importers must evaluate the hazards of the chemicals they produce or import. Using that information, they must then prepare labels for containers and material safety data sheets (MSDSs). Manufacturers, importers, and distributors of hazardous chemicals are then required to provide these labels and MSDSs to their customers. Employers that "use" the chemicals must obtain the information and provide it to their own employees through the following activities:

- Identify and list hazardous chemicals in the workplace.
- Obtain MSDSs and labels for each hazardous chemical.
- Develop and implement a written hazard communication program, including labels, MSDSs, and employee training.
- Communicate hazard information and appropriate protective measures to their employees through labels, MSDSs, and formal training programs.

Safety and Health Program Management Guidelines

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and their costs. To assist employers and employees in developing effective safety and health programs, OSHA published recommended *Safety and Health Program Management Guidelines* (Federal Register 54(18):3908-3916, January 26, 1989). These voluntary guidelines apply to all places of employment covered by OSHA. The guidelines recommend specific actions under each of four general elements that are critical to the development of a successful safety and health management program:

- Management commitment and employee involvement
- Worksite analysis
- Hazard prevention and control
- Safety and health training

FEDERAL ENVIRONMENTAL SAFETY AUTHORITIES

During the last three decades, general public awareness and concern resulting from major accidents have contributed to the enactment of new laws that establish current federal environmental policy. Hazardous materials prevention policy has been included in and derived from the statutory language of this legislation. Recent laws include:

- Water Quality Improvement Act of 1970
- 1972 Amendments to the Federal Water Pollution Control Act (Clean Water Act)
- Safe Drinking Water Act of 1974
- Toxic Substances Control Act of 1976
- Resource Conservation and Recovery Act of 1976
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980
- Emergency Planning and Community Right-to-Know Act of 1986
- Oil Pollution Act of 1990

Of particular importance in this framework of federal environmental safety and hazardous materials prevention authorities are the Clean Air Act Amendments of 1990 and EPA's Accidental Release Prevention standard.

Clean Air Act Amendments

Section 112(r)(7) of the Clean Air Act Amendments of 1990 (CAAA; Public Law 101-549) mandated that EPA promulgate regulations and develop guidance to prevent and mitigate the consequences of accidental releases to the air of chemicals that pose a significant risk to the public and the environment. The law specified that the regulations cover "the use, operation, repair, replacement, and maintenance of equipment to monitor, detect, inspect, and control such releases, including training of persons in the use and maintenance of such equipment and in the conduct of periodic inspections." In addition to operations, regulations should also address emergency response, storage, recordkeeping, reporting, vapor recovery, and other requirements.

The law requires the owner or operator of a stationary source at which a regulated substance is present in specified quantities to prepare and implement a risk management plan to detect and prevent or minimize accidental releases. The plan must include a hazard assessment of any regulated substance, including an estimate of potential release quantities, possible population exposures, release histories, and an evaluation of worst-case incidents. The law also specifies that EPA describe requirements for employers to develop and implement safety and response programs.

Section 304 of the CAAA required OSHA to promulgate "a chemical process safety standard designed to protect employees from hazards associated with accidental release of highly hazardous chemicals in the workplace" and a "list of highly hazardous chemicals which includes toxic, flammable, highly reactive, and explosive substances." Congress stressed that the standard should be developed in coordination with EPA, and address, at a minimum, employer requirements for safety information systems, workplace hazard assessments, employee participation, employee information and training, operating procedures, quality assurance programs, maintenance programs, pre-startup safety reviews, management of change, and incident investigations.

Accidental Release Prevention

The Clean Air Act Amendments of 1990 mandated that EPA promulgate regulations and develop guidance to prevent accidental releases to the air of regulated substances and mitigate the consequences of releases that do occur. The resulting rule, *Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act, Section 112(r)(7)* (40 CFR Part 68) focuses prevention measures on chemicals that pose the greatest risk to the public and the environment. Chemical processes are divided into three categories based on the potential for off-site consequences associated with a worst-case accidental release, accident history, and compliance with the requirements of OSHA's Process Safety Management Standard.

In summary, the owner or operator of a covered process must (1) prepare and submit a risk management plan (RMP), including registration that covers all affected processes and chemicals; (2) conduct a worst-case release scenario analysis, review accident history, and ensure emergency response procedures are coordinated with community response organizations to determine eligibility for Program 1; (3) if eligible, document the worst case and complete a Program 1 certification for the RMP; (4) for Program 2 processes, conduct a hazard assessment, document a management system, implement a more extensive but still streamlined prevention program, and implement an emergency response program; and (5) for Program 3 processes, conduct a hazard assessment, document a management system, implement a prevention program that is fundamentally identical to the OSHA Process Safety Management Standard, and implement an emergency response program.

NATIONAL CODES AND STANDARDS

Uniform Fire Code Article 80—Hazardous Materials

Article 80 of the Uniform Fire Code defines requirements for the "prevention, control, and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials and information needed by emergency response personnel" (80001.1.1). The code applies to all hazardous materials (as defined in Article 2) except when specific requirements are provided in other articles.

General requirements addressed in Article 80 include permits; development of hazardous materials management plans and inventory statements; design, construction, and installation of equipment; handling and transport of hazardous materials; safety information (MSDS forms, identification signs, etc.); and general safety precautions. Storage requirements are then defined in detail for the various hazard categories (compressed gases, flammable solids and gases, organic peroxides, etc.). Finally, section 8004 describes requirements for use, dispensing, and handling of hazardous materials, both for indoor and outdoor applications.

NFPA 1—Fire Prevention Code

The Fire Prevention Code developed by the National Fire Protection Association (NFPA) “prescribe(s) minimum requirements necessary to establish a reasonable level of fire safety and property protection from the hazards created by fire and explosion. The scope covers the construction, maintenance, and use of property to the extent that such is not covered by existing NFPA codes and standards.” The document is intended to provide jurisdictions with a guideline for the development of a local fire prevention code.

Parts I-IV of NFPA 1 describe general fire prevention requirements, which serve to reduce the risk of fire as a cause of or contributing factor in hazardous materials accidents. Areas addressed include the administration and enforcement of fire prevention programs (recordkeeping and reporting, owner/occupant responsibilities, permits and approvals, etc.); general fire safety requirements (construction, systems and equipment, automatic sprinklering, alarm systems, etc.); and occupancy fire safety requirements (day-care facilities, health care centers, hotels, etc.).

Part V—Special Processes and Material Handling—describes specific hazardous materials requirements, which have been organized by hazard category or application type. The following sections are of particular importance for hazardous materials prevention:

- Chapter 27—Hazardous Materials and Chemicals
- Chapter 28—Flammable and Combustible Liquids
- Chapter 30—Liquefied Petroleum Gases/Liquefied Natural Gases
- Chapter 33—Spray Application Using Flammable and Combustible Materials
- Chapter 35—Dust Explosion Prevention
- Chapter 39—Combustible Fibers

BUILDING CODES

Most jurisdictions base their building codes on “model” codes developed by the Building Officials and Code Administrators (BOCA), the Southern Building Code Congress International (SBCCI), or the International Conference of Building Officials (ICBO). For example, the BOCA National Building, Property Maintenance, and Fire Prevention Codes address safety issues and standards in the construction and operation of buildings, including the administration, organization, and enforcement of related regulations by state and local government units. The three organizations have formed a joint effort, the International Codes Council (ICC), and are working to develop a single International Code that will eventually replace the separate codes.

Hazardous Materials

Prevention Training Guidelines

Appendix B: Hazardous Materials Prevention Training Requirements

OSHA Training Requirements

Many standards promulgated by OSHA explicitly require employers to train employees in the safety and health aspects of their jobs. Other OSHA standards make it the employer's responsibility to limit certain job assignments to employees who are "certified," "competent," or "qualified," meaning that they have had special training in or out of the workplace. These requirements reflect OSHA's belief that training is an essential part of every employer's safety and health program for protecting workers from injuries and illnesses.

General industry training requirements related to hazardous materials prevention are contained throughout 29 CFR Part 1910, addressing, for example, personal protective equipment, employee emergency plans, and fire protection. Other hazardous materials training requirements can be found in standards developed for specific industrial sectors, e.g., maritime (Parts 1915, 1917, 1918), construction (Part 1926), and agriculture (Part 1928).

The Hazard Communication Standard (29 CFR 1910.1200) requires employers to establish training and information programs for employees exposed to hazardous chemicals in the workplace. Training, which must be conducted at the time employees are initially assigned and whenever a new hazard is introduced, should address the following elements:

- How the hazard communication program is implemented in the workplace, and how employees can obtain and use the available hazard information.
- How to read and interpret information on labels and MSDSs.
- The hazards of all chemicals in the work area, and measures employees can take to protect themselves.
- Specific procedures put into effect by the employer to provide protection, such as engineering controls, work practices, and personal protective equipment (PPE).
- Methods and observations—such as visual appearance or smell—that workers can use to detect the presence of hazardous chemicals to which they may be exposed.

Under this rule, an employer can provide employees information and training through whatever means are found to be appropriate and protective. Employee training may be satisfied in part by general training by, for example, trade associations, unions, colleges, and professional schools. In addition, previous training, education, and experience of workers may relieve the employer of some requirements under this regulation. Regardless of the method chosen, however, the employer is always ultimately responsible for ensuring that employees are adequately trained.

OSHA's *Process Safety Management of Highly Hazardous Chemicals* standard (29 CFR 1910.119) identifies additional training requirements for employers with large-scale chemical processes as defined in the regulation. The requirements cover subjects such as an overview of the process, safety and health hazards, operating procedures and safety work practices, emergency operations including shutdown, routine and nonroutine work authorization activities, and other areas pertinent to process safety and health. Refresher training should be provided at least every three years, and more often if necessary. Employers are further required to document that each covered employee has received and understood the training required under the standard. Separate but similar training requirements are specified for contract employees.

