
**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**

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

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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

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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.

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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 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 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?

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**Hazardous Materials
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Training Guidelines**

**First Responder
Awareness**

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.	<ul style="list-style-type: none">- No length required; 4-16 hours is common practice.- Traditional classroom format.- Competencies:<ul style="list-style-type: none">- 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*

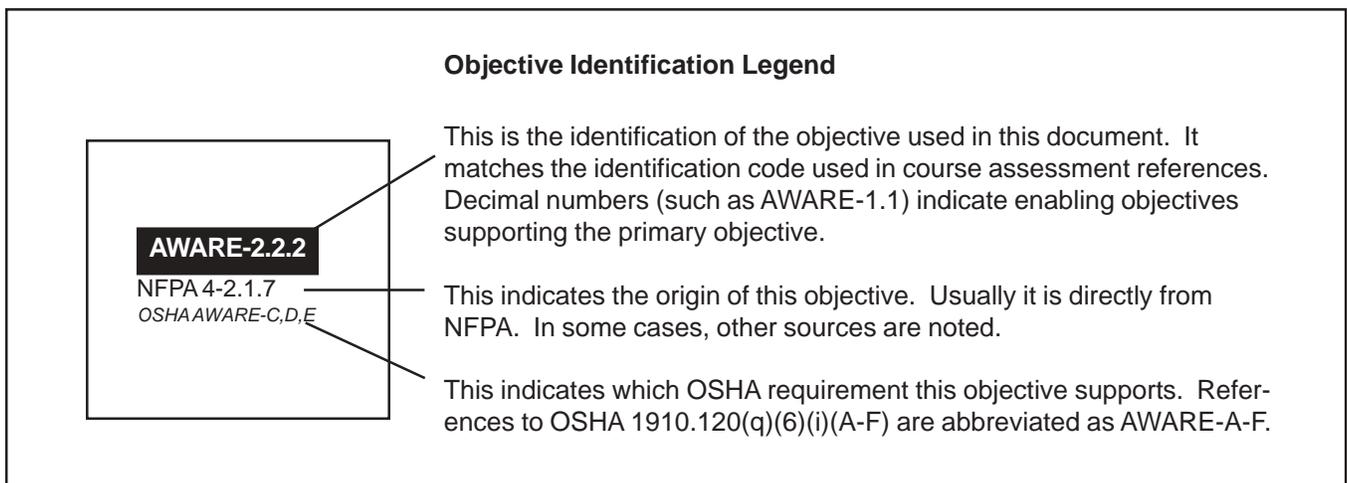
OSHA AWARE-A	Define the different types of hazardous substances and identify the risks associated with them in an incident.
OSHA AWARE-B	Given a simulated incident involving hazardous materials, identify the potential outcomes.
OSHA AWARE-C	Given the data available during an incident response, demonstrate 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.

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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.



Identification

Recommended Training Objectives

AWARE-1	Given a hazardous materials incident scenario, demonstrate an understanding of the goal of the competencies for the first responder at the awareness level.
NFPA 4.1.2.1 OSHA AWARE-C,D,E	
AWARE-1.1	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.
NFPA 2-1.3(a) OSHA AWARE-C,D,E	
AWARE-1.1.1	Identify the competency goal that the first responder at the awareness level shall be able to detect the presence of hazardous materials
NFPA 4.1.2.2(1)a OSHA AWARE-C	
AWARE-1.1.2	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
NFPA 4.2.1.2(1)b OSHA AWARE-D	
AWARE-1.1.3	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 <i>North American Emergency Response Guidebook</i> .
NFPA 4.2.1.2(1)c OSHA AWARE-E	

First Responder Awareness Recommended Training

AWARE-1.2	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 <i>North American Emergency Response Guidebook</i> , and be able to do the following:	Response Training Issues
NFPA 4.1.2.2(2) OSHA AWARE-E		Awareness
AWARE-1.2.1	...Identify the competency goal that the first responder at the awareness level shall be able to initiate protective actions\	Operations
NFPA 4.1.2.2(2)a OSHA AWARE-E		Technician
AWARE-1.2.2	...Identify the competency goal that the first responder at the awareness level shall be able to initiate the notification process	Incident Commander
NFPA 4.1.2.2(2)b OSHA AWARE-A,B,F		HM Branch Officer
Analyzing the Incident <i>Detecting the Presence of Hazardous Materials.</i>		
AWARE-2	Given various facility or transportation situations, or both, with and without hazardous materials present, identify those situations where hazardous materials are present.	HM Safety Officer
NFPA 4.2.1 OSHA AWARE-A,B,C,D		OSHA Specialist NFPA SpEmp A & Tech Spec
AWARE-2.1	Identify the definition of hazardous materials (or dangerous goods, in Canada).	OSHA Specialist NFPA SpEmp B,C
NFPA 4.2.1(1) OSHA AWARE-A		EMS Level 1
AWARE-2.2	Identify the UN/DOT hazard classes and divisions of hazardous materials and identify common examples of materials in each hazard class or division.	EMS Level 2
NFPA 4.2.1(2) OSHA AWARE-A,E		Hospital Personnel
AWARE-2.3	Identify the primary hazards associated with each of the UN/DOT hazard classes and divisions of hazardous materials by hazard class or division.	Special Topics
NFPA 4.2.1(3) OSHA AWARE-B,E		Related Standards
AWARE-2.4	Identify the difference between hazardous materials incidents and other emergencies.	
NFPA 4.2.1(4) OSHA AWARE-A,B		
AWARE-2.5	Identify typical occupancies and locations in the community where hazardous materials are manufactured, transported, stored, used, or disposed of.	
NFPA 4.2.1(5) OSHA AWARE-C,D		
AWARE-2.6	Identify typical container shapes that can indicate hazardous materials.	
NFPA 4.2.1(6) OSHA AWARE-C,D		
AWARE-2.7	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.	
NFPA 4.2.1(7) OSHA AWARE-C,D,E		

First Responder Awareness

Recommended Training

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 locations that could become targets for criminal or terrorist activity using hazardous materials.

First Responder Awareness
Recommended Training

<p>AWARE-2.14 NFPA 4.2.1(14) OSHA AWARE-C</p>	<p>Describe the difference between a chemical and a biological incident.</p>	<p>Response Training Issues</p>	
<p>AWARE-2.15 NFPA 4.2.1(15) OSHA AWARE-C</p>	<p>Identify at least four indicators of possible criminal or terrorist activity involving chemical agents.</p>		<p>Awareness</p>
<p>AWARE-2.16 NFPA 4.2.1(16) OSHA AWARE-C</p>	<p>Identify at least four indicators of possible criminal or terrorist activity involving biological agents</p>		<p>Operations</p>
<p>Analyzing the Incident Surveying the Hazardous Materials Incident from a Safe Location</p>		<p>Technician</p>	
		<p>Incident Commander</p>	
<p>AWARE-3 NFPA 4.2.2 OSHA AWARE-D,E</p>	<p>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.</p>	<p>HM Branch Officer</p>	
<p>AWARE-3.1 NFPA 4.2.2 (1) OSHA AWARE-D</p>	<p>Identify difficulties encountered in determining the specific names of hazardous materials in both facilities and transportation.</p>	<p>HM Safety Officer</p>	
<p>AWARE-3.2 Rad.1st Resp. (See Special Topics)</p>	<p>Identify the significance of the terms "Type A," "Type B," and "Special Form" as they relate to radioactive material packaging.</p>	<p>OSHA Specialist NFPA SpEmp A & Tech Spec</p>	
<p>AWARE-3.3 Rad. 1st Resp. (See Special Topics)</p>	<p>Identify additional information concerning radionuclide identity and activity provided on radioactive material labels and shipping papers.</p>	<p>OSHA SpSpecEmpl NFPA SpEmp B,C</p>	
<p>AWARE-3.4 Rad. 1st Resp. (See Special Topics)</p>	<p>Identify additional information concerning physical and chemical form and packaging type provided on radioactive material shipping papers.</p>	<p>EMS Level 1</p>	
<p>AWARE-3.5 NFPA 4.2.2 (2) OSHA AWARE-D</p>	<p>Identify sources for obtaining the names of, UN/NA identification numbers for, or types of placard associated with hazardous materials in transportation.</p>	<p>EMS Level 2</p>	
<p>AWARE-3.6 NFPA 4.2.2 (3) OSHA AWARE-D</p>	<p>Identify sources for obtaining the names of hazardous materials in a facility.</p>	<p>Hospital Personnel</p>	
		<p>Special Topics</p>	
		<p>Related Standards</p>	

First Responder Awareness

Recommended Training

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 <i>North American Emergency Response Guidebook</i> .
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 <i>Special Topics</i>)	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 <i>North American Emergency Response Guidebook</i> , 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.

First Responder Awareness Recommended Training

AWARE-5.3.3	Identify the ways hazardous materials are harmful to people, the environment, and property at hazardous materials incidents.	Response Training Issues	
NFPA 4.4.1(3)(c) <i>OSHA AWARE-A,B</i>			
AWARE-5.3.4	Identify the general routes of entry for human exposure to hazardous materials for each hazard class.		Awareness
NFPA 4.4.1(3)(d) <i>OSHA AWARE-A,B,C</i>			
AWARE-5.4	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		Operations
NFPA 4.4.1(4) <i>OSHA AWARE-E</i>			
AWARE-5.5	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		Technician
NFPA 4.4.1(5) <i>OSHA AWARE-A,E</i>			
AWARE-5.6	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		Incident Commander
NFPA 4.4.1(6) <i>OSHA AWARE-A,E</i>			
AWARE-5.7	Identify the shapes of recommended initial isolation and protective action zones.		HM Branch Officer
NFPA 4.4.1(7) <i>OSHA AWARE-B,C,E</i>			
AWARE-5.8	Describe the difference between small and large spills as found in the table of Initial Isolation and Protective Action Distances.	HM Safety Officer	
NFPA 4.4.1(8) <i>OSHA AWARE-B,C,E</i>			
AWARE-5.9	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	OSHA Specialist NFPA SpEmp A & Tech Spec	
NFPA 4.4.1(9) <i>OSHA AWARE-B,C,E</i>			
AWARE-5.10	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.	OSHA SpEmp NFPA SpEmp B,C	
NFPA 4.4.1(10) <i>OSHA AWARE-B,C,E</i>			
AWARE-5.11	Identify the techniques used to isolate the hazard area and deny entry to unauthorized persons at hazardous materials incidents.	EMS Level 1	
NFPA 4.4.1(11) <i>OSHA AWARE-E</i>			
		EMS Level 2	
		Hospital Personnel	
		Special Topics	
		Related Standards	

First Responder Awareness

Recommended Training

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.

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

**First Responder
Operations**

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.	<ul style="list-style-type: none">- 8-40 hours (minimum 8 required).- Classroom and simulator/field instruction.- Competencies:<ul style="list-style-type: none">- 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.	<ol style="list-style-type: none">1. Competency retesting of all response skills.2. Technical information updates.3. Incident scene decision-making using simulated emergencies.

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.

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

First Responder Operations

Recommended Training

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	Given a hazardous materials incident scenario, demonstrate an understanding of the goal of the competencies of the first responder at the operations level.
NFPA 5.1.2 OSHA OPS-A OSHA AWARE-B	
OPS-1.1	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:
NFPA 5.1.2.1(1) OSHA OPS-A OSHA AWARE-B	
OPS-1.1.1	...survey the hazardous materials incident to identify the containers and materials involved, determine whether hazardous materials have been released, and evaluate the surrounding conditions.
NFPA 5.1.2.1(1)(a) OSHA OPS-A OSHA AWARE-B	
OPS-1.1.2	...collect hazard and response information from material safety data sheets (MSDS), CHEMTREC/CANUTEC/SETIQ, and shipper/manufacturer contacts.
NFPA 5.1.2.1(1)(b) OSHA OPS-B	

First Responder Operations Recommended Training

OPS-1.1.3	...predict the likely behavior of a material as well as its container.	Response Training Issues
NFPA 5.1.2.1(1)(c) OSHA OPS-A OSHA AWARE-B		
OPS-1.1.4	...estimate the potential harm at a hazardous materials incident.	Awareness
NFPA 5.1.2.1(1)(d) OSHA OPS-A OSHA AWARE-B		
OPS-1.2	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 in the following tasks:	Operations
NFPA 5.1.2.1(2) OSHA OPS-B,D		
OPS-1.2.1	...describe the response objectives for hazardous materials incidents.	Technician
NFPA 5.1.2.1(2)(a) OSHA OPS-A		
OPS-1.2.2	...describe the defensive options available for a given response objective.	Incident Commander
NFPA 5.1.2.1(2)(b) OSHA OPS-D		
OPS-1.2.3	...determine whether the personal protective equipment provided is appropriate for implementing each defensive option.	HM Branch Officer
NFPA 5.1.2.1(2)(c) OSHA OPS-B		
OPS-1.2.4	...identify the emergency decontamination procedures.	HM Safety Officer
NFPA 5.1.2.1(2)(d) OSHA OPS-E		
OPS-1.3	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:	OSHA Specialist NFPA SpEmp A & Tech Spec
NFPA 5.1.2.1(3) OSHA OPS-B,D,F OSHA I.C.-A,B,D		
OPS-1.3.1	...establish and enforce scene control procedures including control zones, emergency decontamination, and communications.	OSHA SpEmp NFPA SpEmp B,C
NFPA 5.1.2.1(3)(a) OSHA OPS-F OSHA I.C.-B,D		
OPS-1.3.2	...initiate an incident management system (IMS) for hazardous materials incidents.	EMS Level 1
NFPA 5.1.2.1(3)(b) OSHA I.C.-A		
OPS-1.3.3	...don, work in, and doff personal protective equipment provided by the authority having jurisdiction.	EMS Level 2
NFPA 5.1.2.1(3)(c) OSHA OPS-B		
OPS-1.3.4	...perform defensive control functions identified in the plan of action.	Hospital Personnel
NFPA 5.1.2.1(3)(d) OSHA OPS-D		
OPS-1.4	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:	Special Topics
NFPA 5.1.2.1(4) OSHA OPS-D		
		Related Standards

First Responder Operations

Recommended Training

OPS-1.4.1 ...evaluate the status of the defensive actions taken in accomplishing the response objectives.
NFPA 5.1.2.1(4)(a)
OSHA OPS-D

OPS-1.4.2 ...communicate the status of the planned response
NFPA 5.1.2.1(4)(b)
OSHA OPS-D

Analyzing the Incident

Surveying the Hazardous Materials Incident

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

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

OPS-2.1.1 Given examples of the following tank cars, identify each tank car by type:
NFPA 5.2.1.1(A)
OSHA OPS-A
OSHA AWARE-C

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

- (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) Cryogenic intermodal tanks
 - (b) Tube modules

OPS-2.1.3 Given examples of the following cargo tanks, identify each cargo tank by type:
NFPA 5.2.1.1(C)
OSHA OPS-A
OSHA AWARE-C

- (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 Given examples of the following tanks, identify at least one material, and its hazard, that is typically found in each tank
NFPA 5.2.1.1(D)
OSHA OPS-A
OSHA AWARE-C

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

First Responder Operations Recommended Training

<p>OPS-2.1.5 NFPA 5.2.1.1(E) OSHA OPS-A OSHA AWARE-C</p>	<p>Given examples of the following nonbulk packages, identify each package by type:</p> <ol style="list-style-type: none"> (1) Bags (2) Carboys (3) Cylinders (4) Drums 	Response Training Issues	Awareness
<p>OPS-2.1.6 NFPA 5.2.1.1(F) OSHA OPS-A</p>	<p>Given examples of the following radioactive material containers, identify each container/ package by type</p> <ol style="list-style-type: none"> (1) Type A (2) Type B (3) Industrial (4) Excepted (5) Strong, tight containers 	Operations	Technician
<p>OPS-2.2 NFPA 5.2.1.2 OSHA OPS-A</p>	<p>Given examples of facility and transportation containers, identify the markings that differentiate one container from another.</p>	Incident Commander	HM Branch Officer
<p>OPS-2.2.1 NFPA 5.2.1.2(A) OSHA OPS-A</p>	<p>Given examples of the following marked transport vehicles and their corresponding shipping papers, identify the vehicle or tank identification marking:</p> <ol style="list-style-type: none"> (1) Rail transport vehicles, including tank cars (2) Intermodal equipment including tank containers (3) Highway transport vehicles, including cargo tanks 	HM Branch Officer	HM Safety Officer
<p>OPS-2.2.2 NFPA 5.2.1.2(B) OSHA OPS-A</p>	<p>Given examples of facility containers, identify the markings indicating container size, product contained, and/or site identification numbers.</p>	OSHA Specialist NFPA SpEmp A & Tech Spec	OSHA SpEEmp | NFPA SpEmp B, C
<p>OPS-2.3 NFPA 5.2.1.3 OSHA OPS-A OSHA AWARE-E</p>	<p>Given examples of facility and transportation situations involving hazardous materials, identify the name(s) of the hazardous material(s) in each situation.</p>	OSHA SpEEmp | NFPA SpEmp B, C	Level 1
<p>OPS-2.3.1 NFPA 5.2.1.3(A) OSHA OPS-A OSHA AWARE-E</p>	<p>Identify the following information on a pipeline marker:</p> <ol style="list-style-type: none"> (a) Product (b) Owner (c) Emergency telephone number 	Level 1	Level 2
<p>OPS-2.3.2 NFPA 5.2.1.3(B) OSHA OPS-A OSHA AWARE-E</p>	<p>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:</p> <ol style="list-style-type: none"> (a) Name of pesticide (b) Signal word (c) Pest control product (PCP) number (in Canada) (d) Precautionary statement (e) Hazard statement (f) Active ingredient 	Hospital Personnel	Special Topics
<p>OPS-2.3.3 NFPA 5.2.1.3(C) OSHA OPS-A</p>	<p>Given a label for a radioactive material, identify vertical bars, contents, activity, and transport index.</p>	Related Standards	
<p>OPS-2.4 NFPA 5.2.1.4 OSHA OPS-A</p>	<p>Identify and list the surrounding conditions that should be noted by the first responders when surveying hazardous materials incidents.</p>		

First Responder Operations

Recommended Training

OPS-2.5 Give examples of ways to verify information obtained from the survey of a hazardous materials incident.
NFPA 5.2.1.5
OSHA OPS-A

OPS-2.6 Identify at least three additional hazards that could be associated with an incident involving criminal or terrorist activity.
NFPA 5.2.1.6
OSHA OPS-A

Analyzing the Incident

Collecting Hazard and Response Information

OPS-3 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:
NFPA 5.2.2
OSHA OPS-A

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

OPS-3.2 ...Identify two ways to obtain a material safety data sheet (MSDS) in an emergency.
NFPA 5.2.2(2)
OSHA OPS-A

OPS-3.3 ...Using a material safety data sheet (MSDS) for a specified material, identify the following hazard and response information:
NFPA 5.2.2(3)
OSHA OPS-A,B,C,D,F
OSHA AWARE-A
OSHA I.C.-C.4

- (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 ...Identify the following:
NFPA 5.2.2(4)
OSHA OPS-A
OSHA AWARE-E

- (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 ...Identify two methods of contacting the manufacturer or shipper to obtain hazard and response information.
NFPA 5.2.2(5)
OSHA OPS-A
OSHA AWARE-E

First Responder Operations Recommended Training

OPS-3.6	...Identify the type of assistance provided by the federal defense authorities with respect to criminal or terrorist activities involving hazardous materials.	Response Training Issues
NFPA 5.2.2(6) OSHA OPS-A OSHA AWARE-E OSHA I.C.-C.4	Awareness	
OPS-3.7	...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.		Operations
NFPA 5.2.2(7) OSHA OPS-A OSHA AWARE-E OSHA I.C.-C.4	...Describe the properties and characteristics of the following: (a) Alpha particles (b) Beta particles (c) Gamma rays (d) Neutrons	Technician
OPS-3.8		Incident Commander
NFPA 5.2.2(8) OSHA OPS-A,B,C,D,F OSHA AWARE-A OSHA I.C.-C.4	Analyzing the Incident <i>Predicting the Behavior of a Material and its Container</i>	HM Branch Officer
OPS-4	Given an incident involving a single hazardous material, predict the likely behavior of the material and its container, and be able to:	HM Safety Officer
NFPA 5.2.3 OSHA OPS-A	...Given two examples of scenarios involving known hazardous materials, interpret the hazard and response information obtained from the current edition of the <i>North American Emergency Response Guidebook</i> ; material safety data sheets (MSDS); CHEMTREC/CANUTEC/SETIQ; local, state, and federal authorities; and shipper/manufacturer contacts, as follows:	OSHA Specialist NFPA SpEmp A & Tech Spec
OPS-4.1	(a) Match the following chemical and physical properties with their significance and impact on the behavior of the container and/or its contents:	OSHA SpEmp NFPA SpEmp B,C
NFPA 5.2.3(1)(a) OSHA OPS-A,C	<ul style="list-style-type: none"> 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) 	EMS Level 1
OPS-4.1a	(b) Identify the differences among the following terms:	EMS Level 2
NFPA 5.2.3(1)(a) OSHA OPS-A,C	<ul style="list-style-type: none"> i. Exposure and hazard ii. Exposure and contamination iii. Contamination and secondary contamination iv. Radioactive material exposure (internal and external) and radioactive contamination 	Hospital Personnel
OPS-4.1b		Special Topics
NFPA 5.2.3(1)(b) OSHA OPS-A,C		Related Standards

First Responder Operations

Recommended Training

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

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

First Responder Operations

Recommended Training

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.

<p>OPS-8.2b NFPA 5.3.3(2)b OSHA OPS-B OSHA IC-B.1,C.2</p>	<p>(b) Identify the purpose, advantages, and limitations of the following levels of protective clothing at hazardous materials incidents:</p> <ul style="list-style-type: none"> i. Structural fire-fighting protective clothing ii. High temperature-protective clothing iii. Chemical-protective clothing iv. Liquid splash-protective clothing v. Vapor-protective clothing 	Response Training Issues	Awareness	Operations	Technician
<p>Planning the Response <i>Identifying Emergency Decontamination Procedures</i></p>					
<p>OPS-9 NFPA 5.3.4 OSHA OPS-E,F</p>	<p>Given a plan of action for a hazardous materials incident, identify emergency decontamination procedures, and be able to do the following:</p>	Incident Commander			
<p>OPS-9.1 NFPA 5.3.4 (1) OSHA OPS-A OSHA AWARE-A,B</p>	<p>...Identify ways that personnel, personal protective equipment, apparatus, and tools and equipment become contaminated.</p>	HM Branch Officer			
<p>OPS-9.2 NFPA 5.3.4 (2) OSHA OPS-A OSHA AWARE-A,B</p>	<p>...Describe how the potential for secondary contamination determines the need for emergency decontamination procedures.</p>	HM Safety Officer			
<p>OPS-9.3 NFPA 5.3.4 (3) OSHA OPS-E,F</p>	<p>...Identify the purpose of emergency decontamination procedures at hazardous materials incidents.</p>	OSHA Specialist NFPA SpEmpl A & Tech Spec			
<p>OPS-9.4 NFPA 5.3.4 (4) OSHA OPS-A,E,F</p>	<p>...Identify the advantages and limitations of emergency decontamination procedures.</p>	OSHA SpecEmpl NFPA SpEmpl B,C			
<p>OPS-9.5 Rad. 1st Resp. (See <i>Special Topics</i>)</p>	<p>...Identify appropriate procedures for dealing with accident victims with life-threatening injuries who are known or suspected to be contaminated with radioactive material.</p>	EMS Level 1			
<p>OPS-9.6 NFPA 5.3.4 (5) OSHA OPS-A,E,F</p>	<p>...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.</p>	EMS Level 2			
<p>OPS-9.6 NFPA 5.3.4 (6) OSHA OPS-A,E,F</p>	<p>...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.</p>	Hospital Personnel			
		Special Topics			
		Related Standards			

First Responder Operations

Recommended Training

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 <i>Special Topics: Terrorism</i>)	...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.

<p>OPS-11.3 NFPA 5.4.2(3) OSHA I.C.- A,A.1,A.2,B,D</p>	<p>...Identify the purpose, need, benefits, and elements of an incident management system (IMS) at hazardous materials incidents.</p>	<p>Response Training Issues</p>	
<p>OPS-11.4 NFPA 5.4.2(4) OSHA I.C.-A,B,D</p>	<p>...Identify the considerations for determining the location of the command post for a hazardous materials incident.</p>		<p>Awareness Operations</p>
<p>OPS-11.5 NFPA 5.4.2(5) OSHA I.C.-A,B,D</p>	<p>...Identify the procedures for requesting additional resources at a hazardous materials incident.</p>		
<p>OPS-11.6 NFPA 5.4.2(6) OSHA I.C.-A.3,C.1.</p>	<p>...Identify the authority and responsibilities of the safety officer.</p>		<p>Technician Commander</p>
<p>Implementing the Planned Response Using Personal Protective Equipment</p>			
<p>OPS-12 NFPA 5.4.3 OSHA OPS-B</p>	<p>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:</p>	<p>HM Branch Officer</p>	
<p>OPS-12.1 NFPA 5.4.3(1) OSHA I.C.-C.5</p>	<p>...Identify the importance of the buddy system in implementing the planned defensive options.</p>		<p>HM Safety Officer</p>
<p>OPS-12.2 NFPA 5.4.3(2) OSHA I.C.-C.2</p>	<p>...Identify the importance of the backup personnel in implementing the planned defensive options.</p>	<p>OSHA Specialist NFPA SpEmp A & Tech Spec</p>	
<p>OPS-12.3 NFPA 5.4.3(3) OSHA OPS-F</p>	<p>...Identify the safety precautions to be observed when approaching and working at hazardous materials incidents.</p>		<p>OSHA SpecEmpl NFPA SpEmp B,C</p>
<p>OPS-12.4 NFPA 5.4.3(4) OSHA OPS-F</p>	<p>...Identify the symptoms of heat and cold stress.</p>	<p>EMS Level 1</p>	
<p>OPS-12.5 NFPA 5.4.3(5) OSHA I.C.-C</p>	<p>...Identify the physical capabilities required for, and the limitations of, personnel working in the personal protective equipment as provided by the authority having jurisdiction.</p>		<p>EMS Level 2</p>
<p>OPS-12.6 NFPA 5.4.3(6) OSHA OPS-C</p>	<p>...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.</p>	<p>Hospital Personnel</p>	
<p>OPS-12.7 NFPA 5.4.3(7) OSHA 29 CFR 1910.134</p>	<p>...Identify the procedures for cleaning, disinfecting, and inspecting respiratory protective equipment.</p>		<p>Special Topics</p>
		<p>Related Standards</p>	

First Responder Operations

Recommended Training

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.