Haz Mat Prevention Training Requirements

In this standard, OSHA has adopted a performance-oriented approach to training. Employers can determine the amount of training and the content of the training program that best reflects the operation's complexity and the experience and necessary skill level of their employees. A minimum number of training hours is not specified, and previous training and experience can be recognized if the employer certifies in writing that employees have the required knowledge, skills, and abilities to safely carry out their duties and responsibilities. (Note: essentially similar training requirements are identified in EPA's *Accidental Release Prevention Requirements: Risk Management Programs* (40 CFR Part 68) for designated facilities.)

Transportation Training Requirements

Federal transportation law requires the training of all hazardous materials employees, defined as persons who directly affect hazardous materials transportation safety. The term includes employees and self-employed individuals who:

- Load, unload, or handle hazardous materials;
- Test, recondition, repair, modify, mark, or otherwise represent packagings as qualified for use in the transportation of hazardous materials;
- Prepare hazardous materials for transportation;
- Have responsibility for the safety of transporting hazardous materials; or
- Operate a vehicle used to transport hazardous materials.

Instruction should increase the employee's awareness of safety and ability to perform assigned functions, thereby reducing the number and severity of hazardous materials incidents. Training should include a systematic program that ensures that hazardous materials employees have familiarity with the general provisions of the Hazardous Materials Regulations (49 CFR Parts 171-180), are able to recognize and identify hazardous materials, have knowledge of specific regulatory requirements applicable to their job functions, and have knowledge of emergency response information, self-protection measures, and accident prevention methods and procedures.

Each hazardous materials employer is responsible for training and testing workers, certifying that they can perform their assigned duties, and developing and retaining records of current training. Instruction must include general awareness/familiarization, function-specific, and safety training. Driver training is also required for hazardous materials employees who will operate a motor vehicle. In addition, the regulations prescribe modal-specific training requirements for the individual modes of transportation (air, vessel, highway, etc.) in 49 CFR Parts 174-177.

The regulations define requirements and exceptions for initial training and recurrent or refresher training, required at least once every three years. Relevant training received from a previous employer or source may be used to satisfy the requirements, provided a current record of training is obtained form the previous employer or source. Employers are required to develop and retain training records for the preceding three years, to include at a minimum:

- Hazmat employee's name
- Completion date of most recent training
- Training materials (copy, description, or location)
- Name and address of hazmat trainer
- Certification that the employee has been trained and tested

Environmental Safety Training Requirements

The Clean Air Act Amendments of 1990 (Public Law 101-549) authorized EPA to promulgate regulations that require the owner or operator of regulated facilities (stationary sources) to prepare a risk management plan which identifies employee training measures. At a minimum, the standard would require employers to:

- Provide written safety and operation information to employees and train employees in operating procedures, emphasizing hazards and safe practices;
- Train and educate employees and contractors in emergency response; and
- Establish maintenance systems for critical process-related equipment, including employee training to ensure ongoing mechanical integrity.

In response to this legislative mandate, EPA promulgated the *Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act, Section 112(r)(7)* (40 CFR Part 68). This rule identified training requirements for Program 3 processes (Section 68.71) that are identical to the OSHA Process Safety Management standard, with minor wording changes to address statutory differences. The requirements address initial training, refresher training, employer certification, and training documentation for larger and more complex hazardous materials operations.

Section 68.54 of the EPA standard describes a streamlined version of OSHA training requirements for Program 2 sources, which generally have more simple processes and fewer employees involved in hazardous materials operations. The primary difference is that training documentation requirements identified for Program 3 processes have been dropped. The rule specifically states that training conducted to comply with other federal or state regulations or industry codes, or training conducted by equipment vendors, may be used to demonstrate compliance if the training covers the standard operating procedures (SOPs) for the process. Workers must be retrained when SOPs are revised as a result of a major change in operations.

The EPA Accidental Release Prevention standard does not specify safety training requirements for Program 1 processes. Program 1 is available to any process that has not had an accidental release with offsite consequences in the five years prior to the submission of the risk management plan and has no public receptors within the distance to a specified toxic or flammable endpoint associated with a worst-case release scenario.

Hazardous Materials

Prevention Training Guidelines

Appendix C: Organizational Structure for Hazardous Materials Prevention

ORGANIZATIONAL STRUCTURE
FOR HAZARDOUS MATERIALS PREVENTION

[Note: The following material, which summarizes government agency programs in hazardous materials prevention, is derived from "A Review of federal Authorities for Hazardous Materials Accident Safety: Report to Congress Section 112(r)(10) Clean Air Act As Amended," prepared in coordination with the National Response Team by the Chemical Emergency Preparedness and Prevention Office of EPA. The material will be reviewed and updated during the national review of these draft Curriculum Guidelines.]

Primary responsibility for the development and implementation of accident prevention measures at the federal level is within DOT, including the U.S. Coast Guard; OSHA within the Department of Labor and EPA. The NRC also maintains regulatory responsibilities for source, by-product, and special nuclear materials. Some of the statutes and regulations administered by NRC, in conjunction with FEMA, particularly in the areas of planning and response to significant radioactive materials emergencies, are discussed in this review. Other laws and regulations pertinent to the safety of commercial nuclear power plants were not considered within the scope of this analysis. Food and Drug Administration authorities for consumer-related hazardous materials safety were not considered within the scope of this review.

DOT/Research and Special Programs Administration (RSPA)

The administering body for hazardous materials safety within DOT is the Research and Special Programs Administration. The Hazardous Materials Transportation Act (HMTA) of 1975 gave DOT umbrella authority for developing hazardous materials transportation safety policy. It enabled the Office of Hazardous Materials Safety to develop policies pertinent to all modes of transportation. HMTA authorized the Secretary to issue regulations for the safe transportation in commerce of hazardous materials. The Hazardous Materials Transportation Uniform Safety Act (HMTUSA) of 1990 expanded DOT's hazardous materials safety responsibilities and clarified certain provisions contained in the original HMTA.

RSPA Prevention and Regulatory Programs. RSPA's Office of Hazardous Materials Safety has primary responsibility for regulating the transport of hazardous materials across all modes except pipelines. Because of the multiple points of exposure during transportation and the potential for exposure to hazardous material handlers and first responders, the primary goal of these regulations is to prevent accidents from occurring. A secondary goal is to ensure that response personnel can easily identify the materials, so that the appropriate actions and precautions can be taken if an accident does occur. The regulations address: criteria for classifying risks of materials being transported; identification through proper labeling and manifesting of what is being transported; containerization and packaging for transport; handling of hazardous materials in loading and unloading; and procedures for accident notification and follow-up reports.

Federal hazardous materials regulations (except for penalties and specific relief provisions) apply to all agencies of the Federal government with the exception of the U.S. Postal Service. They also apply to all contractors used by Federal government agencies.

RSPA's Office of Pipeline Safety oversees the safe transportation of natural gas to 55 million residential and commercial customers, and the environmentally sound transportation of 25 percent of the nation's intercity freight, more than 605 billion ton miles of petroleum and other hazardous materials by pipeline. This office has jurisdiction over more than 2,000 gas pipeline operators and 155,000 miles of pipeline that transport hazardous liquids, and is authorized under the Natural Gas Pipeline Safety Act of 1968 and the Hazardous Liquid Pipeline Safety Act of 1979 (HLPSA). Following enactment of the Oil Pollution Act of 1990, the Department delegated responsibility for spill prevention and containment of oil and hazardous substances from pipelines to RSPA. These responsibilities, defined under the Federal Water Pollution Control Act, further expand the role of RSPA in environmental protection, and cover categories of pipelines currently excepted by the HLPSA or regulations adopted thereunder. Pipeline safety regulations cover criteria for pipe design, joining of materials, construction, customer meters, service regulators and service lines, corrosion control, testing, upgrading, operations, and maintenance. Enforcement of the regulations is shared by 244 State and 24 Federal inspectors.

RSPA Enforcement. RSPA has the primary federal responsibility for enforcing hazardous materials regulations for transportation. RSPA's enforcement process includes random inspections of packaging manufacturers, shipper and carrier facilities, and investigations of accidents and incident involving hazardous materials. In addition to RSPA's enforcement program, the DOT modal administrations (Federal Highway Administration, Federal Aviation Administration, Federal Railway Administration, and U.S. Coast Guard) and the states also enforce the hazardous materials regulations.

RSPA Training. More recent initiatives, developed in response to HMTUSA, are focusing on providing grants for emergency preparedness planning to states and grants for emergency response training to states and Native American tribes. The Office of Hazardous Materials Safety is administering a planning and training grant program assisted by other federal agencies, including FEMA, EPA, DOE, OSHA, NIEHS and the Bureau of Indian Affairs. DOT also offers training through the Transportation Safety Institute and prepares and distributes training modules and other materials. In addition, the Federal Highway Administration provides funds for training to states.

DOT/U.S. Coast Guard

USCG Regulatory Programs. The Coast Guard maintains regulatory authority for bulk carriers by water transport. Because authority for transportation by navigable waters has historically been a federal responsibility, the Coast Guard exercises a unique and broad authority over the shipping industry. In general, its application of an "umbrella" regulatory structure controls vessel design, operations, pollution prevention, personnel qualification, and a number of other categories. Domestic and foreign vessels operating on the navigable waters of the United States are required to have proper licensing and documentation in order to operate, and in the case of commercial vessels, to take part in their trade. The Coast Guard is responsible for issuing these certificates and endorsing certificates issued by international organizations.

Among the provisions administered by the Coast Guard are regulations concerning:

- The boundaries for Coast Guard jurisdiction;
- Specific requirements for obtaining waivers to inspection laws and regulations;
- The transportation of hazardous materials in vessels, including the carriage of explosives, and port and waterway safety;
- The prevention of pollution from ships and the enforcement of waste reception facility requirements;
- The prevention of oil discharges into the navigable waters of the U.S.;
- The protection and security of vessels, harbors and waterfront facilities;
- Dry bulk waterfront facilities; and
- The oversight of and prevention of unlawful dumping or transportation of materials for dumping into the ocean (the EPA exercises most of the regulatory authority over this activity).