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

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.



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

Hazardous Materials Technician

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.

Response
Training
Issues

Awareness

Operations

Technician

Incident
Commander

HM Branch
Officer

HM Safety
Officer

OSHA Specialist
NFPA SpEmp A
& Tech Spec

OSHA SpecEmp
NFPA SpEmp
B,C

EMS
Level 1

EMS
Level 2

Hospital
Personnel

Special
Topics

Related
Standards

Hazardous Materials Technician 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.	<ol style="list-style-type: none"> 1. First Responder Awareness training. 2. First Responder Operations training (min. 24 hours required). 	<ul style="list-style-type: none"> - 40-240 hours. - Classroom and simulator/field instruction, with emphasis on hands-on training. - Competencies: <ul style="list-style-type: none"> - 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. 	<ol style="list-style-type: none"> 1. Competency retesting of all response skills. 2. Technical information updates. 3. Incident scene decision-making using simulated emergencies.

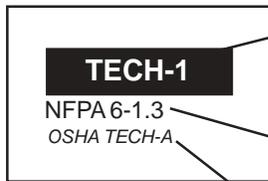
Recommended Training

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



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

<p>TECH-1 NFPA 6.1.2.2 OSHA TECH-A,B,E</p>	<p>Given a hazardous materials incident scenario, demonstrate an understanding of the role of the hazardous materials technician.</p>
<p>TECH-1.1 NFPA 6.1.2.2(1) OSHA TECH-B,E,I</p>	<p>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:</p>
<p>TECH-1.1.1 NFPA 6.1.2.2(1)a OSHA TECH-B,E,I</p>	<p>...(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.</p>
<p>TECH-1.1.2 NFPA 6.1.2.2(1)b OSHA TECH-B,E,I</p>	<p>...(b) Identify the responsibility to collect and interpret hazard and response information from printed resources, technical resources, computer data bases, and monitoring equipment.</p>

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

Hazardous Materials Technician

Recommended Training

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.

Hazardous Materials Technician Recommended Training

		Response Training Issues
TECH-1.4	Describe the responsibility to evaluate the progress of the planned response by evaluating the effectiveness of the control functions.	Awareness
NFPA 6.1.2.2(4) OSHA TECH-C,F		
TECH-1.5	Describe the responsibility to terminate the incident, and be able to do the following:	Operations
NFPA 6.1.2.2(5) OSHA TECH-H		
TECH-1.5.1	...(a) Identify the responsibility to assist in the incident debriefing.	Technician
NFPA 6.1.2.2(5)a OSHA TECH-C,H		
TECH-1.5.2	...(b) Identify the responsibility to assist in the incident critique.	Incident Commander
NFPA 6.1.2.2(5)b OSHA TECH-C,H		
TECH-1.5.3	...(c) Identify the responsibility to provide reports and documentation of the incident.	HM Branch Officer
NFPA 6.1.2.2(5)c OSHA TECH-A,H		
Analyzing the Incident Surveying the Hazardous Materials Incident		
TECH-2	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.	HM Safety Officer
NFPA 6.2.1 OSHA TECH-B,E		OSHA Specialist NFPA SpecEmp A & Tech Spec
TECH-2.1	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.	OSHA SpecEmp NFPA SpecEmp B,C
NFPA 6.2.1.1 OSHA TECH-E		
TECH-2.1.1	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	EMS Level 1
NFPA 6.2.1.1(A) OSHA TECH-E		EMS Level 2
TECH-2.1.2	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	Hospital Personnel
NFPA 6.2.1.1(B) OSHA TECH-E		Special Topics
		Related Standards

Hazardous Materials Technician

Recommended Training

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: <ol style="list-style-type: none">(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: <ol style="list-style-type: none">(1) Nonpressure tank(2) Pressure tank(3) Cryogenic 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: <ol style="list-style-type: none">(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 typical material found in each package: <ol style="list-style-type: none">(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: <ol style="list-style-type: none">(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: <ol style="list-style-type: none">(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: <ol style="list-style-type: none">(1) Nonpressure tank(2) Pressure tank(3) Cryogenic liquid tank

Hazardous Materials Technician Recommended Training

TECH-2.3	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:	Response Training Issues
NFPA 6.2.1.2 OSHA TECH-B		
TECH-2.3.1	Identify the steps in an analysis process for identifying unknown solid and liquid materials.	Awareness
NFPA 6.2.1.2(A) OSHA TECH-B		
TECH-2.3.2	Identify the steps in an analysis process for identifying an unknown atmosphere.	Operations
NFPA 6.2.1.2(B) OSHA TECH-B		
TECH-2.3.3	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	Technician
NFPA 6.2.1.2(C) OSHA TECH-B		
TECH-2.3.4	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	Incident Commander
NFPA 6.2.1.2(D) OSHA TECH-B		
TECH-2.3.5	Demonstrate how radiation detection instruments may be used defensively.	HM Branch Officer
Rad. 1st Resp. (See Special Topics) OSHA TECH-B		
TECH-2.3.6	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	HM Safety Officer
NFPA 6.2.1.2(E) OSHA TECH-B		
TECH-2.3.7	Demonstrate the field maintenance and testing procedures for the monitoring equipment, test strips, and reagents provided by the authority having jurisdiction.	OSHA Specialist NFPA SpEmp A & Tech Spec
NFPA 6.2.1.2(F) OSHA TECH-B		
		OSHA SpecEmp NFPA SpEmp B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Hazardous Materials Technician

Recommended Training

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

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.

<p>TECH-3.6 NFPA 6.2.2(F) OSHA TECH-B,E</p>	<p>Identify two methods for determining the pressure in bulk packaging or facility containers.</p>	Response Training Issues
<p>TECH-3.7 NFPA 6.2.2(G) OSHA TECH-B,E</p>	<p>Identify one method for determining the amount of lading remaining in damaged bulk packaging or facility containers.</p>	Awareness
<p>Analyzing the Incident <i>Describing the Condition of the Container Involved in the Incident</i></p>		Operations
<p>TECH-4 NFPA 6.2.3 OSHA TECH-E</p>	<p>Given simulated facility and transportation container damage, describe the damage and be able to do the following:</p>	Technician
<p>TECH-4.1 NFPA 6.2.3.1 OSHA TECH-E</p>	<p>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.</p>	Incident Commander
<p>TECH-4.1.1 NFPA 6.2.3.1(A) OSHA TECH-E</p>	<p>Identify the basic design and construction features, including closures, of the following bulk containers:</p> <ul style="list-style-type: none"> (1) Cargo tanks: <ul style="list-style-type: none"> (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: <ul style="list-style-type: none"> (a) Nonpressure tank (b) Pressure tank (3) Intermodal tanks: <ul style="list-style-type: none"> (a) Nonpressure intermodal tanks: <ul style="list-style-type: none"> i. IM- 101 portable tank ii. IM-102 portable tank (b) Pressure intermodal tanks (specification 51) (c) Specialized intermodal tanks: <ul style="list-style-type: none"> i. Cryogenic intermodal tanks ii. Tube modules (4) One-ton containers (5) Pipelines (6) Railroad cars: <ul style="list-style-type: none"> (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) 	HM Branch Officer
		HM Safety Officer
		OSHA Specialist NFPA SpEmp A & Tech Spec
		OSHA SpEmp NFPA SpEmp B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Hazardous Materials Technician

Recommended Training

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: <ol style="list-style-type: none">(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: <ol style="list-style-type: none">(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: <ol style="list-style-type: none">(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: <ol style="list-style-type: none">(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.

Hazardous Materials Technician Recommended Training

<p>TECH-5.2 NFPA 6.2.4.2 OSHA TECH-E</p>	<p>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:</p> <ol style="list-style-type: none"> (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 	Response Training Issues
<p>Analyzing the Incident <i>Estimating the Likely Size of an Endangered Area</i></p>		Awareness
<p>TECH-6 NFPA 6.2.5 OSHA TECH-E</p>		Operations
<p>TECH-6.1 NFPA 6.2.5.1 OSHA TECH-E</p>	<p>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:</p>	Technician
<p>TECH-6.2 NFPA 6.2.5.2 OSHA TECH-E</p>	<p>Identify local resources for dispersion pattern prediction and modeling including computers, monitoring equipment, or specialists in the field.</p>	Incident Commander
<p>TECH-6.2.1 NFPA 6.2.5.2(A) OSHA TECH-I</p>	<p>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.</p>	HM Branch Officer
<p>TECH-6.2.1 NFPA 6.2.5.2(A) OSHA TECH-I</p>	<p>Describe the following toxicological terms and exposure values and explain their significance in the risk assessment process:</p> <ol style="list-style-type: none"> (1) Parts per million (ppm) (2) Parts per billion (ppb) (3) Lethal dose (LD₅₀) (4) Lethal concentrations (LC₅₀) (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 	HM Safety Officer
<p>TECH-6.2.2 NFPA 6.2.5.2(B) OSHA TECH-E,I</p>	<p>Describe the following radiological terms and explain their significance in predicting the extent of health hazards and environmental impact in a hazardous materials incident:</p> <ol style="list-style-type: none"> (a) Types (b) Measurement (c) Protection 	OSHA Specialist NFPA SpEimp A & Tech Spec
<p>TECH-6.2.3 NFPA 6.2.5.2(C) OSHA TECH-E,I</p>	<p>Identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials incident.</p>	OSHA SpEimp NFPA SpEimp B,C
<p>TECH-6.3 NFPA 6.2.5.3 OSHA TECH-E,I</p>	<p>Identify a method for estimating the outcomes within an endangered area of a hazardous materials incident.</p>	EMS Level 1
<p>TECH-6.2.2 NFPA 6.2.5.2(B) OSHA TECH-E,I</p>		EMS Level 2
<p>TECH-6.3 NFPA 6.2.5.3 OSHA TECH-E,I</p>	<p>Identify a method for estimating the outcomes within an endangered area of a hazardous materials incident.</p>	Hospital Personnel
<p>TECH-6.2.3 NFPA 6.2.5.2(C) OSHA TECH-E,I</p>		Special Topics
<p>TECH-6.3 NFPA 6.2.5.3 OSHA TECH-E,I</p>		Related Standards

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
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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.
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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.
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TECH-8.2 NFPA 6.3.2.2 OSHA TECH-F	Identify the possible action options to accomplish a given response objective.
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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:
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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.
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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.
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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: <ol style="list-style-type: none">(1) Positive pressure self-contained breathing apparatus(2) Positive pressure air line respirators with required escape unit(3) Air purifying respirators
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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.
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Hazardous Materials Technician Recommended Training

<p>TECH-9.2.3 NFPA 6.3.3.2(C) OSHA TECH-D OSHA I.C.-B.2,C.1</p>	<p>Identify the operational components of air purifying respirators and air line respirators by name and describe their functions.</p>	Response Training Issues
<p>TECH-9.3 NFPA 6.3.3.3 OSHA TECH-D OSHA I.C.-B.2,C.1</p>	<p>Identify the factors to be considered in selecting the proper chemical-protective clothing for a specified action option.</p>		Awareness
<p>TECH-9.3.1 NFPA 6.3.3.3 (A) OSHA TECH-D,I</p>	<p>Describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:</p> <ol style="list-style-type: none"> (1) Degradation (2) Penetration (3) Permeation 	Operations
<p>TECH-9.3.2 NFPA 6.3.3.3 (B) OSHA TECH-D,I</p>	<p>Identify at least three indications of material degradation of chemical-protective clothing.</p>	Technician
<p>TECH-9.3.3 NFPA 6.3.3.3 (C) OSHA TECH-D,I</p>	<p>Identify the three types of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type.</p>	Incident Commander
<p>TECH-9.3.4 NFPA 6.3.3.3 (D) OSHA TECH-D</p>	<p>Identify the relative advantages and disadvantages of the following heat exchange units used for the cooling of personnel in chemical-protective clothing:</p> <ol style="list-style-type: none"> (1) Air cooled (2) Ice cooled (3) Water cooled 	HM Branch Officer
<p>TECH-9.3.5 NFPA 6.3.3.3 (E) OSHA TECH-D OSHA I.C.-B.2,C.1</p>	<p>Identify the process for selecting the proper protective clothing at hazardous materials incidents.</p>	HM Safety Officer
<p>TECH-9.3.6 NFPA 6.3.3.3 (F) OSHA TECH-D OSHA I.C.-B.2</p>	<p>Given three examples of various hazardous materials, determine the appropriate protective clothing construction materials for a given action option using chemical compatibility charts.</p>	OSHA Specialist NFPA SpEmpl A & Tech Spec
<p>TECH-9.3.7 NFPA 6.3.3.3 (G) OSHA TECH-D OSHA I.C.-C</p>	<p>Identify the physical and psychological stresses that can affect users of specialized protective clothing.</p>	OSHA Specialist NFPA SpEmpl B,C
<p>Planning the Response <i>Developing Appropriate Decontamination Procedures</i></p>		EMS Level 1
<p>TECH-10 NFPA 6.3.4 OSHA TECH-A,G</p>	<p>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:</p>	EMS Level 2
<p>TECH-10.1 NFPA 6.3.4(1) OSHA TECH-A,G</p>	<p>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.</p>	Hospital Personnel
		Special Topics
		Related Standards

Hazardous Materials Technician

Recommended Training

TECH-10.2 Identify three sources of technical information for selecting appropriate decontamination procedures and identify how to contact those sources in an emergency.
NFPA 6.3.4 (2)
OSHA TECH-A,G

Planning the Response *Developing a Plan of Action*

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

TECH-11.1 Describe the purpose of, procedures for, equipment required, and safety precautions used with the following techniques for hazardous materials control:
NFPA 6.3.5 (A)
OSHA TECH-F

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

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

TECH-11.3 Given a simulated hazardous materials incident, develop the safety considerations that must be included in the plan of action, and be able to:
NFPA 6.3.5 (C)
OSHA TECH-F
OSHA HMSPEC-H

TECH-11.3.1 List and describe the safety considerations to be included.
NFPA 6.3.5 (C)(1)
OSHA TECH-F
OSHA HMSPEC-H

TECH-11.3.2 Identify the points that should be made in a safety briefing prior to working at the scene.
NFPA 6.3.5 (C)(2)
OSHA TECH-F
OSHA HMSPEC-H

TECH-11.4 Identify the atmospheric and physical safety hazards associated with hazardous materials incidents involving confined spaces.
NFPA 6.3.5 (D)
OSHA TECH-F

TECH-11.5 Identify the pre-entry activities to be performed.
NFPA 6.3.5 (E)
OSHA TECH-F

TECH-11.6 Identify the procedures, equipment, and safety precautions for collecting legal evidence at hazardous materials incidents.
NFPA 6.3.5 (F)
OSHA TECH-F

Hazardous Materials Technician Recommended Training

Implementing the Planned Response Performing Incident Management Duties		Response Training Issues
TECH-12	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).	Awareness
NFPA 6.4.1 OSHA TECH-C,H		
TECH-12.1	Identify the role of the hazardous materials technician during an incident involving hazardous materials.	Operations
NFPA 6.4.1(1) OSHA TECH-C,H		
TECH-12.2	Identify the duties and responsibilities of the following hazardous materials branch functions within the incident management system:	Technician
NFPA 6.4.1(2) OSHA I.C.- A,A.1,B,B.1,D	<ul style="list-style-type: none"> (a) Backup (b) Decontamination (c) Entry (d) Hazardous Materials Branch Management (e) Hazardous Materials Branch Safety (f) Information/research (g) Reconnaissance (h) Resources 	Incident Commander
TECH-12.3	Given a simulated hazardous materials incident, demonstrate setup of the decontamination corridor as specified in the planned response.	HM Branch Officer
NFPA 6.4.1(3) OSHA TECH-A,C,G OSHA HMSPEC-G		
TECH-12.4	Given a simulated hazardous materials incident, demonstrate the decontamination process specified in the planned response.	HM Safety Officer
NFPA 6.4.1(4) OSHA TECH-A,G		
Implementing the Planned Response Using Protective Clothing and Respiratory Protection		OSHA Specialist NFPA Sperm A & Tech Spec
TECH-13	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:	OSHA Spec/Emp NFPA Sperm B,C
NFPA 6.4.2 OSHA TECH-D		
TECH-13.1	Describe three safety procedures for personnel wearing vapor-protective clothing.	EMS Level 1
NFPA 6.4.2(1) OSHA TECH-A,D		
TECH-13.2	Describe three emergency procedures for personnel wearing vapor-protective clothing.	EMS Level 2
NFPA 6.4.2(2) OSHA TECH-A,D		
TECH-13.3	Identify the procedures for donning, working in, and doffing the following types of respiratory protection:	Hospital Personnel
NFPA 6.4.2(3) OSHA TECH-D OSHA 29 CFR 1910.134	<ul style="list-style-type: none"> (a) Air line respirator with required escape unit (b) Air purifying respirator 	
TECH-13.4	Demonstrate donning, working in, and doffing chemical-protective clothing in addition to any other specialized protective equipment provided by the authority having jurisdiction.	Special Topics
NFPA 6.4.2(4) OSHA TECH-D		
		Related Standards

Hazardous Materials Technician

Recommended Training

TECH-13.5 Demonstrate the ability to record the use, repair, and testing of chemical-protective clothing according to manufacturer's specifications and recommendations.
NFPA 6.4.2(5)
OSHA TECH-D
OSHA (q)(10)

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

Implementing the Planned Response

Performing Control Functions Identified in Plan of Action

TECH-14 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 Given a pressure vessel, select the appropriate material or equipment and demonstrate a method(s) to contain leaks from the following locations:
NFPA 6.4.3 (1)
OSHA TECH-F

- (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 Given the fittings on a pressure container, demonstrate the ability to perform the following:
NFPA 6.4.3 (2)
OSHA TECH-F

- (a) Close valves that are open
- (b) Replace missing plugs
- (c) Tighten loose plugs

TECH-14.3 Given a 55-gal (208-L) drum, demonstrate the ability to contain the following types of leaks using appropriate tools and materials:
NFPA 6.4.3 (3)
OSHA TECH-F

- (a) Bung leak
- (b) Chime leak
- (c) Forklift puncture
- (d) Nail puncture

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

- (a) Rolling slide-in
- (b) Slide-in
- (c) Slip-over

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

TECH-14.6 Identify three considerations for assessing a leak or spill inside a confined space without entering the area.
NFPA 6.4.3 (6)
OSHA TECH-E

Hazardous Materials Technician Recommended Training

<p>TECH-14.7 NFPA 6.4.3 (7) OSHA TECH-A,E,F</p>	<p>Identify three safety considerations for product transfer operations.</p>	Response Training Issues	Awareness
<p>TECH-14.8 NFPA 6.4.3 (8) OSHA TECH-F</p>	<p>Given an MC-306/DOT-406 cargo tank and a dome cover clamp, demonstrate the ability to install the clamp on the dome properly.</p>			Operations
<p>TECH-14.9 NFPA 6.4.3 (9) OSHA TECH-A,E,F</p>	<p>Identify the methods and precautions used when controlling a fire involving an MC-306/DOT-406 aluminum shell cargo tank.</p>	Technician	
<p>TECH-14.10 NFPA 6.4.3 (10) OSHA TECH-A,E,F</p>	<p>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:</p> <ul style="list-style-type: none"> (a) Dome cover leak (b) Irregular-shaped hole (c) Puncture (d) Split or tear 		Incident Commander	HM Branch Officer
<p>TECH-14.11 NFPA 6.4.3 (11) OSHA TECH-A,E,F</p>	<p>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.</p>	HM Safety Officer	
<p>Evaluating Progress <i>Evaluating the Effectiveness of the Control Functions</i></p>			
<p>TECH-15 NFPA 6.5 OSHA TECH-A,E,F</p>	<p>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.</p>	OSHA Specialist NFPA SpEmpl A & Tech Spec	OSHA SpEmpl NFPA SpEmpl B,C
<p>Terminating the Incident <i>Assisting in the Debriefing</i></p>			
<p>TECH-16 NFPA 6.6.1 OSHA TECH-H</p>	<p>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:</p>	EMS Level 1	
<p>TECH-16.1 NFPA 6.6.1(1) OSHA TECH-H</p>	<p>Describe three components of an effective debriefing.</p>		EMS Level 2
<p>TECH-16.2 NFPA 6.6.1(2) OSHA TECH-H</p>	<p>Describe the key topics of an effective debriefing.</p>	Hospital Personnel	
<p>TECH-16.3 NFPA 6.6.1(3) OSHA TECH-H</p>	<p>Describe when a debriefing should take place.</p>		Special Topics
<p>TECH-16.4 NFPA 6.6.1(4) OSHA TECH-H</p>	<p>Describe who should be involved in a debriefing.</p>	Related Standards	

Hazardous Materials Technician

Recommended Training

Terminating the Incident

Assisting in the Incident Critique

TECH-17 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:
NFPA 6.6.2
OSHA TECH-H

TECH-17.1 Describe three components of an effective critique.
NFPA 6.6.2(1)
OSHA TECH-H

TECH-17.2 Describe who should be involved in a critique.
NFPA 6.6.2(2)
OSHA TECH-H

TECH-17.3 Describe why an effective critique is necessary after a hazardous materials incident.
NFPA 6.6.2(3)
OSHA TECH-H

TECH-17.4 Describe which written documents should be prepared as a result of the critique.
NFPA 6.6.2(4)
OSHA TECH-H

Terminating the Incident

Providing Reports and Documentation

TECH-18 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:
NFPA 6.6.3
OSHA TECH-A,H

TECH-18.1 Identify the reports and supporting documentation required by the local emergency response plan and the organization's standard operating procedures.
NFPA 6.6.3 (1)
OSHA TECH-A,H

TECH-18.2 Demonstrate the proper completion of the reports required by the local emergency response plan and the organization's standard operating procedures.
NFPA 6.6.3 (2)
OSHA TECH-A,H

TECH-18.3 Describe the importance of personnel exposure records.
NFPA 6.6.3 (3)
OSHA TECH-A,H

TECH-18.4 Describe the importance of debriefing records.
NFPA 6.6.3 (4)
OSHA TECH-A,H

TECH-18.5 Describe the importance of critique records.
NFPA 6.6.3 (5)
OSHA TECH-A,H

Hazardous Materials Technician Recommended Training

TECH-18.6	Identify the steps in keeping an activity log and exposure records. NFPA 6.6.3 (6) <i>OSHA TECH-A,H</i>	Response Training Issues
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) <i>OSHA TECH-A,H</i>	Awareness
TECH-18.8	Identify the requirements for compiling hot zone entry and exit logs. NFPA 6.6.3 (8) <i>OSHA TECH-A,H</i>	Operations
TECH-18.9	Identify the requirements for compiling personal protective equipment logs. NFPA 6.6.3 (9) <i>OSHA TECH-A,H</i>	Technician
TECH-18.10	Identify the requirements for filing documents and maintaining records. NFPA 6.6.3 (10) <i>OSHA TECH-A,H</i>	Incident Commander
		HM Branch Officer
		HM Safety Officer
		OSHA Specialist NFPA Sperm A & Tech Spec
		OSHA Spermpl NFPA Sperm B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards



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
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**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
<p>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.</p>	<ol style="list-style-type: none"> 1. First Responder Awareness training. 2. First Responder Operations training (min. 24 hours required). 	<ul style="list-style-type: none"> - 16-40 hours. - Classroom and simulator/field instruction, with emphasis on incident management and resource coordination. - Competencies: <ul style="list-style-type: none"> - 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. 	<ol style="list-style-type: none"> 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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Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Incident Commander Required Training

Continued from previous page

- (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.

Incident Commander Required Training

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

Identification

*Sample **Required Training** Objectives*

<i>Identification</i>	<i>Sample Required Training Objectives</i>	Response Training Issues
OSHA I.C.-A	Given a simulated incident involving hazardous materials, demonstrate implementation of the employer's incident command system.	Awareness
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)	Operations
OSHA I.C.-A.2	Demonstrate transfer of command.- Note to OSHA 29 CFR 1910.120(q)(3)(i)	Technician
OSHA I.C.-A.3	Define the roles and responsibilities of the safety officer.- OSHA 29 CFR 1910.120 (q)(3)(vii and viii)	Incident Commander
OSHA I.C.-B	Given a simulated incident involving hazardous materials, demonstrate implementation of the employer's emergency response plan.	HM Branch Officer
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)	HM Safety Officer
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 Specialist NFPA SpEmp A & Tech Spec
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 SpecEmp NFPA SpEmp B,C
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)	EMS Level 1
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)	EMS Level 2
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)	Hospital Personnel
OSHA I.C.-D	Given a simulated incident involving hazardous materials, demonstrate implementation of the local emergency response plan.	Special Topics
OSHA I.C.-E	Identify and describe the State emergency response plan and the federal regional response team.	Related Standards
OSHA I.C.-F	Given a simulated incident involving hazardous materials, identify and demonstrate management of decontamination procedures.	

Incident Commander

Recommended Training

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 hazardous 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

I.C.-1

NFPA 7-1.3

OSHA I.C.-A

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.