The Ports and Waterways Safety Act of 1972 provides for the establishment, operation, and maintenance of vessel traffic services, the control of vessel movement, among other matters, and the establishment of vessel operating requirements. The act allows for field level controls that, if not appropriately applied, would result in an unacceptable hazard to the environment or property. Orders regarding these matters can be issued only by the Captain on the Port or the cognizant District Commander.

Organizational Structure for Haz Mat Prevention

The Federal Water Pollution Control Act (FWPCA), as amended, delegates to the Coast Guard the enforcement authority and responsibility in cases where oil and hazardous substances are discharged in harmful quantities. The Coast Guard is also tasked with enforcement of the Act to Prevent Pollution From Ships, which is the implementation of the international MARPOL protocol. The Coast Guard also conducts surveillance of Ocean dumping as mandated in the Marine Protection, Research, and Sanctuaries Act of 1972.

USCG Enforcement. Inspection, compliance, and enforcement are cornerstones to the Coast Guard's prevention programs. The Officer in Charge of Marine Inspections exercises considerable power in his/her port and is responsible for:

- Inspection of vessels and facilities to determine compliance with applicable laws, rules and regulations related to construction, equipment, manning, and operation;
- Shipyard inspections;
- Factory inspections of materials and equipment;
- Licensing, certification, shipment and discharge of seamen;
- Investigation of marine casualties and accidents;
- Pollution prevention;
- Investigations of violations of the law;
- Negligence, misconduct, unskillfulness, incompetence of persons holding licenses, certificates or documents issued by the Coast Guard;
- Initiations of actions seeking suspension or revocation of licenses; and
- Presentation at hearings held by Administrative Law Judges concerning these cases.

New vessels, foreign vessels, waterfront transfer and storage facilities, tankers, and a variety of other vessels are all required to be inspected by the Coast Guard. Certificates of inspection are issued and grant specific rights to each ship. Each class of vessel has unique inspection regulations based on the type of vessel it is and the specific cargo that it carries.

If any equipment is found not to be in compliance with applicable regulations, a form is issued to the master, owner, or operator which details the problems and mandates the specific circumstances that the cited deficiencies must be corrected. Any vessel may be inspected/reinspected. Certificates of inspection may be revoked if the vessel is found not to comply with the terms of the vessel's certificate of inspection. A vessel or facility may be exempted from complying with any specific regulation by the Commandant.

Investigations are conducted after a marine casualty to determine cause and to determine appropriate proceedings to be taken against those responsible. Investigating officers have the power to administer oaths, subpoena witnesses, etc. At the conclusion of an investigation, recommendations are forwarded to Coast Guard Headquarters program managers for review and further action as appropriate. In investigations where criminal liability is alleged, the case is referred to the U.S. Attorney General for prosecution.

Administrative punishments are intended to be remedial, not penal, with the goal of maintaining competence and safety in the field. Initial recommendations to revoke licenses are set forth by the investigating officer. Investigations are initiated if it appears that the holder of the license was negligent in some manner. An investigating officer can accept voluntary surrender of a license. Upon completion of a case investigation, the case is forwarded to an Administrative Law Judge, who holds hearings and adjudicates the cases.

Prior to the Federal Water Pollution Control Act of 1972, the Coast Guard did not have the kind of authority it needed to enforce against discharges. The Ports and Tanker Safety Act of 1978 expanded many equipment and operating requirements for vessels, with emphasis on tank vessels to coincide with many international initiatives, such as agreements reached by the International Maritime Organization.

Coast Guard Organization. The Coast Guard maintains 47 Captain of the Port operations. The functions performed by the Coast Guard at each of these locations include: port security, port safety, facility inspections, personnel/merchant mariners documentation, vessel inspections and accident response and investigation.

Like other transportation modes, the Coast Guard's program is predicated upon prevention. However, unlike other transportation authorities, because of the history, mission, and unique resources of the Coast Guard, it maintains and is responsible for a total safety system including accident prevention, preparedness, and response.

Other Modal Administrations

Federal Aviation Administration (FAA). The FAA regulates air commerce, controls the use of airspace, and operates air navigation facilities and a common system of air traffic control and navigation for both civil and military air craft. The Administrator issues and enforces rules, regulations, and minimum standards relating to the manufacture, operation, and maintenance of aircraft, as well as the rating and certification of airmen and the certification of airports. The agency performs flight inspection of air navigation facilities in the U.S. and as required, abroad. It also enforces regulations under the Hazardous Materials Transportation Act applicable to shipments by air and investigates accidents involving air carrier.

Federal Highway Administration (FHWA). The FHWA seeks to coordinate highways with other modes of transportation to achieve the most effective balance of transportation systems and facilities. Under the authority of the motor carrier safety provisions, the agency exercises Federal regulatory jurisdiction over the safety performance of all commercial motor carriers engaged in interstate or foreign commerce. The FHWA has jurisdiction over the safe movement on U.S. highways of dangerous cargoes such as hazardous wastes, explosives, flammables, and other volatile materials, and deals with more than 185,000 carriers and approximately 25,000 shippers of hazardous materials.

The FHWA conducts safety reviews at carriers' facilities to determine their safety performance; all carriers must comply with Federal safety regulations specifying safe operating practices. Compliance reviews are conducted to follow up on problem areas identified during safety reviews. These reviews may lead to prosecution or other sanctions against violators of the Federal motor carrier safety regulations or the hazardous materials transportation regulations.

The FHWA works with states and local government enforcement officers to enforce regulations affecting interstate transportation. It provides grants to assist the states and local governments in enforcing those regulations and encourages slates to adopt regulations compatible with federal standards.

Federal Railroad Administration (FRA). The FRA promulgates and enforces rail safety regulations, administers railroad financial assistance programs, conducts research and development in support of improved railroad safety and national rail transportation policy, provides for the rehabilitation of Northeast Corridor rail passenger service, and consolidates government support of rail transportation activities. The FRA administers and enforces regulations resulting from the Railroad Safety Act and transportation of explosives and other hazardous materials under the Hazardous Materials Transportation Act, and the reporting and investigation of railroad accidents.

National Transportation safety Board (NTSB)

The National Transportation Safety Board is an independent agency that originated within the U.S. Department of Transportation (DOT). Congress passed an Act in 1975, giving the Board increased authority in accident investigation and severing its ties with DOT. The Board's mission is to determine the "probable cause" of transportation accidents and to formulate safety recommendations to improve transportation safety.

DOL/Occupational Safety and Health Administration (OSHA)

Authority for worker protection and hazardous materials prevention programs is housed in the Occupational Safety and Health Administration (OSHA), established within the Department of Labor in 1970. The Occupational Safety and Health Act (OSH Act) gives OSHA authority to promulgate its hazardous materials regulations. In addition, SARA and the 1990 Clean Air Act Amendments included OSHA requirements. OSHA's regulatory system is one which has developed requirements that apply to safety of all industries. OSHA promulgates regulations, inspects workplaces, enforces regulations, conducts workplace safety and health training, disseminates information, collects data, and investigates workplace accidents.

OSRA Regulatory Programs. The specific OSHA hazardous materials program includes standards for: the handling and storage of liquids that are flammable and combustible and of certain chemicals that are reactive and unstable; the design, installation, and use of storage tanks; fire protection within a facility; firefighting operations, including training and equipment; emergency preparedness and evacuation plans; permissible exposure limits for more than 600 air contaminants; employee access to medical records of their workplace exposures to toxic substances or harmful physical agents; medical services and first aid; protection of workers engaged in hazardous waste operations; respiratory protection; use of personal protective equipment; communication of information about hazardous chemicals, including the important requirement that employers train workers in the precautions needed to minimize the risk of potentially dangerous exposures; and, the control of hazardous energy sources, also known as lockout/tagout. OSHA recently issued its chemical process safety standard requiring employers to conduct hazard assessments of chemicals and chemical processes and to develop programs to manage these risks including the training of workers. For hazards not addressed by a particular standard, OSHA enforces the "General Duty Clause" of the OSH Act, which requires employers to provide a place of employment free from recognized hazards that are causing or are likely to cause death or serious physical harm to employees.

OSHA Organization, Accident Investigation and Enforcement. The OSH Act encourages States to develop and operate, under Federal OSHA guidance, State job safety and health plans, including plans for hazardous materials. Once a State plan is approved, OSHA funds up to 50 percent of the program's operating costs, and the State's programs must be at least as effective as the Federal OSHA program. Twenty-five States (including two territories) have OSHA-approved programs. Twenty-three state plans cover both private and public sector employees. Two state plans cover public sector only.

OSHA investigates all serious workplace accidents involving chemical releases to determine whether there has been a violation of the OSH Act or of any regulations under that Act; and to determine whether changes are needed in the OSHA program.

Under the OSH Act, OSHA is authorized to conduct workplace inspections. OSHA inspections, in order of priority, include: imminent danger situations; to catastrophes and fatal accidents; employee complaints of violations of standards; and planned inspections of high of high-hazard or targeted industries, including the chemical industry. OSHA is also authorized to issue citations for violations of OSHA regulations and to assess penalties. In 1990 and 1991, OSHA issued unprecedented multimillion dollar penalties against several chemical companies which had willfully violated OSHA regulations. Section 4(b)(1) of the OSH Act is specifically designed to avoid duplication and overlap of federal safety and health regulations. Under section 4(b)(1), OSHA is preempted from applying its regulations to working conditions addressed by other federal agency regulations.

OSHA has placed increased emphasis on chemical accident prevention in the last two to three years. In 1990, OSHA initiated its Special Emphasis Program in the petrochemical industry (PetroSEP), by selecting 28 corporations for inspection. This program targeted corporations of more than 2,500 employers where most petrochemical facilities exist, within the three primary SIC Codes — 2821 (plastic materials), 2869 (industrial organic chemicals), and 2911 (petroleum refineries). In addition, OSHA has increased its coordination with other federal agencies, in particular, with EPA, which led to a Memorandum of Understanding governing coordination, sharing information and data, and cooperating in certain enforcement actions in the PetroSEP program. OSHA has supported public and worker training programs at its training facility in Illinois, and has provided materials to the public.