Incident Commander
Recommended Training

I.C.-1.1.2	Identify the responsibility to estimate the potential outcomes within the endangered area at a hazardous materials incident.	Response Training Issues
NFPA 7.1.2.2 (1)b <i>OSHA I.C.-A,B,D</i>		Awareness
I.C.-1.2	Describe the responsibility to plan response operations within the capabilities and competencies of available personnel, personal protective equipment, and control equipment.	Operations
NFPA 7.1.2.2 (2) <i>OSHA I.C.-A,B,D</i>		Technician
I.C.-1.2.1	Identify the response objectives for hazardous materials incidents.	Incident Commander
NFPA 7.1.2.2 (2)a <i>OSHA I.C.-A,B,D</i>		HM Branch Officer
I.C.-1.2.2	Identify the potential action options (defensive, offensive, and nonintervention) available by response objective.	HM Safety Officer
NFPA 7.1.2.2 (2)b <i>OSHA I.C.-A,B,D</i>		OSHA Specialist NFPA SpEmp A & Tech Spec
I.C.-1.2.3	Identify the responsibility to approve the level of personal protective equipment required for a given action option.	OSHA SpecEmp NFPA SpEmp B,C
NFPA 7.1.2.2 (2)c <i>OSHA I.C.-A,B,D</i>		EMS Level 1
I.C.-1.2.4	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.	EMS Level 2
NFPA 7.1.2.2 (2)d <i>OSHA I.C.-A,B,D</i>		Hospital Personnel
I.C.-1.3	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.	Special Topics
NFPA 7.1.2.2(3) <i>OSHA I.C.-A,B,D</i>		Related Standards
I.C.-1.3.1	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.	
NFPA 7.1.2.2(3)a <i>OSHA I.C.-A,B,D</i>		
I.C.-1.3.2	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.	
NFPA 7.1.2.2(3)b <i>OSHA I.C.-A,B,D</i>		
I.C.-1.3.3	Identify the responsibility to provide a focal point for information transfer to media and local elected officials through the IMS structure.	
NFPA 7.1.2.2(3)c <i>OSHA I.C.-A,B,D</i>		
I.C.-1.4	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.	
NFPA 7.1.2.2(4) <i>OSHA I.C.-A,B,D</i>		
I.C.-1.5	Describe the responsibility to terminate the incident.	
NFPA 7.1.2.2(5) <i>OSHA I.C.-A,B,D</i>		
I.C.-1.5.1	Identify the responsibility to transfer command (control) when appropriate.	
NFPA 7.1.2.2(5)a <i>OSHA I.C.-A,B,D</i>		

Incident Commander

Recommended Training

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 (LD₅₀)
- (d) Lethal concentrations (LC₅₀)
- (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 equivalent 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	Response Training Issues
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.	Awareness
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.	Operations
I.C.-3.6	NFPA 7.2.2 (6) 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.	Technician
I.C.-3.7	NFPA 7.2.2 (7) OSHA I.C.-B.1, B.2	Identify the methods available to the organization for obtaining local weather conditions and predictions for short-term future weather changes.	Incident Commander
I.C.-3.8	NFPA 7.2.2 (8) OSHA I.C.-B.1, B.2	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	HM Branch Officer
I.C.-3.9	NFPA 7.2.2 (9) 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)	HM Safety Officer
Planning the Response <i>Identifying Response Objectives</i>			OSHA Specialist NFPA SpEmp A & Tech Spec
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.	OSHA SpecEmpl NFPA SpEmp B,C
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.	EMS Level 1
Planning the Response <i>Identifying the Potential Action Options</i>			EMS Level 2
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:	Hospital Personnel
			Special Topics
			Related Standards

Incident Commander

Recommended Training

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.

Incident Commander
Recommended Training

		Response Training Issues
<p>I.C.-7.3 NFPA 7.3.4.3 OSHA I.C.-A,B,D,E</p>	<p>Given the local emergency response plan and/or the organization’s standard operating procedures, identify which agency will perform the following:</p> <ol style="list-style-type: none"> (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 	Awareness Operations Technician Incident Commander HM Branch Officer HM Safety Officer
<p>I.C.-7.4 NFPA 7.3.4.4 OSHA I.C.-A</p>	<p>Identify the process for determining the effectiveness of an action option on the potential outcomes.</p>	OSHA Specialist NFPA SpEmp A & Tech Spec
<p>I.C.-7.5 NFPA 7.3.4.5 OSHA I.C.-A,3,B,C</p>	<p>Identify the safe operating practices/procedures that are required to be followed at a hazardous materials incident.</p>	OSHA SpecEmpl NFPA SpEmp B,C
<p>I.C.-7.5.1 NFPA 7.3.4.4 (A) OSHA I.C.-B,C</p>	<p>Identify the importance of pre-incident planning relating to safety during responses to specific sites.</p>	EMS Level 1
<p>I.C.-7.5.2 NFPA 7.3.4.4 (B) OSHA I.C.-A,3,B,C</p>	<p>Identify the procedures for presenting a safety briefing prior to allowing personnel to work on a hazardous materials incident.</p>	EMS Level 2
<p>I.C.-7.5.3 NFPA 7.3.4.4 (C) OSHA I.C.-A,3,B,C</p>	<p>Identify at least three safety precautions associated with search and rescue missions at hazardous materials incidents.</p>	Hospital Personnel Special Topics Related Standards

Incident Commander

Recommended Training

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: <ol style="list-style-type: none">(1) Absorption(2) Adsorption(3) Chemical degradation(4) Dilution(5) Disposal(6) Evaporation(7) Neutralization(8) Solidification(9) Vacuuming(10) Washing
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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.
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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:
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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.
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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: <ol style="list-style-type: none">(a) Backup(b) Decontamination(c) Entry(d) Hazardous Materials Branch Management(e) Hazardous Materials Branch Safety(f) Information/research(g) Reconnaissance(h) Resources
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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.
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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.
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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.
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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.
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Recommended Training

<p>I.C.-8.7 NFPA 7.4.1 (7) OSHA I.C.-B,D,E</p>	<p>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.</p>	Response Training Issues
<p>Implementing the Planned Response <i>Directing Resources (Private and Governmental)</i></p>		Awareness Operations
<p>I.C.-9 NFPA 7.4.2 OSHA I.C.-A,A.1,B,B.1,D</p>	<p>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.</p>	Technician
<p>Implementing the Planned Response <i>Providing a Focal Point for Information Transfer to Media and Elected Officials</i></p>		Incident Commander
<p>I.C.-10 NFPA 7.4.3 OSHA I.C.-A</p>	<p>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:</p>	HM Branch Officer
<p>I.C.-10.1 NFPA 7.4.3 (1) OSHA I.C.-A</p>	<p>Identify the local policy for providing information to the media.</p>	HM Safety Officer
<p>I.C.-10.2 NFPA 7.4.3 (2) OSHA I.C.-A</p>	<p>Identify the responsibilities of the public information officer at a hazardous materials incident.</p>	OSHA Specialist NFPA SpEmp A & Tech Spec
<p>Evaluating Progress <i>Evaluating Progress of the Plan of Action</i></p>		OSHA SpecEmp B,C
<p>I.C.-11 NFPA 7.5.1 OSHA I.C.-A,B,D</p>	<p>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:</p>	EMS Level 1
<p>I.C.-11.1 NFPA 7.5.1(1) OSHA I.C.-A,B,D</p>	<p>Identify the procedures for evaluating whether the action options are effective in accomplishing the objectives.</p>	EMS Level 2
<p>I.C.-11.2 NFPA 7.5.1(2) OSHA I.C.-A,B,B.2,D,F</p>	<p>Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.</p>	Hospital Personnel
<p>I.C.-11.3 NFPA 7.5.1(3) OSHA I.C.-A,B,B.2,D,F</p>	<p>Determine the effectiveness of the following:</p> <ul style="list-style-type: none"> (a) Personnel being used (b) Personal protective equipment (c) Established control zones (d) Decontamination process 	Special Topics
		Related Standards

Incident Commander

Recommended Training

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.
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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:
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I.C.-13.1 NFPA 7.6.2 (1) OSHA I.C.-A,B,D	Describe three components of an effective debriefing.
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I.C.-13.2 NFPA 7.6.2 (2) OSHA I.C.-A,B,D	Describe the key topics in an effective debriefing.
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I.C.-13.3 NFPA 7.6.2 (3) OSHA I.C.-A,B,D	Describe when a debriefing should take place.
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I.C.-13.4 NFPA 7.6.2 (4) OSHA I.C.-A,B,D	Describe who should be involved in a debriefing.
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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.
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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:
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I.C.-14.1 NFPA 7.6.3 (1) OSHA I.C.-A,B,D	Describe three components of an effective critique.
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I.C.-14.2 NFPA 7.6.3 (2) OSHA I.C.-A,B,D	Describe who should be involved in a critique.
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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.
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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.
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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.
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Terminating the Incident <i>Reporting and Documenting the Hazardous Materials Incident</i>		Response Training Issues
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:	Awareness
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.	Operations
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.	Technician
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.	Incident Commander
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.	HM Branch Officer
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.	HM Safety Officer
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.	OSHA Specialist NFPA SpEmp A & Tech Spec
		OSHA SpEmp NFPA SpEmp B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards



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

**Hazardous Materials
Branch Officer**

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.	<ul style="list-style-type: none">- 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.	<ol style="list-style-type: none">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.

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

Recommended Training

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.
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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.
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Planning the Response <i>Developing a Plan of Action</i>		Response Training Issues
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.	Awareness
HMBO-4.1 NFPA 9.3.2 (1)	Identify the order of the steps for developing a plan of action.	Operations
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.	Technician
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: <ul style="list-style-type: none"> (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 	Incident Commander
HMBO-4.4 NFPA 9.3.2 (4)	Identify the process for determining the effectiveness of an action option on the potential outcomes.	HM Branch Officer
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.	HM Safety Officer
Implementing the Planned Response <i>Implementing the Incident Management System</i>		OSHA Specialist NFPA SpEmp A & Tech Spec
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:	OSHA SpecEmpl NFPA SpEmp B,C
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.	EMS Level 1
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.	EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Recommended Training

HMBO-5.3 Given the local emergency planning documents, identify the elements of each of the documents.
NFPA 9.4.1 (3)

HMBO-5.4 Identify the elements of the incident management system necessary to coordinate response activities at hazardous materials incidents.
NFPA 9.4.1 (4)

HMBO-5.5 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.
NFPA 9.4.1 (5)

HMBO-5.6 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.
NFPA 9.4.1 (6)

Implementing the Planned Response *Directing Resources (Private and Governmental)*

HMBO-6 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.
NFPA 9.4.2

Implementing the Planned Response *Providing a Focal Point for Information Transfer to Media and Elected Officials*

HMBO-7 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.
NFPA 9.4.3

HMBO-7.1 Identify the local policy for providing information to the media.
NFPA 9.4.3 (1)

HMBO-7.2 Identify the responsibilities of the public information officer at a hazardous materials incident.
NFPA 9.4.3 (2)

Evaluating Progress *Evaluating Progress of the Plan of Action*

HMBO-8 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.
NFPA 9.5.1

HMBO-8.1 Identify the procedures for evaluating whether the action options are effective in accomplishing the objectives.
NFPA 9.5.1 (1)

HMBO-8.2 Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.
NFPA 9.5.1 (2)

<p>HMBO-8.3 NFPA 9.5.1 (3)</p>	<p>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</p>	Response Training Issues
<p>Terminating the Incident <i>Terminating the Emergency Phase of the Hazardous Materials Incident</i></p>		Awareness
<p>Terminating the Incident <i>Terminating the Emergency Phase of the Hazardous Materials Incident</i></p>		Operations
<p>HMBO-9 NFPA 9.6.1</p>	<p>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.</p>	Technician
<p>HMBO-9.1 NFPA 9.6.1 (1)</p>	<p>Identify the steps required in terminating the emergency phase of a hazardous materials incident.</p>	Incident Commander
<p>HMBO-9.2 NFPA 9.6.1 (2)</p>	<p>Identify the procedures for conducting incident debriefings at a hazardous materials incident.</p>	HM Branch Officer
<p>HMBO-9.3 NFPA 9.6.1 (3)</p>	<p>Identify the steps in transferring authority as prescribed in the local emergency response plan or the organization's standard operating procedures.</p>	HM Safety Officer
<p>Terminating the Incident <i>Conducting a Debriefing</i></p>		OSHA Specialist NFPA SpEmpl A & Tech Spec
<p>HMBO-10 NFPA 9.6.2</p>	<p>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.</p>	OSHA SpecEmpl NFPA SpEmpl B,C
<p>HMBO-10.1 NFPA 9.6.2 (1)</p>	<p>Describe three components of an effective debriefing.</p>	EMS Level 1
<p>HMBO-10.2 NFPA 9.6.2 (2)</p>	<p>Describe the key topics in an effective debriefing.</p>	EMS Level 2
<p>HMBO-10.3 NFPA 9.6.2 (3)</p>	<p>Describe when a debriefing should take place.</p>	Hospital Personnel
<p>HMBO-10.4 NFPA 9.6.2 (4)</p>	<p>Describe who should be involved in a debriefing.</p>	Special Topics
<p>HMBO-10.5 NFPA 9.6.2 (5)</p>	<p>Identify the procedures for conducting incident debriefings at a hazardous materials incident.</p>	Related Standards

Recommended Training

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.

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

**Safety Officer at
Hazardous Materials
Incidents**

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.

Required Training

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. 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.	-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.
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.		

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

Recommended Training

Recommended Training

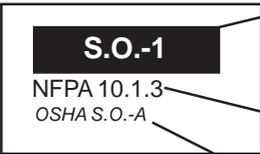
For Hazardous Materials Branch Safety Officer

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	
 <p>S.O.-1 NFPA 10.1.3 OSHA S.O.-A</p>	<p>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.</p> <p>This indicates the origin of this objective. Usually it is directly from NFPA. In some cases, other sources are noted.</p> <p>This indicates which OSHA requirement this objective supports. References to OSHA are abbreviated as follows:</p> <p style="text-align: center;">OSHA 29 CFR 1910.120 (q) (3) (vii-viii) = OSHA S.O. - A to C</p>

Identification

Recommended Training Objectives

<p>S.O.-1 NFPA 10.1.2.2 OSHA S.O.-A,B,C</p>	<p>Given a hazardous materials incident scenario, demonstrate an understanding of the role of the hazardous materials branch safety officer.</p>
<p>S.O.-1.1 NFPA 10.1.2.2(1) OSHA S.O.-B</p>	<p>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.</p>
<p>S.O.-1.2 NFPA 10.1.2.2(2) OSHA S.O.-A</p>	<p>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:</p>

Hazardous Materials Branch Safety Officer
Recommended Training

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.	Response Training Issues
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.	Awareness
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.	Operations
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.	Technician
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.	Incident Commander
S.O.-1.2.6	NFPA 10.1.2.2(2)f OSHA S.O.-A	Identify the responsibility to review the decontamination operations.	HM Branch Officer
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.	HM Safety Officer
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:	OSHA Specialist NFPA SpEmp A & Tech Spec
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).	OSHA SpecEmp NFPA SpEmp B,C
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.	EMS Level 1
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.	EMS Level 2
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.	Hospital Personnel
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.	Special Topics
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.	Related Standards

Recommended Training

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

Hazardous Materials Branch Safety Officer
Recommended Training

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

Recommended Training

S.O.-2.9.3 NFPA 10.2.1(l)(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
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S.O.-2.9.4 NFPA 10.2.1(l)(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
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S.O.-2.9.5 NFPA 10.2.1(l)(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
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S.O.-2.9.6 NFPA 10.2.1(l)(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.
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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:
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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.
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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.
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Hazardous Materials Branch Safety Officer
Recommended Training

Planning the Response <i>Providing Recommendations Regarding Safety Considerations</i>		Response Training Issues
S.O.-4.1	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.	Awareness
NFPA 10.3.2.1 OSHA S.O.-A,C		
S.O.-4.2	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).	Operations
NFPA 10.3.2.2 OSHA S.O.-A,C		
Planning the Response <i>Assisting in the Development of a Plan of Action</i>		Technician
S.O.-5	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.	Incident Commander
NFPA 10.3.3 OSHA S.O.-A		
S.O.-5.1	Identify the importance and list five benefits of pre-emergency planning relating to specific sites.	HM Branch Officer
NFPA 10.3.3(1) OSHA S.O.-A		
S.O.-5.2	Identify and name five hazards and precautions to be observed when approaching a hazardous materials incident.	HM Safety Officer
NFPA 10.3.3(2) OSHA S.O.-A		
S.O.-5.3	List the elements of safety considerations.	OSHA Specialist NFPA SpEmp A & Tech Spec
NFPA 10.3.3(3) OSHA S.O.-A		
S.O.-5.4	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.	OSHA SpEmp NFPA SpEmp B,C
NFPA 10.3.3(4) OSHA S.O.-A		
Planning the Response <i>Providing Recommendations Regarding Safety and Reviewing the Plan of Action</i>		EMS
S.O.-6	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.	Level 1
NFPA 10.3.4 OSHA S.O.-A		
S.O.-6.1	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.	EMS Level 2
NFPA 10.3.4(1) OSHA S.O.-A		
S.O.-6.2	Make recommendations to the incident commander on the safety considerations in the proposed plan of action.	Hospital Personnel
NFPA 10.3.4(2) OSHA S.O.-A		
		Special Topics
		Related Standards

Recommended Training

Planning the Response

Reviewing Selection of Personal Protective Equipment

<p>S.O.-7 NFPA 10.3.5 OSHA S.O.-A</p>	<p>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:</p>
<p>S.O.-7.1 NFPA 10.3.5(1) OSHA S.O.-A</p>	<p>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.</p>
<p>S.O.-7.2 NFPA 10.3.5(2) OSHA S.O.-A</p>	<p>Identify five safety considerations for personnel wearing vapor-protective, liquid splash-protective, and high temperature-protective clothing.</p>
<p>S.O.-7.3 NFPA 10.3.5(3) OSHA S.O.-A</p>	<p>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.</p>
<p>S.O.-7.4 NFPA 10.3.5(4) OSHA S.O.-A</p>	<p>Given the names of five different hazardous materials, identify chemical-protective clothing levels for typical action options.</p>
<p>S.O.-7.5 NFPA 10.3.5(5) OSHA S.O.-A</p>	<p>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.</p>

Planning the Response

Reviewing the Proposed Decontamination Plan

<p>S.O.-8 NFPA 10.3.6 OSHA S.O.-A</p>	<p>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:</p>
<p>S.O.-8.1 NFPA 10.3.6(1) OSHA S.O.-A</p>	<p>Identify the advantages and limitations and describe an example where each of the following decontamination methods would be used:</p> <ul style="list-style-type: none"> (a) Absorption (b) Adsorption (c) Chemical degradation (d) Dilution (e) Disposal (f) Evaporation (g) Neutralization (h) Solidification (i) Vacuuming (j) Washing
<p>S.O.-8.2 NFPA 10.3.6(2) OSHA S.O.-A</p>	<p>Identify how personnel, personal protective equipment, apparatus, tools, and equipment become contaminated, as well as the importance and limitations of decontamination procedures.</p>
<p>S.O.-8.3 NFPA 10.3.6(3) OSHA S.O.-A</p>	<p>Explain the need for decontamination procedures at hazardous materials incidents.</p>

		Response Training Issues
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.	Awareness
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.	Operations
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.	Technician
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.	Incident Commander
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:	HM Branch Officer
S.O.-9.1 NFPA 10.3.7(1) OSHA S.O.-A	Identify the elements required in an emergency medical services plan.	HM Safety Officer
S.O.-9.2 NFPA 10.3.7(2) OSHA S.O.-A	Identify the importance of an on-site medical monitoring program.	OSHA Specialist NFPA SpEmp A & Tech Spec
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.	OSHA SpEmp NFPA SpEmp B,C
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:	EMS Level 1
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.	EMS Level 2
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.	Hospital Personnel
		Special Topics
		Related Standards

Recommended Training

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.

Hazardous Materials Branch Safety Officer
Recommended Training

		Response Training Issues
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.	Awareness
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.	Operations
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.	Technician
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.	Incident Commander
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.	HM Branch Officer
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.	HM Safety Officer
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.	OSHA Specialist NFPA SpEmp A & Tech Spec
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.	OSHA SpecEmp NFPA SpEmp B,C
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.	EMS Level 1
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.	EMS Level 2
S.O.-13.9 NFPA 10.4.4(9) OSHA S.O.-B,C	Identify three safety considerations that can minimize secondary contamination.	Hospital Personnel
Implementing the Planned Response Maintaining Communications		Special Topics
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:	Related Standards
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.	

Recommended Training

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.

Hazardous Materials Branch Safety Officer
Recommended Training

Evaluating Progress Taking Corrective Actions		Response Training Issues
S.O.-19	NFPA 10.5.2 OSHA S.O.-B	Awareness
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:		Operations
S.O.-19.1	NFPA 10.5.2(1) OSHA S.O.-B	Technician
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		Incident Commander
S.O.-19.1.1	NFPA 10.5.2(1)(a) OSHA S.O.-B	HM Branch Officer
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.		HM Safety Officer
S.O.-19.1.2	NFPA 10.5.2(1)(b) OSHA S.O.-B	OSHA Specialist NFPA SpEmP A & Tech Spec
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.		OSHA SpecEmpl NFPA SpEmP B,C
S.O.-19.2	NFPA 10.5.2(2) OSHA S.O.-B	EMS Level 1
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.		EMS Level 2
S.O.-19.3	NFPA 10.5.2(3) OSHA S.O.-B	Hospital Personnel
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.		Special Topics
S.O.-19.4	NFPA 10.5.2(4) OSHA S.O.-B	Related Standards
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.		

Recommended Training

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.
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Terminating the Incident

Information to be Presented

S.O.-22.1 NFPA 10.6.4 OSHA S.O.-B,C	<p>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:</p> <ol style="list-style-type: none">(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
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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
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**Hazardous Materials
and Terrorist Incident
Response
Training Guidelines**

**OSHA: Specialist and NFPA:
Specialist Employee A, and
Technician Specialties**

Hazardous Materials Specialist

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.

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.

Response
Training
Issues

Awareness

Operations

Technician

Incident
Commander

HM Branch
Officer

HM Safety
Officer

OSHA Specialist
NFPA Schemp A
& Tech Spec

OSHA SpecEmpl
NFPA Schemp
B,C

EMS
Level 1

EMS
Level 2

Hospital
Personnel

Special
Topics

Related
Standards

Hazardous Materials Specialist 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.	<ol style="list-style-type: none"> 1st Responder Awareness Training 1st Responder Operations Training Hazardous Materials Technician Training Advanced technical expertise in specific area(s) of hazardous materials. 	<ul style="list-style-type: none"> - Classroom and simulator/field instruction, with emphasis on hands-on training - Competencies: <ul style="list-style-type: none"> - 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, containment 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. 	<ol style="list-style-type: none"> 1. Competency retesting of all response skills 2. Technical information updates. 3. Incident scene decision-making using simulated emergencies.

(includes: Spec Empl A and Tank Car, Cargo Tank, and Intermodal Tank Specialties)

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

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:

<i>Objective ID</i>	<i>Source</i>
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

Recommended Training

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.

Private Sector Specialist Employee A
Recommended Training

<p>SPEC(A)-3.2 NFPA 8.4.1.2.2(2)b OSHA HMSPEC-A,F,H</p>	<p>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.</p>	Response Training Issues
<p>SPEC(A)-3.3 NFPA 8.4.1.2.2(2)c OSHA HMSPEC-D</p>	<p>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.</p>	Awareness
<p>SPEC(A)-3.4 NFPA 8.4.1.2.2(2)d OSHA HMSPEC-G</p>	<p>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.</p>	Operations
<p>SPEC(A)-3.5 NFPA 8.4.1.2.2(2)e OSHA HMSPEC-A,F,H</p>	<p>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.</p>	Technician
<p>SPEC(A)-4 NFPA 8.4.1.2.2(3) OSHA HMSPEC-F</p>	<p>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.</p>	Incident Commander
<p>SPEC(A)-4.1 NFPA 8.4.1.2.2(3)a OSHA HMSPEC-D</p>	<p>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.</p>	HM Branch Officer
<p>SPEC(A)-4.2 NFPA 8.4.1.2.2(3)b OSHA HMSPEC-F</p>	<p>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.</p>	HM Safety Officer
<p>SPEC(A)-5 NFPA 8.4.1.2.2(4) OSHA HMSPEC-A,F,H</p>	<p>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.</p>	OSHA Specialist NFPA SpecEmp A & Tech Spec
<p>SPEC(A)-4.1 NFPA 8.4.1.2.2(3)a OSHA HMSPEC-D</p>	<p>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.</p>	OSHA SpecEmp NFPA SpecEmp B,C
<p>SPEC(A)-4.2 NFPA 8.4.1.2.2(3)b OSHA HMSPEC-F</p>	<p>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.</p>	EMS Level 1
<p>SPEC(A)-5 NFPA 8.4.1.2.2(4) OSHA HMSPEC-A,F,H</p>	<p>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.</p>	EMS Level 2
<p>SPEC(A)-5 NFPA 8.4.1.2.2(4) OSHA HMSPEC-A,F,H</p>	<p>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.</p>	Hospital Personnel
		Special Topics
		Related Standards

Technician with Tank Car Specialty

Recommended Training

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 NFPA 11.1.2.2(1)a OSHA HMSPEC-E	Identify the responsibility to determine the type and extent of damage to tank cars.
TANK-1.1.2 NFPA 11.1.2.2(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 NFPA 11.1.2.2(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 NFPA 11.1.2.2(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 NFPA 11.1.2.2(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		Response Training Issues
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.	Awareness
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.	Operations
TANK-2.2 NFPA 11.2.1(2) OSHA HMSPEC-B,E	Point out the "B" end of the car.	Technician
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. <ul style="list-style-type: none"> (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) 	Incident Commander
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.	HM Branch Officer
TANK-2.5 NFPA 11.2.1(5) OSHA HMSPEC-B,E	Describe the difference between "insulation" and "thermal protection" on tank cars.	HM Safety Officer
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.	OSHA Specialist NFPA SpEmpl A & Tech Spec
TANK-2.7 NFPA 11.2.1(7) OSHA HMSPEC-B,E	Describe the difference between "interior" and "exterior" heater coils on tank cars.	OSHA SpecEmpl NFPA SpEmpl B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Technician with Tank Car Specialty

Recommended Training

TANK-2.8

NFPA 11.2.1(8)
OSHA HMSPEC-B,E

Given examples of various fittings arrangements for pressure, nonpressure, cryogenic, and CO₂ 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. CO₂ 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 CO₂ cars and liquefied atmospheric gases i cryogenic liquid tank cars
 - iii. Staged safety relief system for a CO₂ 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 CO₂ 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 CO₂ 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

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	Response Training Issues
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	Awareness
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	Operations
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.	Technician
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.	Incident Commander
TANK-2.15 NFPA 11.2.1(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	HM Branch Officer
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.	HM Safety Officer
Analyzing the Incident Predicting the Likely Behavior of the Tank Car and its Contents		OSHA Specialist NFPA Schemp A & Tech Spec
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:	OSHA Spec Empl NFPA Schemp B,C
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	EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Technician with Tank Car Specialty