OSHA Training. Although the Occupational Safety and Health Act of 1970 does not address specifically the responsibility of employers to provide safety and health training to employees, Section 5(a)(2) does require that each employer "...shall comply with the ...standards promulgated under this Act." OSHA standards that contain training requirements for emergency prevention, preparedness, and response cooperations include the Process Safety Management Standard, mentioned above, the Hazardous Waste Operations and Emergency Response Standard (HAZWOPER), and the Hazard Communication Standard.

Under the Hazard Communication Standard, employers must establish a training and information program for employees exposed to hazardous chemicals in their work area at the time of initial assignment and whenever a new hazard is introduced. OSHA's HAZWOPER standard covers workers employed in clean-up operations at uncontrolled hazardous waste sites and at waste treatment, storage and disposal facilities licensed by EPA under the Resource Conservation and Recovery Act (RCRA). The standard also covers workers responding to emergencies, including those involving hazardous materials (e.g., spills). State, county and municipal workers such as police, ambulance workers, and firefighters with local fire departments, are covered by the regulations issued by the 23 states that have their own safety and health programs. EPA regulations cover such employees in the other states.

EPA Hazardous Materials Organization

EPA Organization. A number of different federal environmental statutes establish the regulatory framework for hazardous materials safety for communities and the environment. Safety programs and standards, which address prevention, have been included within statutory language that is often intended to address general environmental degradation, rather than accidents in particular. EPA authority for contingency planning and emergency response is primarily from specific language and statutes, e.g., CERCLA, EPCRA, and OPA, which also contain other provisions for long-term problems.

Organizational Structure for Haz Mat Prevention

The organization of safety programs at EPA is complex. This is due, in part, to the Agency's current structure, which organizes programs by environmental medium, typically by statute, and in part to the fragmentation of safety provisions in multiple laws. The fragmentation occurs when organizational structures are designed to accommodate statutes while sometimes de-emphasizing management of programs by function.

EPA administers hazardous materials safety provisions primarily through two offices within its Office of Solid Waste and Emergency Response. These two offices are: the Chemical Emergency Preparedness and Prevention Office (CEPPO), and the Office of Emergency and Remedial Response (OERR). Each office manages programs under multiple statutes. CEPPO is primarily responsible for regulations and programs under the 1986 Emergency Planning and Community Right to Know Act (EPCRA), for accident prevention provisions under §112(r) of the Clean Air Act, for EPA's responsibilities under HMTUSA, and for overall emergency coordination within EPA, including acting as chair of the National Response Team (NRT) and National Incident Coordination Team (NICT), the EPA intra-agency emergency coordination mechanism. OERR is responsible for regulatory and response functions required by CERCLA and SARA, and for EPA response to oil spill incidents under the Oil Pollution Act. Specific OERR responsibilities include: reviewing and approving facility Response Plans as required by the Oil Pollution Act (OPA), developing and writing revisions to the National Contingency Plan; developing prevention activities for fixed oil facilities under the Clean Water Act as amended by OPA; development of reportable quantities regulations; training for state and local first responders; developing and maintaining the Emergency Response Notification System; and response to oil spills and other emergencies in the inland zone. OERR also administers remedial programs under CERCLA.

In addition to its regulatory functions, CEPPO undertakes compliance and guidance programs under various statutory authorities. These programs are designed to support state and local planners and to encourage industry, states and local communities in improving accident prevention, preparedness, and response efforts. Among these efforts are its Accidental Release Information Program; the Chemical Safety Audit Program under CERCLA authorities, which assists industry through facility visits in improving safety practices, technologies and techniques; and CAMEO, the EPA/NOAA computer software designed to aid in emergency planning and response at the state and local levels.

Two other offices within the Office of Solid Waste and Emergency Response have significant responsibility with respect to hazardous materials that affect safety. The Office of Solid Waste is responsible for developing and administering standards under RCRA. Permitting standards for hazardous waste management facilities, for instance, serve to reduce the probability of accidents. Similarly, the Office of Underground Storage Tanks develops and manages technical standards under Subtitle I of RCRA for underground storage of oil and hazardous substances. Both offices also manage corrective action programs for solid waste management units and leaking underground storage tanks.

The Office of Pesticides, Prevention and Toxic Substances manages EPA's system of registering new chemicals for commercial use under authority of the Toxic Substance Control Act (TSCA), and annually tracks emergency and non-emergency toxic releases as required by EPCRA through the Toxic Release Inventory. Through a registration system for potentially new chemical products, EPA receives some 3,000 to 4,000 premanufacturing notices annually. TSCA also requires immediate notification when accidental releases of a toxic chemical present a substantial risk of injury to health or the environment. This office is also responsible for administering programs under the Federal Insecticide, Fungicide, and Rodenticide Act with regard to pesticide safety and worker protection.

EPA's Office of Air and Radiation manages programs under the Clean Air Act and leads the EPA response to radiological accidents under the FRERP. Also, through the FRERP, OAR leads the federal response to accidents involving naturally-occurring and accelerator-produced radioactive materials and foreign sources of radiological materials. Recent examples are the 1979 crash of the USSR's nuclear powered COSMOS satellite in Canada, and the 1986 Chernobyl nuclear reactor accident in the Ukraine. Although the FRERP was not activated for these incidents, using the most recent revisions it would be for similar incidents. For smaller radiological incidents which do not require a coordinated federal response, this Office responds with the Office of Solid Waste and Emergency Response using the National Contingency Plan, as occurred in the clean-up of a radium chemical company in Bronx, NY. The Office of Air Quality Programs and Standards develops and implements technical standards under the Clean Air Act to prevent or reduce emergency and non-emergency releases of hazardous materials. Like RCRA standards, those air standards serve, by regulating industry practices, to reduce the probability that accidents will occur.

The Office of Water at EPA, the regional offices, and delegated states, using Clean Water Act authority, establish permitting requirements, and set standards to control the release of pollutants to surface water and to municipal wastewater treatment plants. This Office also contributes to response actions that affect wetlands, coastal areas, and oceans, and overseas implementation of the Safe Drinking Water Act.

As addressed in more detail in Chapter 4, numerous statutory and non-statutory lists of hazardous materials are managed by EPA programs. These lists form the way EPA requirements for accident prevention, preparedness, and response are developed and implemented. The lists, however, have multiple purposes and contain different listed materials based on varying criteria and statutory mandates. All of the Offices described manage lists. These lists do not currently serve an integrated function in terms of data management or regulatory development for accident safety. EPA is developing an electronic Registry of Lists under its Office of Policy, Planning and Evaluation to facilitate integration.

Most of EPA's prevention, preparedness, and response regulations, programs and activities require technical expertise and support for development and implementation. In addition, DOT draws on EPA expertise and information in the development of some of its regulations, particularly for hazard classification.

EPA Regional Organization and Enforcement. Within the ten EPA regional offices, implementation of hazardous materials safety provisions mentioned above is typically divided differently among offices. Regional Administrators have primary responsibility for implementing how their region will administer new regulations and programs. Typically, the regions will assign implementation authority to a media office responsible for a given statute. Because hazardous materials safety regulations have been promulgated under a variety of laws, it is increasingly awkward for EPA to administer its safety programs at the regional level, as well as at headquarters, with its current organizational structure.

EPA statutes also include clauses pertinent to adoption of its laws and/or regulations by the states. EPA statutes generally allow states' adoption and expansion of environmental statutes, provided that the federal standards are the minimum. Unlike the funding programs for the states used by OSHA, federal funding may or may not be provided to the states for implementation.

EPA Training. Training courses for first responders are offered by the Environmental Response Team and through the Regional programs. EPA participates with FEMA, OSHA, and DOT, among others on the Training Committee of the National Response Team in the review and development of courses for contingency planning and responses. Further, EPA develops courses to implement its prevention responsibilities.

Prevention Training Issues
Prevention Awareness
Prevention Policy Development
Community Prevention Program Management
Prevention in Operations
Design & Plans Review
Inspection & Enforcement
Appendix A: Prevention Authorities
Appendix B: Training Mandates
Appendix C: Federal Programs
Appendix D: OSHA 1910.119

Nuclear Regulatory Commission (NRC)

The Nuclear Regulatory Commission controls the handling of nuclear materials through an extensive licensing and regulatory program. This program includes several different requirements for responsible parties to immediately report releases of radionuclides.

The extent of the Commission's regulatory jurisdiction is limited to certain types of nuclear materials and to certain parties who may handle these materials. First, the Commission only licenses source, byproduct, and special nuclear material as defined by the Atomic Energy Act. The Commission does not license naturally-occurring and accelerator-produced radioactive materials, although exposure to naturally-occurring radioactive materials may be subject to Commission regulation when they are associated with sources, byproduct, or special nuclear material being used under an active license. Second, the Atomic Energy Act exempts certain activities of the Department of Energy and the Department of Defense involving source, byproduct, and special nuclear materials from Commission license requirements.

The Nuclear Regulatory Commission exercises its statutory authority by imposing a combination of design criteria, operating parameters, and license conditions at the time of construction and licensing. It assures that the license conditions are fulfilled through inspection and enforcement. The Nuclear Regulatory Commission and the states that entered into agreement with the Nuclear Regulatory Commission to assume the regulations of certain programs license more than 20,000 users of radioactive materials.

The NRC and the Department of Transportation (DOT) share responsibility for regulating the transportation of licensed radioactive materials. The NRC regulates the design, construction, use, and maintenance of packagings for larger quantities of radioactive materials. The DOT regulates the carriers of radioactive material, and requires carriers to report to DOT any suspected radioactive contamination involving shipment of radioactive material. The NRC is also responsible for regulating the safeguarding of designated shipments to assure security of nuclear material against theft or sabotage.

Bureau of Alcohol, Tobacco, and Firearms (ATF), Department of Treasury

The Bureau of Alcohol, Tobacco, and Firearms (ATF) has the authority under 18 U.S.C. 40 "to protect commerce from interruption by reducing the hazards to persons or property arising from the misuse and unsafe or insecure storage of explosives." ATF regulates "any chemical compound mixture or device having a *common or intended* (emphasis added) purpose of functioning by explosion" by licensing manufacturers. The Bureau also prescribes by regulation the configuration, construction, and location of storage magazines. Section 846 of 18 U.S.C. authorizes the Bureau to inspect any accident or fire when there is any reason to believe that explosive materials were involved. The Bureau maintains four teams and responds within 24 hours of an incident. ATF coordinates closely with DOT and DOD on classification of explosives, and with other appropriate agencies on storage.

Federal Emergency Management Agency (FEMA)

The Federal Emergency Management Agency (FEMA) provides extensive guidance, technical and/or financial assistance to State and local governments for emergency preparedness activities which include: planning, training, exercising, mitigation, and information sharing. Under Presidential Executive Order, FEMA has the responsibility to establish overall policies for emergency planning by Federal agencies. It may assess the plans of those agencies and may recommend to the President changes, if necessary.

Organizational Structure for Haz Mat Prevention

FEMA is a member of the National Response Team and the Regional Response Teams, which coordinate hazardous materials emergency preparedness, response, and assistance activities among federal agencies, States, and local governments. FEMA may provide advice and assistance to the on-scene coordinator during an emergency regarding temporary or permanent relocation of citizens. FEMA administers the Emergency Broadcast System and a National Warning System which are used by governors and mayors to warn of disasters and communicate with the community in natural and technological emergencies. FEMA also administers an extensive program for emergency management training of State and local personnel through its Emergency Management Institute. Eighteen programs, currently managed under FEMA's Comprehensive Cooperative Agreement (CCA) provide funding and technical assistance to State and local governments for emergency management. Five of these programs provide for technical assistance only. FEMA also supports EPA in the implementation of activities under the Emergency Planning and Community Right to Know Act and DOT under the Hazardous Materials Transportation and Uniform Safety Amendments of 1990.

The U.S. Fire Administration within FEMA, coordinates federal activities related to fire protection in the following areas: fire policy and coordination, firefighter health and safety, fire data and analysis, and fire prevention and arson control. USFA works with federal, State and local governments, fire service organizations, and the private sector to minimize losses of life and property. The USFA may investigate major fire incidents to make recommendations concerning fire safety and prevention. The USFA also provides hazardous materials response training to firefighters.

Hazardous Materials

Prevention Training Guidelines

Appendix D: OSHA Process Safety Management Standard 1910.119

OSHA PROCESS SAFETY MANAGEMENT STANDARD 1910.119 APPENDIX C NONMANDATORY GUIDELINE

This material was developed by OSHA as a nonmandatory guideline to assist employers and employees in complying with the requirements of 29 CFR 1910.119, *Process Safety Management of Highly Hazardous Chemicals*. Examples presented in this appendix are not the only means of achieving the performance goals in the standard. This appendix neither adds nor detracts from the requirements of the standard.

1. **Introduction to Process Safety Management.**
2. **Employee Involvement in Process Safety Management.**
3. **Process Safety Information.**
4. **Process Hazard Analysis.**
5. **Operating Procedures and Practices.**
6. **Employee Training.**
7. **Contractors.**
8. **Pre-Startup Safety.**
9. **Mechanical Integrity.**
10. **Nonroutine Work Authorizations.**
11. **Managing Change.**
12. **Investigation of Incidents.**
13. **Emergency Preparedness.**
14. **Compliance Audits.**

1. Introduction to Process Safety Management.

The major objective of process safety management is to prevent unwanted releases of hazardous chemicals especially into locations which could expose employees and others to serious hazards. An effective process safety management program requires a systematic approach to evaluating the whole process. Using this approach the process design, process technology, operational and maintenance activities and procedures, nonroutine activities and procedures, emergency preparedness plans and procedures, training programs, and other elements which impact the process are all considered in the evaluation. Process safety management is the proactive identification, evaluation and mitigation or prevention of chemical releases that could occur as a result of failures in process, procedures or equipment.

The process safety management standard targets highly hazardous chemicals that have the potential to cause a catastrophic incident. This standard as a whole is to aid employers in their efforts to prevent or mitigate episodic chemical releases that could lead to a catastrophe in the workplace and possibly to the surrounding community. To control these types of hazards, employers need to develop the necessary expertise, experiences, judgement and proactive initiative within their workforce to properly implement and maintain an effective process safety management program as envisioned in the OSHA standard. This OSHA standard is required by the Clean Air Act Amendments as is the Environmental Protection Agency’s Risk Management Plan. Employers, who merge the two sets of requirements into their process safety management program, will better assure full compliance with each as well as enhancing their relationship with the local community.

While OSHA believes process safety management will have a positive effect on the safety of employees in workplaces and also offers other potential benefits to employers (increased productivity), smaller businesses which may have limited resources available to them at this time might consider alternative avenues of decreasing the risks associated with highly hazardous chemicals at their workplaces. One method which might be considered is the reduction in the inventory of the highly hazardous chemical. This reduction in inventory will result in a reduction of the risk or potential for a catastrophic incident. Also, employers including small employers may be able to establish more efficient inventory control by reducing the quantities of highly hazardous chemicals on site below the established threshold quantities. This reduction can be accomplished by ordering smaller shipments and maintaining the minimum inventory necessary for efficient and safe operation. When reduced inventory is not feasible, then the employer might consider dispersing inventory to several locations on site. Dispersing storage into locations where a release in one location will not cause a release in another location is a practical method to also reduce the risk or potential for catastrophic incidents.

2. Employee Involvement in Process Safety Management.

Section 304 of the Clean Air Act Amendments states that employers are to consult with their employees and their representatives regarding the employers efforts in the development and implementation of the process safety management program elements and hazard assessments. Section 304 also requires employers to train and educate their employees and to inform affected employees of the findings from incident investigations required by the process safety management program. Many employers, under their safety and health programs, have already established means and methods to keep employees and their representatives informed about relevant safety and health issues and employers may be able to adapt these practices and procedures to meet their obligations under this standard. Employers who have not implemented an occupational safety and health program may wish to form a safety and health committee of employees and management representatives to help the employer meet the obligations specified by this standard. These committees can become a significant ally in helping the employer to implement and maintain an effective process safety management program for all employees.

3. Process Safety Information.

Complete and accurate written information concerning process chemicals, process technology, and process equipment is essential to an effective process safety management program and to a process hazards analysis. The compiled information will be a necessary resource to a variety of users including the team that will perform the process hazards analysis as required under paragraph (e); those developing the training programs and the operating procedures; contractors whose employees will be working with the process; those conducting the pre-startup reviews; local emergency preparedness planners; and insurance and enforcement officials. The information to be compiled about the chemicals, including process intermediates, needs to be comprehensive enough for an accurate assessment of the fire and explosion characteristics, reactivity hazards, the safety and health hazards to workers, and the corrosion and erosion effects on the process equipment and monitoring tools. Current material safety data sheet (MSDS) information can be used to help meet this requirement which must be supplemented with process chemistry information including runaway reaction and over pressure hazards if applicable.

Process technology information will be a part of the process safety information package and it is expected that it will include diagrams of the type shown in Appendix B of this section as well as employer established criteria for maximum inventory levels for process chemicals; limits beyond which would be considered upset conditions; and a qualitative estimate of the consequences or results of deviation that could occur if operating beyond the established process limits. Employers are encouraged to use diagrams which will help users understand the process.

A block flow diagram is used to show the major process equipment and interconnecting process flow lines and show flow rates, stream composition, temperatures, and pressures when necessary for clarity. The block flow diagram is a simplified diagram.

Process flow diagrams are more complex and will show all main flow streams including valves to enhance the understanding of the process, as well as pressures and temperatures on all feed and product lines within all major vessels, in and out of headers and heat exchangers, and points of pressure and temperature control. Also, materials of construction information, pump capacities and pressure heads, compressor horsepower and vessel design pressures and temperatures are shown when necessary for clarity. In addition, major components of control loops are usually shown along with key utilities on process flow diagrams.

Piping and instrument diagrams (P&IDs) may be the more appropriate type of diagrams to show some of the above details and to display the information for the piping designer and engineering staff. The P&IDs are to be used to describe the relationships between equipment and instrumentation as well as other relevant information that will enhance clarity. Computer software programs which do P&IDs or other diagrams useful to the information package, may be used to help meet this requirement.

The information pertaining to process equipment design must be documented. In other words, what were the codes and standards relied on to establish good engineering practice. These codes and standards are published by such organizations as the American Society of Mechanical Engineers, American Petroleum Institute, American National Standards Institute, National Fire Protection Association, American Society for Testing and Materials, National Board of Boiler and Pressure Vessel Inspectors, National Association of Corrosion Engineers, American Society of Exchange Manufacturers Association, and model building code groups.

In addition, various engineering societies issue technical reports which impact process design. For example, the American Institute of Chemical Engineers has published technical reports on topics such as two phase flow for venting devices. This type of technically recognized report would constitute good engineering practice.

For existing equipment designed and constructed many years ago in accordance with the codes and standards available at that time and no longer in general use today, the employer must document which codes and standards were used and that the design and construction along with the testing, inspection and operation are still suitable for the intended use. Where the process technology requires a design which departs from the applicable codes and standards, the employer must document that the design and construction is suitable for the intended purpose.

4. Process Hazard Analysis.

A process hazard analysis (PHA), sometimes called a process hazard evaluation, is one of the most important elements of the process safety management program. A PHA is an organized and systematic effort to identify and analyze the significance of potential hazards associated with the processing or handling of highly hazardous chemicals. A PHA provides information which will assist employers and employees in making decisions for improving safety and reducing the consequences of unwanted or unplanned releases of hazardous chemicals. A PHA is directed toward analyzing potential causes and consequences of fires, explosions, releases of toxic or flammable chemicals and major spills of hazardous chemicals. The PHA focuses on equipment, instrumentation, utilities, human actions (routine and nonroutine), and external factors that might impact the process. These considerations assist in determining the hazards and potential failure points or failure modes in a process.