Recommended Training

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: <ul style="list-style-type: none">(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: <ul style="list-style-type: none">(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 Given various types of tank cars, describe the significance of pressure increases in assessing tank damage.
 NFPA 11.2.2(14)
 OSHA HMSPEC-B,E,I

TANK-3.15 Given various types of tank cars, describe the significance of the amount of lading in the tank in assessing tank damage.
 NFPA 11.2.2(15)
 OSHA HMSPEC-B,E,I

TANK-3.16 Describe the significance of flame impingement on a tank car.
 NFPA 11.2.2(16)
 OSHA HMSPEC-B,E,I

**Planning the Response
 Determining the Response Options**

TANK-4 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:
 NFPA 11.3.1
 OSHA HMSPEC-F

TANK-4.1 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:
 NFPA 11.3.1(1)
 OSHA HMSPEC-D,F

- (a) Transferring liquids and vapors
- (b) Flaring liquids and vapors
- (c) Venting
- (d) Hot and cold tapping
- (e) Vent and burn

TANK-4.2 Describe the inherent risks associated with, procedures for, equipment required to implement, and safety precautions for leak control techniques on various tank car fittings.
 NFPA 11.3.1(2)
 OSHA HMSPEC-F

TANK-4.3 Describe the effect flaring or venting gas or liquid has on the pressure in the tank (flammable gas or flammable liquid product).
 NFPA 11.3.1(3)
 OSHA HMSPEC-F

TANK-4.4 Describe the inherent risks associated with, procedures for, equipment required to implement, and safety precautions for lifting of tank cars.
 NFPA 11.3.1(4)
 OSHA HMSPEC-F

TANK-4.5 Describe the inherent risks associated with, procedures for, and safety precautions for the following operations:
 NFPA 11.3.1(5)
 OSHA HMSPEC-F

- (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 Describe the hazards associated with working on railroad property during emergencies.
 NFPA 11.3.1(6)
 OSHA HMSPEC-F

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

Technician with Tank Car Specialty

Recommended Training

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 Given a hazardous materials incident scenario, demonstrate an understanding of the role of Technician with a cargo tank specialty.
 NFPA 12.1.2.2
 OSHA HMSPEC-A-I

CARGO-1.1 Describe the responsibility to analyze a hazardous materials incident involving cargo tanks to determine the magnitude of the problem in terms of outcomes.
 NFPA 12.1.2.2(1)
 OSHA HMSPEC-E

CARGO-1.1.1 Identify the responsibility to determine the type and extent of damage to cargo tanks.
 NFPA 12.1.2.2(1)a
 OSHA HMSPEC-E

CARGO-1.1.2 Identify the responsibility to predict the likely behavior of cargo tanks and their contents in an emergency.
 NFPA 12.1.2.2(1)b
 OSHA HMSPEC-E

CARGO-1.2 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.
 NFPA 12.1.2.2(2)
 OSHA HMSPEC-A,C,D,E,F

CARGO-1.3 Describe the responsibility to implement the planned response to a hazardous materials incident involving cargo tanks.
 NFPA 12.1.2.2(2)
 OSHA HMSPEC-A,C,D,E,F

Analyzing the Incident
Determining the Type and Extent of Damage to Cargo Tanks

CARGO-2 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:
 NFPA 12.2.1
 OSHA HMSPEC-B,E

CARGO-2.1 Given the specification mark for a cargo tank and the appropriate reference materials, describe the tank's basic construction and features.
 NFPA 12.2.1(1)
 OSHA HMSPEC-B,E

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

Technician with Cargo Tank Specialty

Recommended Training

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

<p>CARGO-2.10 NFPA 12.2.1(10) OSHA HMSPEC-B,E</p>	<p>Describe the normal and emergency methods of activation for the following types of cargo tank truck valve systems:</p> <ul style="list-style-type: none"> (a) Air (b) Cable (c) Hydraulic
<p>CARGO-2.11 NFPA 12.2.1(11) OSHA HMSPEC-B,E</p>	<p>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:</p> <ul style="list-style-type: none"> (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

<p>CARGO-3 NFPA 12.2.2 OSHA HMSPEC-B,E</p>	<p>Predict the likely behavior of the cargo tank and its contents, and be able to do the following:</p>
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<p>CARGO-3.1 NFPA 12.2.2(1) OSHA HMSPEC-B,E</p>	<p>Given the following types of cargo tanks (including a tube trailer), describe the likely breach/release mechanisms:</p> <ul style="list-style-type: none"> (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
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<p>CARGO-3.2 NFPA 12.2.2(2) OSHA HMSPEC-B,E</p>	<p>Describe the difference in types of construction materials used in cargo tanks and their significance in assessing tank damage.</p>
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<p>CARGO-3.3 NFPA 12.2.2(3) OSHA HMSPEC-B,E</p>	<p>Describe the significance of the jacket on cargo tanks in assessing tank damage.</p>
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<p>CARGO-3.4 NFPA 12.2.2(4) OSHA HMSPEC-B,E</p>	<p>Describe the significance of each of the following types of damage on different types of cargo tanks in assessing tank damage:</p> <ul style="list-style-type: none"> (a) Crack (b) Scrape, score, gouge, or loss of metal (c) Puncture (d) Dent (e) Flame impingement (f) Corrosion (internal/external)
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Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Spec Empl NFPA Spec Empl B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Technician with Cargo Tank Specialty

Recommended Training

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 following:

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

Technician with Cargo Tank Specialty Recommended Training

<p>CARGO-5.4 NFPA 12.4.1(4) OSHA HMSPEC-F</p>	<p>Given the following product transfer and recovery equipment, demonstrate the safe and correct application and use of each of the following:</p> <ul style="list-style-type: none"> (a) Portable pumps (air, electrical, gasoline/diesel) (b) Vehicles with power-take-off (PTO) driven pumps (c) Pressure transfer (d) Vacuum trucks 	Response Training Issues	Awareness
<p>CARGO-5.5 NFPA 12.4.1(5) OSHA HMSPEC-F</p>	<p>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:</p> <ul style="list-style-type: none"> (a) Drilling (b) Unloading lines (c) Vapor recovery lines (d) Internal safety valve 	Operations	Technician
<p>CARGO-5.6 NFPA 12.4.1(6) OSHA HMSPEC-F</p>	<p>Given a simulated overturned MC-307/DOT-407 cargo tank, demonstrate the safe and proper procedures for product removal and transfer.</p>	Incident Commander	HM Branch Officer
<p>CARGO-5.7 NFPA 12.4.1(7) OSHA HMSPEC-F</p>	<p>Given a simulated overturned MC-331 cargo tank, demonstrate the safe and proper procedures for product removal and transfer.</p>	HM Safety Officer	
<p>CARGO-5.8 NFPA 12.4.1(8) OSHA HMSPEC-F</p>	<p>Given the necessary resources, demonstrate the flaring of a MC-331 flammable gas cargo tank.</p>	OSHA Spec Empl NFPA SpEmpl B,C	EMS Level 1
<p>CARGO-5.9 NFPA 12.4.1(9) OSHA HMSPEC-F</p>	<p>Given a simulated flammable liquid spill from a cargo tank, describe the procedures for site safety and fire control during cleanup and removal operations.</p>	EMS Level 2	Hospital Personnel
		Special Topics	Related Standards

Technician with Intermodal Tank Specialty

Recommended Training

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 an 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 NFPA 13.1.2.2(1)a OSHA HMSPEC-E	Identify the responsibility to determine the type and extent of damage to an intermodal tank.
INTML-1.1.2 NFPA 13.1.2.2(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.

Technician with Intermodal Tank Specialty Recommended Training

INTML-2.2	Given examples of intermodal tanks (some jacketed; some not jacketed), point out the jacketed intermodal tanks.	Response Training Issues
NFPA 13.2.1(2) <i>OSHA HIMSPEC-B,E</i>		Awareness
INTML-2.3	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	Operations
NFPA 13.2.1(3) <i>OSHA HIMSPEC-B,E</i>		Technician
INTML-2.4	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	Incident Commander
NFPA 13.2.1(4) <i>OSHA HIMSPEC-B,E</i>		HM Branch Officer
		HM Safety Officer
		OSHA Specialist NFPA Sperm A & Tech Spec
INTML-2.5	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	OSHA Spec Empl NFPA Sperm B,C
NFPA 13.2.1(5) <i>OSHA HIMSPEC-B,E</i>		EMS Level 1
INTML-2.6	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)	EMS Level 2
NFPA 13.2.1(6) <i>OSHA HIMSPEC-B,E</i>		Hospital Personnel
INTML-2.7	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.	Special Topics
NFPA 13.2.1(7) <i>OSHA HIMSPEC-B,E</i>		Related Standards

Technician with Intermodal Tank Specialty

Recommended Training

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

Technician with Intermodal Tank Specialty
Recommended Training

INTML-4.2	NFPA 13.3.1(2) OSHA HIMSPEC-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.	Response Training Issues
<i>Implementing the Planned Response</i>			Awareness
INTML-5	NFPA 13.4.1 OSHA HIMSPEC-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:	Operations
INTML-5.1	NFPA 13.4.1 (1) OSHA HIMSPEC-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	Technician
INTML-5.2	NFPA 13.4.1 (2) OSHA HIMSPEC-F	Demonstrate proper procedures for the following types of emergency product removal: (a) Gas/liquid transfer (pressure/pump) (b) Flaring (c) Venting	Incident Commander
INTML-5.3	NFPA 13.4.1 (3) OSHA HIMSPEC-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	HM Branch Officer
INTML-5.4	NFPA 13.4.1 (4) OSHA HIMSPEC-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.)	HM Safety Officer
INTML-5.5	NFPA 13.4.1 (5) OSHA HIMSPEC-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	OSHA Specialist NFPA Spemip A & Tech Spec
INTML-5.6	NFPA 13.4.1 (6) OSHA HIMSPEC-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	OSHA SpecEmpl NFPA Spemip B,C
			EMS Level 1
			EMS Level 2
			Hospital Personnel
			Special Topics
			Related Standards

Technician with Intermodal Tank Specialty

Recommended Training

INTML-5.7

NFPA 13.4.1 (7)
OSHA HIMSPEC-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 HIMSPEC-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 HIMSPEC-F

Given the necessary resources, demonstrate the flaring of a pressure flammable gas intermodal tank.

INTML-5.10

NFPA 13.4.1 (10)
OSHA HIMSPEC-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.

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

**OSHA: Specialist Employee
and NFPA: Specialist
Employee B,C**

Specialist Employee

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.

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. <i>Additional competencies for those specialist employees whose expertise and assistance may be required in the warm or hot zone:</i> - 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. <i>For those specialist employees who may provide assistance in the warm or hot zone:</i> 2. Competency retesting of response skills and use of personal protective equipment.

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

Recommended Training

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

NFPA 8.2.1.3
OSHA SpEMP-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.

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)(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

<p style="background-color: black; color: white; padding: 2px; text-align: center; font-weight: bold;">SPEC(C)-1</p> <p>NFPA 8.2.1.2.2 OSHA SpEMP-1,2</p>	<p>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:</p>
<p style="background-color: black; color: white; padding: 2px; text-align: center; font-weight: bold;">SPEC(C)-1.1</p> <p>NFPA 8.2.1.2.2(1) OSHA SpEMP-1</p>	<p>Describe the responsibility to assist the incident commander in analyzing the magnitude of an emergency involving chemicals or containers for chemicals.</p>
<p style="background-color: black; color: white; padding: 2px; text-align: center; font-weight: bold;">SPEC(C)-1.1.1</p> <p>NFPA 8.2.1.2.2(1)a OSHA SpEMP-1</p>	<p>Identify the responsibility to provide information on the hazards and harmful effects of specific chemicals.</p>

<p>SPEC(C)-1.1.2 NFPA 8.2.1.2.2(1)b OSHA SpEMP-1</p>	<p>Identify the responsibility to provide information on the characteristics of specific containers for chemicals.</p>	Response Training Issues
<p>SPEC(C)-1.2 NFPA 8.2.1.2.2(2) OSHA SpEMP-2</p>	<p>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.</p>	Awareness
<p>Analyzing the Incident <i>Providing Information on the Hazards and Harmful Effects of Specific Chemicals</i></p>		Operations
<p>Analyzing the Incident <i>Providing Information on the Hazards and Harmful Effects of Specific Chemicals</i></p>		Technician
<p>SPEC(C)-2 NFPA 8.2.2.1 OSHA SpEMP-1</p>	<p>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:</p>	Incident Commander
<p>SPEC(C)-2.1 NFPA 8.2.2.1(1) OSHA SpEMP-1</p>	<p>Identify the following hazard information from the material safety data sheet (MSDS) or other appropriate resource:</p> <ul style="list-style-type: none"> (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 	HM Branch Officer
		HM Safety Officer
<p>SPEC(C)-2.2 NFPA 8.2.2.1(2) OSHA SpEMP-1</p>	<p>Identify how to contact CHEMTREC/CANUTEC/SETIQ.</p>	OSHA Specialist NFPA SpEmp A & Tech Spec
<p>SPEC(C)-2.3 NFPA 8.2.2.1(3) OSHA SpEMP-1</p>	<p>Identify the resources available from CHEMTREC/CANUTEC/SETIQ.</p>	OSHA SpEmp NFPA SpEmp B,C
<p>SPEC(C)-2.4 NFPA 8.2.2.1(4) OSHA SpEMP-1</p>	<p>Given their organization's emergency response plan and standard operating procedures, identify additional resources of hazard information, including a method of contact.</p>	EMS Level 1
<p>Analyzing the Incident <i>Providing Information on Characteristics of Specific Containers</i></p>		EMS Level 2
<p>SPEC(C)-3 NFPA 8.2.2.2 OSHA SpEMP-1</p>	<p>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:</p>	Hospital Personnel
<p>SPEC(C)-3.1 NFPA 8.2.2.2 (1) OSHA SpEMP-1</p>	<p>Given examples of various containers for chemicals used in his or her organization's area of specialization, identify each container by name.</p>	Special Topics
		Related Standards