The selection of a PHA methodology or technique will be influenced by many factors including the amount of existing knowledge about the process. Is it a process that has been operated for a long period of time with little or no innovation and extensive experience has been generated with its use? Or, is it a new process or one which has been changed frequently by the inclusion of innovative features? Also, the size and complexity of the process will influence the decision as to the appropriate PHA methodology to use. All PHA methodologies are subject to certain limitations. For example, the checklist methodology works well when the process is very stable and no changes are made, but it is not as effective when the process has undergone extensive change. The checklist may miss the most recent changes and consequently the changes would not be evaluated. Another limitation to be considered concerns the assumptions made by the team or analyst. The PHA is dependent on good judgement and the assumptions made during the study need to be documented and understood by the team and reviewer and kept for a future PHA.

The team conducting the PHA need to understand the methodology that is going to be used. A PHA team can vary in size from two people to a number of people with varied operational and technical backgrounds. Some team members may only be a part of the team for a limited time. The team leader needs to be fully knowledgeable in the proper implementation of the PHA methodology that is to be used and should be impartial in the evaluation. The other full or part time team members need to provide the team with expertise in areas such as process technology, process design, operating procedures and practices, including how the work is actually performed, alarms, emergency procedures, instrumentation, maintenance procedures, both routine and nonroutine tasks, including how the tasks are authorized, procurement of parts and supplies, safety and health, and any other relevant subject as the need dictates. At least one team member must be familiar with the process.

The ideal team will have an intimate knowledge of the standards, codes, specifications and regulations applicable to the process being studied. The selected team members need to be compatible and the team leader needs to be able to manage the team, and the PHA study. The team needs to be able to work together while benefiting from the expertise of others on the team or outside the team, to resolve issues, and to forge a consensus on the findings of the study and recommendations.

The application of a PHA to a process may involve the use of different methodologies for various parts of the process. For example, a process involving a series of unit operations of varying sizes, complexities, and ages may use different methodologies and team members for each operation. Then the conclusions can be integrated into one final study and evaluation. A more specific example is the use of a checklist PHA for a standard boiler or heat exchanger and the use of a Hazard and Operability PHA for the overall process. Also, for batch type processes like custom batch operations, a generic PHA of a representative batch may be used where there are only small changes of monomer or other ingredient ratios and the chemistry is documented for the full range and ratio of batch ingredients. Another process that might consider using a generic type of PHA is a gas plant. Often these plants are simply moved from site to site and therefore, a generic PHA may be used for these movable plants. Also, when an employer has several similar size gas plants and no sour gas is being processed at the site, then a generic PHA is feasible as long as the variations of the individual sites are accounted for in the PHA. Finally, when an employer has a large continuous process which has several control rooms for different portions of the process such as for a distillation tower and a blending operation, the employer may wish to do each segment separately and then integrate the final results.

Additionally, small businesses which are covered by this rule, will often have processes that have less storage volume, less capacity, and less complicated than processes at a large facility. Therefore, OSHA would anticipate that the less complex methodologies would be used to meet the process hazard analysis criteria in the standard. These process hazard analyses can be done in less time and with a few people being involved. A less complex process generally means that less data, P&IDS, and process information is needed to perform a process hazard analysis.

Many small businesses have processes that are not unique, such as cold storage lockers or water treatment facilities. Where employer associations have a number of members with such facilities, a generic PHA, evolved from a checklist or what- if questions, could be developed and used by each employer effectively to reflect his/her particular process; this would simplify compliance for them.

When the employer has a number of processes which require a PHA, the employer must set up a priority system of which PHAs to conduct first. A preliminary or gross hazard analysis may be useful in prioritizing the processes that the employer has determined are subject to coverage by the process safety management standard. Consideration should first be given to those processes with the potential of adversely affecting the largest number of employees. This prioritizing should consider the potential severity of a chemical release, the number of potentially affected employees, the operating history of the process such as the frequency of chemical releases, the age of the process and any other relevant factors. These factors would suggest a ranking order and would suggest either using a weighing factor system or a systematic ranking method. The use of a preliminary hazard analysis would assist an employer in determining which process should be of the highest priority and thereby the employer would obtain the greatest improvement in safety at the facility.

Detailed guidance on the content and application of process hazard analysis methodologies is available from the American Institute of Chemical Engineers' Center for Chemical Process Safety.

5. Operating Procedures and Practices.

Operating procedures describe tasks to be performed, data to be recorded, operating conditions to be maintained, samples to be collected, and safety and health precautions to be taken. The procedures need to be technically accurate, understandable to employees, and revised periodically to ensure that they reflect current operations. The process safety information package is to be used as a resource to better assure that the operating procedures and practices are consistent with the known hazards of the chemicals in the process and that the operating parameters are accurate. Operating procedures should be reviewed by engineering staff and operating personnel to ensure that they are accurate and provide practical instructions on how to actually carry out job duties safely.

Operating procedures will include specific instructions or details on what steps are to be taken or followed in carrying out the stated procedures. These operating instructions for each procedure should include the applicable safety precautions and should contain appropriate information on safety implications. For example, the operating procedures addressing operating parameters will contain operating instructions about pressure limits, temperature ranges, flow rates, what to do when an upset condition occurs, what alarms and instruments are pertinent if an upset condition occurs, and other subjects. Another example of using operating instructions to properly implement operating procedures is in starting up or shutting down the process. In these cases, different parameters will be required from those of normal operation. These operating instructions need to clearly indicate the distinctions between startup and normal operations such as the appropriate allowances for heating up a unit to reach the normal operating parameters. Also the operating instructions need to describe the proper method for increasing the temperature of the unit until the normal operating temperature parameters are achieved.

Computerized process control systems add complexity to operating instructions. These operating instructions need to describe the logic of the software as well as the relationship between the equipment and the control system; otherwise, it may not be apparent to the operator.

Operating procedures and instructions are important for training operating personnel. The operating procedures are often viewed as the standard operating practices (SOPs) for operations. Control room personnel and operating staff, in general, need to have a full understanding of operating procedures. If workers are not fluent in English then procedures and instructions need to be prepared in a second language understood by the workers. In addition, operating procedures need to be changed when there is a change in the process as a result of the management of change procedures. The consequences of operating procedure changes need to be fully evaluated and the information conveyed to the personnel. For example, mechanical changes to the process made by the maintenance department (like changing a valve from steel to brass or other subtle changes) need to be evaluated to determine if operating procedures and practices also need to be changed. All management of change actions must be coordinated and integrated with current operating procedures and operating personnel must be oriented to the changes in procedures before the change is made. When the process is shut down in order to make a change, then the operating procedures must be updated before startup of the process.

Training in how to handle upset conditions must be accomplished as well as what operating personnel are to do in emergencies such as when a pump seal fails or a pipeline ruptures. Communication between operating personnel and workers performing work within the process area, such as nonroutine tasks, also must be maintained. The hazards of the tasks are to be conveyed to operating personnel in accordance with established procedures and to those performing the actual tasks. When the work is completed, operating personnel should be informed to provide closure on the job.

6. Employee Training.

All employees, including maintenance and contractor employees, involved with highly hazardous chemicals need to fully understand the safety and health hazards of the chemicals and processes they work with for the protection of themselves, their fellow employees and the citizens of nearby communities. Training conducted in compliance with 1910.1200, the Hazard Communication standard, will help employees to be more knowledgeable about the chemicals they work with as well as familiarize them with reading and understanding MSDS. However, additional training in subjects such as operating procedures and safety work practices, emergency evacuation and response, safety procedures, routine and nonroutine work authorization activities, and other areas pertinent to process safety and health will need to be covered by an employer's training program.

In establishing their training programs, employers must clearly define the employees to be trained and what subjects are to be covered in their training. Employers in setting up their training program will need to clearly establish the goals and objectives they wish to achieve with the training that they provide to their employees. The learning goals or objectives should be written in clear measurable terms before the training begins. These goals and objectives need to be tailored to each of the specific training modules or segments. Employers should describe the important actions and conditions under which the employee will demonstrate competence or knowledge as well as what is acceptable performance.

Hands-on-training where employees are able to use their senses beyond listening, will enhance learning. For example, operating personnel, who will work in a control room or at control panels, would benefit by being trained at a simulated control panel or panels. Upset conditions of various types could be displayed on the simulator, and then the employee could go through the proper operating procedures to bring the simulator panel back to the normal operating parameters. A training environment could be created to help the trainee feel the full reality of the situation but, of course, under controlled conditions. This realistic type of training can be very effective in teaching employees correct procedures while allowing them to also see the consequences of what might happen if they do not follow established operating procedures. Other training techniques using videos or on-the-job training can also be very effective for teaching other job tasks, duties, or other important information. An effective training program will allow the employee to fully participate in the training process and to practice their skill or knowledge.

Employers need to periodically evaluate their training programs to see if the necessary skills, knowledge, and routines are being properly understood and implemented by their trained employees. The means or methods for evaluating the training should be developed along with the training program goals and objectives. Training program evaluation will help employers to determine the amount of training their employees understood, and whether the desired results were obtained. If, after the evaluation, it appears that the trained employees are not at the level of knowledge and skill that was expected, the employer will need to revise the training program, provide retraining, or provide more frequent refresher training sessions until the deficiency is resolved. Those who conducted the training and those who received the training should also be consulted as to how best to improve the training process. If there is a language barrier, the language known to the trainees should be used to reinforce the training messages and information.

Careful consideration must be given to assure that employees including maintenance and contract employees receive current and updated training. For example, if changes are made to a process, impacted employees must be trained in the changes and understand the effects of the changes on their job tasks (e.g., any new operating procedures pertinent to their tasks). Additionally, as already discussed the evaluation of the employee's absorption of training will certainly influence the need for training.

7. Contractors.

Employers who use contractors to perform work in and around processes that involve highly hazardous chemicals, will need to establish a screening process so that they hire and use contractors who accomplish the desired job tasks without compromising the safety and health of employees at a facility. For contractors, whose safety performance on the job is not known to the hiring employer, the employer will need to obtain information on injury and illness rates and experience and should obtain contractor references. Additionally, the employer must assure that the contractor has the appropriate job skills, knowledge and certifications (such as for pressure vessel welders).

Contractor work methods and experiences should be evaluated. For example, does the contractor conducting demolition work swing loads over operating processes or does the contractor avoid such hazards?

Maintaining a site injury and illness log for contractors is another method employers must use to track and maintain current knowledge of work activities involving contract employees working on or adjacent to covered processes. Injury and illness logs of both the employer's employees and contract employees allow an employer to have full knowledge of process injury and illness experience. This log will also contain information which will be of use to those auditing process safety management compliance and those involved in incident investigations.

Contract employees must perform their work safely. Considering that contractors often perform very specialized and potentially hazardous tasks such as confined space entry activities and nonroutine repair activities it is quite important that their activities be controlled while they are working on or near a covered process. A permit system or work authorization system for these activities would also be helpful to all affected employers. The use of a work authorization system keeps an employer informed of contract employee activities, and as a benefit the employer will have better coordination and more management control over the work being performed in the process area. A well run and well maintained process where employee safety is fully recognized will benefit all of those who work in the facility whether they be contract employees or employees of the owner.

8. Pre-Startup Safety.

For new processes, the employer will find a PHA helpful in improving the design and construction of the process from a reliability and quality point of view. The safe operation of the new process will be enhanced by making use of the PHA recommendations before final installations are completed. P&IDS are to be completed along with having the operating procedures in place and the operating staff trained to run the process before startup. The initial startup procedures and normal operating procedures need to be fully evaluated as part of the pre-startup review to assure a safe transfer into the normal operating mode for meeting the process parameters.

For existing processes that have been shutdown for turnaround, or modification, etc., the employer must assure that any changes other than "replacement in kind" made to the process during shutdown go through the management of change procedures. P&IDS will need to be updated as necessary, as well as operating procedures and instructions. If the changes made to the process during shutdown are significant and impact the training program, then operating personnel as well as employees engaged in routine and nonroutine work in the process area may need some refresher or additional training in light of the changes. Any incident investigation recommendations, compliance audits or PHA recommendations need to be reviewed as well to see what impacts they may have on the process before beginning the startup.

9. Mechanical Integrity.

Employers will need to review their maintenance programs and schedules to see if there are areas where "breakdown" maintenance is used rather than an on-going mechanical integrity program. Equipment used to process, store, or handle highly hazardous chemicals needs to be designed, constructed, installed and maintained to minimize the risk of releases of such chemicals. This requires that a mechanical integrity program be in place to assure the continued integrity of process equipment. Elements of a mechanical integrity program include the identification and categorization of equipment and instrumentation, inspections and tests, testing and inspection frequencies, development of maintenance procedures, training of maintenance personnel, the establishment of criteria for acceptable test results, documentation of test and inspection results, and documentation of manufacturer recommendations as to meantime to failure for equipment and instrumentation.

The first line of defense an employer has available is to operate and maintain the process as designed, and to keep the chemicals contained. This line of defense is backed up by the next line of defense which is the controlled release of chemicals through venting to scrubbers or flares, or to surge or overflow tanks which are designed to receive such chemicals, etc. These lines of defense are the primary lines of defense or means to prevent unwanted releases. The secondary lines of defense would include fixed fire protection systems like sprinklers, water spray, or deluge systems, monitor guns, etc., dikes, designed drainage systems, and other systems which would control or mitigate hazardous chemicals once an unwanted release occurs. These primary and secondary lines of defense are what the mechanical integrity program needs to protect and strengthen these primary and secondary lines of defenses where appropriate.

The first step of an effective mechanical integrity program is to compile and categorize a list of process equipment and instrumentation for inclusion in the program. This list would include pressure vessels, storage tanks, process piping, relief and vent systems, fire protection system components, emergency shutdown systems and alarms and interlocks and pumps. For the categorization of instrumentation and the listed equipment the employer would prioritize which pieces of equipment require closer scrutiny than others. Meantime to failure of various instrumentation and equipment parts would be known from the manufacturers data or the employer's experience with the parts, which would then influence the inspection and testing frequency and associated procedures. Also, applicable codes and standards such as the National Board Inspection Code, or those from the American Society for Testing and Material, American Petroleum Institute, National Fire Protection Association, American National Standards Institute, American Society of Mechanical Engineers, and other groups, provide information to help establish an effective testing and inspection frequency, as well as appropriate methodologies.

The applicable codes and standards provide criteria for external inspections for such items as foundation and supports, anchor bolts, concrete or steel supports, guy wires, nozzles and sprinklers, pipe hangers, grounding connections, protective coatings and insulation, and external metal surfaces of piping and vessels, etc. These codes and standards also provide information on methodologies for internal inspection, and a frequency formula based on the corrosion rate of the materials of construction. Also, erosion both internal and external needs to be considered along with corrosion effects for piping and valves. Where the corrosion rate is not known, a maximum inspection frequency is recommended, and methods of developing the corrosion rate are available in the codes. Internal inspections need to cover items such as vessel shell, bottom and head; metallic linings; nonmetallic linings; thickness measurements for vessels and piping; inspection for erosion, corrosion, cracking and bulges; internal equipment like trays, baffles, sensors and screens for erosion, corrosion or cracking and other deficiencies. Some of these inspections may be performed by state of local government inspectors under state and local statutes. However, each employer needs to develop procedures to ensure that tests and inspections are conducted properly and that consistency is maintained even where different employees may be involved. Appropriate training is to be provided to maintenance personnel to ensure that they understand the preventive maintenance program procedures, safe practices, and the proper use and application of special equipment or unique tools that may be required. This training is part of the overall training program called for in the standard.

A quality assurance system is needed to help ensure that the proper materials of construction are used, that fabrication and inspection procedures are proper, and that installation procedures recognize field installation concerns. The quality assurance program is an essential part of the mechanical integrity program and will help to maintain the primary and secondary lines of defense that have been designed into the process to prevent unwanted chemical releases or those which control or mitigate a release. "As built" drawings, together with certifications of coded vessels and other equipment, and materials of construction need to be verified and retained in the quality assurance documentation. Equipment installation jobs need to be properly inspected in the field for use of proper materials and procedures and to assure that qualified craftsmen are used to do the job. The use of appropriate gaskets, packing, bolts, valves, lubricants and welding rods need to be verified in the field. Also procedures for installation of safety devices need to be verified, such as the torque on the bolts on ruptured disc installations, uniform torque on flange bolts, proper installation of pump seals, etc. If the quality of parts is a problem, it may be appropriate to conduct audits of the equipment supplier's facilities to better assure proper purchases of required equipment which is suitable for its intended service. Any changes in equipment that become necessary will need to go through the management of change procedures.

10. Nonroutine Work Authorizations.

Nonroutine work which is conducted in process areas needs to be controlled by the employer in a consistent manner. The hazards identified involving the work that is to be accomplished must be communicated to those doing the work, but also to those operating personnel whose work could affect the safety of the process. A work authorization notice or permit must have a procedure that describes the steps the maintenance supervisor, contractor representative or other person needs to follow to obtain the necessary clearance to get the job started. The work authorization procedures need to reference and coordinate, as applicable, lockout/tagout procedures, line breaking procedures, confined space entry procedures and hot work authorizations. This procedure also needs to provide clear steps to follow once the job is completed in order to provide closure for those that need to know the job is now completed and equipment can be returned to normal.

11. Managing Change.

To properly manage changes to process chemicals, technology, equipment and facilities, one must define what is meant by change. In this process safety management standard, change includes all modifications to equipment, procedures, raw materials and processing conditions other than “replacement in kind”. These changes need to be properly managed by identifying and reviewing them prior to implementation of the change. For example, the operating procedures contain the operating parameters (pressure limits, temperature ranges, flow rates, etc.) and the importance of operating within these limits. While the operator must have the flexibility to maintain safe operation within the established parameters, any operation outside of these parameters requires review and approval by a written management of change procedure.

Management of change covers such as changes in process technology and changes to equipment and instrumentation. Changes in process technology can result from changes in production rates, raw materials, experimentation, equipment unavailability, new equipment, new product development, change in catalyst and changes in operating conditions to improve yield or quality. Equipment changes include among others change in materials of construction, equipment specifications, piping pre-arrangements, experimental equipment, computer program revisions and changes in alarms and interlocks. Employers need to establish means and methods to detect both technical changes and mechanical changes.

Temporary changes have caused a number of catastrophes over the years, and employers need to establish ways to detect temporary changes as well as those that are permanent. It is important that a time limit for temporary changes be established and monitored since, without control, these changes may tend to become permanent. Temporary changes are subject to the management of change provisions. In addition, the management of change procedures are used to insure that the equipment and procedures are returned to their original or designed conditions at the end of the temporary change. Proper documentation and review of these changes is invaluable in assuring that the safety and health considerations are being incorporated into the operating procedures and the process.

Employers may wish to develop a form or clearance sheet to facilitate the processing of changes through the management of change procedures. A typical change form may include a description and the purpose of the change, the technical basis for the change, safety and health considerations, documentation of changes for the operating procedures, maintenance procedures, inspection and testing, P&IDS, electrical classification, training and communications, pre-startup inspection, duration if a temporary change, approvals and authorization. Where the impact of the change is minor and well understood, a check list reviewed by an authorized person with proper communication to others who are affected may be sufficient. However, for a more complex or significant design change, a hazard evaluation procedure with approvals by operations, maintenance, and safety departments may be appropriate. Changes in documents such as P&IDS, raw materials, operating procedures, mechanical integrity programs, electrical classifications, etc., need to be noted so that these revisions can be made permanent when the drawings and procedure manuals are updated. Copies of process changes need to be kept in an accessible location to ensure that design changes are available to operating personnel as well as to PHA team members when a PHA is being done or one is being updated.

12. Investigation of Incidents.

Incident investigation is the process of identifying the underlying causes of incidents and implementing steps to prevent similar events from occurring. The intent of an incident investigation is for employers to learn from past experiences and thus avoid repeating past mistakes. The incidents for which OSHA expects employers to become aware and to investigate are the types of events which result in or could reasonably have resulted in a catastrophic release. Some of the events are sometimes referred to as "near misses," meaning that a serious consequence did not occur, but could have.

Employers need to develop in-house capability to investigate incidents that occur in their facilities. A team needs to be assembled by the employer and trained in the techniques of investigation including how to conduct interviews of witnesses, needed documentation and report writing. A multi-disciplinary team is better able to gather the facts of the event and to analyze them and develop plausible scenarios as to what happened, and why. Team members should be selected on the basis of their training, knowledge and ability to contribute to a team effort to fully investigate the incident. Employees in the process area where the incident occurred should be consulted, interviewed or made a member of the team. Their knowledge of the events form a significant set of facts about the incident which occurred. The report, its findings and recommendations are to be shared with those who can benefit from the information. The cooperation of employees is essential to an effective incident investigation. The focus of the investigation should be to obtain facts, and not to place blame. The team and the investigation process should clearly deal with all involved individuals in a fair, open and consistent manner.

13. Emergency Preparedness.

Each employer must address what actions employees are to take when there is an unwanted release of highly hazardous chemicals. Emergency preparedness or the employer's tertiary (third) lines of defense are those that will be relied on along with the secondary lines of defense when the primary lines of defense which are used to prevent an unwanted release fail to stop the release. Employers will need to decide if they want employees to handle and stop small or minor incidental releases. Whether they wish to mobilize the available resources at the plant and have them brought to bear on a more significant release. Or whether employers want their employees to evacuate the danger area and promptly escape to a preplanned safe zone area, and allow the local community emergency response organizations to handle the release. Or whether the employer wants to use some combination of these actions. Employers will need to select how many different emergency preparedness or tertiary lines of defense they plan to have and then develop the necessary plans and procedures, and appropriately train employees in their emergency duties and responsibilities and then implement these lines of defense.

Employers at a minimum must have an emergency action plan which will facilitate the prompt evacuation of employees due to an unwanted release of a highly hazardous chemical. This means that the employer will have a plan that will be activated by an alarm system to alert employees when to evacuate and, that employees who are physically impaired, will have the necessary support and assistance to get them to the safe zone as well. The intent of these requirements is to alert and move employees to a safe zone quickly. Delaying alarms or confusing alarms are to be avoided. The use of process control centers or similar process buildings in the process area as safe areas is discouraged. Recent catastrophes have shown that a large life loss has occurred in these structures because of where they have been sited and because they are not necessarily designed to withstand over-pressures from shockwaves resulting from explosions in the process area.

Unwanted incidental releases of highly hazardous chemicals in the process area must be addressed by the employer as to what actions employees are to take. If the employer wants employees to evacuate the area, then the emergency action plan will be activated. For outdoor processes where wind direction is important for selecting the safe route to a refuge area, the employer should place a wind direction indicator such as a wind sock or pennant at the highest point that can be seen throughout the process area. Employees can move in the direction of cross wind to upwind to gain safe access to the refuge area by knowing the wind direction.

If the employer wants specific employees in the release area to control or stop the minor emergency or incidental release, these actions must be planned for in advance and procedures developed and implemented. Preplanning for handling incidental releases for minor emergencies in the process area needs to be done, appropriate equipment for the hazards must be provided, and training conducted for those employees who will perform the emergency work before they respond to handle an actual release. The employer's training program, including the Hazard Communication standard training is to address the training needs for employees who are expected to handle incidental or minor releases.

Preplanning for releases that are more serious than incidental releases is another important line of defense to be used by the employer. When a serious release of a highly hazardous chemical occurs, the employer through preplanning will have determined in advance what actions employees are to take. The evacuation of the immediate release area and other areas as necessary would be accomplished under the emergency action plan. If the employer wishes to use plant personnel such as a fire brigade, spill control team, a hazardous materials team, or use employees to render aid to those in the immediate release area and control or mitigate the incident, these actions are covered by §1910.120, the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard. If outside assistance is necessary, such as through mutual aid agreements between employers or local government emergency response organizations, these emergency responders are also covered by HAZWOPER. The safety and health protections required for emergency responders are the responsibility of their employers and of the on-scene incident commander.

Responders may be working under very hazardous conditions and therefore the objective is to have them competently led by an on-scene incident commander and the commander's staff, properly equipped to do their assigned work safely, and fully trained to carry out their duties safely before they respond to an emergency. Drills, training exercises, or simulations with the local community emergency response planners and responder organizations is one means to obtain better preparedness. This close cooperation and coordination between plant and local community emergency preparedness managers will also aid the employer in complying with the Environmental Protection Agency's Risk Management Plan criteria.

One effective way for medium to large facilities to enhance coordination and communication during emergencies for on plant operations and with local community organizations is for employers to establish and equip an emergency control center. The emergency control center would be sited in a safe zone area so that it could be occupied throughout the duration of an emergency. The center would serve as the major communication link between the on-scene incident commander and plant or corporate management as well as with the local community officials. The communication equipment in the emergency control center should include a network to receive and transmit information by telephone, radio or other means. It is important to have a backup communication network in case of power failure or one communication means fails. The center should also be equipped with the plant layout and community maps, utility drawings including fire water, emergency lighting, appropriate reference materials such as a government agency notification list, company personnel phone list, SARA Title III reports and material safety data sheets, emergency plans and procedures manual, a listing with the location of emergency response equipment, mutual aid information, and access to meteorological or weather condition data and any dispersion modeling data.

14. Compliance Audits.

Employers need to select a trained individual or assemble a trained team of people to audit the process safety management system and program. A small process or plant may need only one knowledgeable person to conduct an audit. The audit is to include an evaluation of the design and effectiveness of the process safety management system and a field inspection of the safety and health conditions and practices to verify that the employer's systems are effectively implemented. The audit should be conducted or lead by a person knowledgeable in audit techniques and who is impartial towards the facility or area being audited. The essential elements of an audit program include planning, staffing, conducting the audit, evaluation and corrective action, follow-up and documentation.

Planning in advance is essential to the success of the auditing process. Each employer needs to establish the format, staffing, scheduling and verification methods prior to conducting the audit. The format should be designed to provide the lead auditor with a procedure or checklist which details the requirements of each section of the standard.

The names of the audit team members should be listed as part of the format as well. The checklist, if properly designed, could serve as the verification sheet which provides the auditor with the necessary information to expedite the review and assure that no requirements of the standard are omitted. This verification sheet format could also identify those elements that will require evaluation or a response to correct deficiencies. This sheet could also be used for developing the follow-up and documentation requirements.

The selection of effective audit team members is critical to the success of the program. Team members should be chosen for their experience, knowledge, and training and should be familiar with the processes and with auditing techniques, practices and procedures. The size of the team will vary depending on the size and complexity of the process under consideration. For a large, complex, highly instrumented plant, it may be desirable to have team members with expertise in process engineering and design, process chemistry, instrumentation and computer controls, electrical hazards and classifications, safety and health disciplines, maintenance, emergency preparedness, warehousing or shipping, and process safety auditing. The team may use part-time members to provide for the depth of expertise required as well as for what is actually done or followed, compared to what is written.

An effective audit includes a review of the relevant documentation and process safety information, inspection of the physical facilities, and interviews with all levels of plant personnel. Utilizing the audit procedure and checklist developed in the preplanning stage, the audit team can systematically analyze compliance with the provisions of the standard and any other corporate policies that are relevant. For example, the audit team will review all aspects of the training program as part of the overall audit. The team will review the written training program for adequacy of content, frequency of training, effectiveness of training in terms of its goals and objectives as well as to how it fits into meeting the standard's requirements, documentation, etc. Through interviews, the team can determine the employee's knowledge and awareness of the safety procedures, duties, rules, emergency response assignments, etc. During the inspection, the team can observe actual practices such as safety and health policies, procedures, and work authorization practices. This approach enables the team to identify deficiencies and determine where corrective actions or improvements are necessary.

An audit is a technique used to gather sufficient facts and information, including statistical information, to verify compliance with standards. Auditors should select as part of their preplanning a sample size sufficient to give a degree of confidence that the audit reflects the level of compliance with the standard. The audit team, through this systematic analysis, should document areas which require corrective action as well as those areas where the process safety management system is effective and working in an effective manner. This provides a record of the audit procedures and findings, and serves as a baseline of operation data for future audits. It will assist future auditors in determining changes or trends from previous audits.

Corrective action is one of the most important parts of the audit. It includes not only addressing the identified deficiencies, but also planning, follow-up, and documentation. The corrective action process normally begins with a management review of the audit findings. The purpose of this review is to determine what actions are appropriate, and to establish priorities, timetables, resource allocations and requirements and responsibilities. In some cases, corrective action may involve a simple change in procedure or minor maintenance effort to remedy the concern. Management of change procedures need to be used, as appropriate, even for what may seem to be a minor change. Many of the deficiencies can be acted on promptly, while some may require engineering studies or in-depth review of actual procedures and practices. There may be instances where no action is necessary and this is a valid response to an audit finding. All actions taken, including an explanation where no action is taken on a finding, needs to be documented as to what was done and why.

It is important to assure that each deficiency identified is addressed, the corrective action to be taken noted, and the audit person or team responsible be properly documented by the employer. To control the corrective action process, the employer should consider the use of a tracking system. This tracking system might include periodic status reports shared with affected levels of management, specific reports such as completion of an engineering study, and a final implementation report to provide closure for audit findings that have been through management of change, if appropriate, and then shared with affected employees and management. This type of tracking system provides the employer with the status of the corrective action. It also provides the documentation required to verify that appropriate corrective actions were taken on deficiencies identified in the audit.

These training guidelines support the Hazardous Materials Emergency Preparedness (HMEP) grant program, and are provided as a resource for hazardous materials training as part of the public service collaboration of the U.S. Department of Transportation and the U.S. Fire Administration. By mandate, this material is under continuing review and revision and is constantly updated to reflect changes in the field of hazardous materials emergency preparedness. For this reason, successive hardcopy versions are often referred to as draft. The most current edition is the Internet version located on the web site below.

Copies of this document are available at no cost to members of the hazardous materials planning, prevention and response community. To order copies or to download the Internet version of these guidelines, please use the contact information below.

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