Private Sector Specialist Employee B

Recommended Training

SPEC(C)-3.2 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.
NFPA 8.2.2.2 (2)
OSHA SpEMP-1

SPEC(C)-3.3 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.
NFPA 8.2.2.2 (2)
OSHA SpEMP-1

Planning the Response

Providing Information on Potential Response Options for Specific Chemicals

SPEC(C)-4 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:
NFPA 8.2.3.1
OSHA SpEMP-2

SPEC(C)-4.1 Given a specific chemical used in their organization's area of specialization and an appropriate (MSDS), obtain the following response information:
NFPA 8.2.3.1 (1)
OSHA SpEMP-2

- (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 Given his or her organization's emergency response plan and SOP's, identify additional resources for obtaining response information.
NFPA 8.2.3.1 (2)
OSHA SpEMP-2

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:

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

Private Sector Specialist Employee B

Recommended Training

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: <ul style="list-style-type: none">(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 <i>Providing Information on Characteristics of Specific Containers</i>		Response Training Issues	
SPEC(B)-3	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: <i>NFPA 8.3.2.2 OSHA SpEMP-1</i>		Awareness
SPEC(B)-3.1	Given examples of containers for specific chemicals, identify the purpose and operation of the closures found on those containers. <i>NFPA 8.3.2.2 (1) OSHA SpEMP-1</i>		Operations
SPEC(B)-3.2	Given a chemical container, list the types of damage that could occur. <i>NFPA 8.3.2.2 (2) OSHA SpEMP-1</i>		Technician
SPEC(B)-3.3	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. <i>NFPA 8.3.2.2 (3) OSHA SpEMP-1</i>		Incident Commander
SPEC(B)-3.4	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. <i>NFPA 8.3.2.2 (4) OSHA SpEMP-1</i>	HM Branch Officer	
Analyzing the Incident <i>Providing Information on Concentrations of Chemicals</i>		HM Safety Officer	
SPEC(B)-4	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: <i>NFPA 8.3.2.3 OSHA SpEMP-1</i>	OSHA Specialist NFPA SpEmp A & Tech Spec	
SPEC(B)-4.1	Identify the appropriate monitoring equipment for a chemical used in his or her individual area of specialization. <i>NFPA 8.3.2.3 (1) OSHA SpEMP-1</i>	OSHA SpEmp NFPA SpEmp B,C	
SPEC(B)-4.2	Use the appropriate monitoring equipment provided by their organization to determine the actual concentrations of a specific chemical. <i>NFPA 8.3.2.3 (2) OSHA SpEMP-1</i>	EMS Level 1	
SPEC(B)-4.3	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. <i>NFPA 8.3.2.3 (3) OSHA SpEMP-1</i>	EMS Level 2	
SPEC(B)-4.4	Demonstrate field calibration and testing procedures, as necessary, for the monitoring equipment provided by their organization. <i>NFPA 8.3.2.3 (4) OSHA SpEMP-1</i>	Hospital Personnel	
SPEC(B)-4.5	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. <i>NFPA 8.3.2.3 (5) OSHA SpEMP-1</i>	Special Topics	
		Related Standards	

Private Sector Specialist Employee B

Recommended Training

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: <ul style="list-style-type: none">(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: <ul style="list-style-type: none">(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 <i>Providing Information on Decontamination Methods</i>		Response Training Issues
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.	Awareness
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.	Operations
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.	Technician
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.	Incident Commander
Planning the Response <i>Providing Information on Handling and Disposal Regulations</i>		HM Branch Officer
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.	HM Safety Officer
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.	OSHA Specialist NFPA SpEmp A & Tech Spec
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.	OSHA SpEmp NFPA SpEmp B,C
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.	EMS Level 1
Planning the Response <i>Developing a Plan of Action</i>		EMS Level 2
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.	Hospital Personnel
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.	Special Topics
		Related Standards

Private Sector Specialist Employee B

Recommended Training

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: <ul style="list-style-type: none">(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: <ul style="list-style-type: none">(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.

		Response Training Issues
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.	Awareness
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:	Operations
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.	Technician
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.	Incident Commander
SPEC(B)-13.3 NFPA 8.3.5.2 (3) OSHA SpEMP-1,2	Identify the requirements for compiling incident reports.	HM Branch Officer
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.	HM Safety Officer
SPEC(B)-13.5 NFPA 8.3.5.2 (5) OSHA SpEMP-2,3	Identify the requirements for compiling personal protective equipment logs.	OSHA Specialist NFPA SpEmp A & Tech Spec
SPEC(B)-13.6 NFPA 8.3.5.2 (6) OSHA SpEMP-2,3	Identify the requirements for filing documents and maintaining records.	OSHA SpEmp NFPA SpEmp B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards



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

Emergency Medical Service/ Hazardous Materials Level 1 Responder

Emergency Medical Service/Haz Mat Level 1 Responder

General Training Considerations

Introduction

Emergency medical service (EMS) personnel at EMS/HM Level 1, in addition to their BLS or ALS certification, shall be trained to meet the requirements of the first responder at the awareness level, as defined in OSHA 1910.120(q)(6)(i) and/or 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

Emergency Medical Service/Haz Mat Level 1 Responder General Training Considerations

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)

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

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	<ul style="list-style-type: none"> - Classroom, physical skills lab, and simulator/field instruction, with emphasis on decision making and treatment. - Competencies: <ul style="list-style-type: none"> - 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. 	<ol style="list-style-type: none"> 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

Recommended Training

For EMS/HM Level 1 Responder Training

The following training objectives are recommended for emergency medical service/hazardous materials 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

 NFPA 2-1.3

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.

This indicates the origin of this objective. Usually it is directly from NFPA 473, Chapter 4.

Identification

Recommended Training Objectives

<div style="background-color: black; color: white; padding: 2px 5px; display: inline-block;">EMS(1)-1</div> 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.
<div style="background-color: black; color: white; padding: 2px 5px; display: inline-block;">EMS(1)-1.1</div> 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.
<div style="background-color: black; color: white; padding: 2px 5px; display: inline-block;">EMS(1)-1.2</div> 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.
<div style="background-color: black; color: white; padding: 2px 5px; display: inline-block;">EMS(1)-1.3</div> NFPA 4.1.2(3)	....Describe the responsibility of the EMS/HM Level 1 Responder to implement the planned response.
<div style="background-color: black; color: white; padding: 2px 5px; display: inline-block;">EMS(1)-1.4</div> NFPA 4.1.2(4)	....Describe the responsibility of the EMS/HM Level 1 Responder to terminate the incident

Analyzing the Hazardous Materials Incident

<div style="background-color: black; color: white; padding: 2px 5px; display: inline-block;">EMS(1)-2</div> 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:
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Emergency Medical Service/Haz Mat Level 1 Responder
Recommended Training

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.	Response Training Issues
EMS(1)-2.2 NFPA 4.2.1(2)	....Evaluate the environmental factors as they affect patient care.	Awareness
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)	Operations Technician
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...	Incident Commander HM Branch Officer
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	HM Safety Officer OSHA Specialist NFPA SpEmpl A & Tech Spec OSHA SpEmpl NFPA SpEmpl B,C
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 Level 1
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 Level 2
EMS(1)-3.4 NFPA 4.2.2(4)	....Explain the need for patient decontamination procedures at hazardous materials incidents.	Hospital Personnel
EMS(1)-3.5 NFPA 4.2.2(5)	....Describe how the potential for secondary contamination determines the extent of patient decontamination required.	Special Topics
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.	Related Standards

Recommended Training

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: <ol style="list-style-type: none">(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.

Emergency Medical Service/Haz Mat Level 1 Responder
Recommended Training

EMS(1)-13	Describe the equipment and supplies available to the Level I responder for the care and transportation of the hazardous materials incident patient.	Response Training Issues
Implementing the Planned Response		
EMS(1)-14	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...	Awareness
EMS(1)-14.1	....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	Operations
EMS(1)-14.2	....Describe the procedure for preparing the vehicle and equipment for the patient.	Technician
EMS(1)-14.3	....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.	Incident Commander
EMS(1)-14.4	....Describe the concept of patient transfer from the incident site to the decontamination area and then to the treatment area.	HM Branch Officer
EMS(1)-15	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...	HM Safety Officer
EMS(1)-15.1	....Describe how chemical contamination alters the assessment and care of the hazardous materials patient.	OSHA Specialist NFPA SpEmp A & Tech Spec
EMS(1)-15.2	....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 hemorrhagic fevers, smallpox, and ricin) (k) Incapacitating agents (e.g., BZ, LSD) (l) Radiological materials (e.g., uranium, plutonium, cesium, iridium, technetium)	OSHA SpecEmp NFPA SpEmp B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Recommended Training

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

Emergency Medical Service/Haz Mat Level 1 Responder
Recommended Training

EMS(1)-17.2 NFPA 4.4.4 (2)	<p>...Explain the following factors and how they influence heat stress for hazardous materials response personnel:</p> <ul style="list-style-type: none"> (a) Hydration (b) Physical fitness (c) Environmental factors (d) Activity levels (e) Level of PPE (f) Duration of entry 	Response Training Issues
EMS(1)-17.3 NFPA 4.4.4(3)	<p>...Explain the medical monitoring protocols and demonstrate medical monitoring procedures for personnel at the scene of a hazardous materials incident.</p>	Awareness Operations
EMS(1)-17.4 NFPA 4.4.4(4)	<p>...Describe the criteria for site selection of a medical monitoring station.</p>	Technician
EMS(1)-17.5 NFPA 4.4.4(5)	<p>...Demonstrate the ability to set up and operate a medical monitoring station.</p>	Incident Commander
EMS(1)-17.6 NFPA 4.4.4(6)	<p>...Demonstrate the ability to interpret and analyze data obtained from medical monitoring of hazardous materials response personnel.</p>	HM Branch Officer
EMS(1)-17.7 NFPA 4.4.4(7)	<p>...Given a simulated hazardous materials incident, demonstrate documentation of medical monitoring.</p>	HM Safety Officer
EMS(1)-18 NFPA 4.4.5	<p>Identify at least four specific actions necessary when an incident is suspected to involve criminal or terrorist activity.</p>	OSHA Specialist NFPA SpEmp A & Tech Spec
EMS(1)-19 NFPA 4.4.6	<p>Given either a facility or transportation scenario of hazardous materials, with or 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.</p>	OSHA SpecEmp NFPA SpEmp B,C
EMS(1)-20 NFPA 4.4.7	<p>Given an incident involving the suspicion of a biological warfare agent, identify each of the following:</p> <ul style="list-style-type: none"> (1) Correct body substance isolation procedures to be followed. (2) Proper decontamination procedures in accordance with standard operating procedures or guidelines. (3) Necessary post-exposure reporting. 	EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Recommended Training

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
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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.

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

Emergency Medical Service/ Hazardous Materials Level 2 Responder

Emergency Medical Service/Haz Mat 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

Emergency Medical Service/Haz Mat Level 2 Responder General Training Considerations

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.	<ol style="list-style-type: none"> 1. First Responder Awareness training. 2. EMS/HM Level 1 Responder training. 3. EMT-B certification 	<ul style="list-style-type: none"> - Classroom, physical skills lab, and simulator/field instruction, with emphasis on decision making and treatment skills. - Competencies: <ul style="list-style-type: none"> - 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. 	<ol style="list-style-type: none"> 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.

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

Recommended Training

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:
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Emergency Medical Service/Haz Mat Level 2 Responder
Recommended Training

EMS(2)-2.1 NFPA 5.2.1(1)	<p>....Define the following chemical and physical properties and describe their importance in the risk assessment process:</p> <ul style="list-style-type: none"> (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 	Response Training Issues
EMS(2)-2.2 NFPA 5.2.1(2)	<p>....Define the following radiological terms and explain their use in the risk assessment process:</p> <ul style="list-style-type: none"> (a) Alpha radiation (b) Beta radiation (c) Gamma radiation (d) Radiological measurement units 	Awareness
EMS(2)-2.3 NFPA 5.2.1(3)	<p>....Define the following toxicological terms and explain their use in the risk assessment process:</p> <ul style="list-style-type: none"> (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) 	Operations
EMS(2)-2.4 NFPA 5.2.1(4)	<p>....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.</p>	Technician
EMS(2)-3 NFPA 5.2.2	<p>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:</p>	Incident Commander
EMS(2)-3.1 NFPA 5.2.2(1)	<p>....Identify sources of technical information for the performance of patient decontamination.</p>	HM Branch Officer
EMS(2)-3.2 NFPA 5.2.2(2)	<p>....Identify the factors that influence the decision of when and where to treat the patient and the extent of patient care, including the following:</p> <ul style="list-style-type: none"> (a) Hazardous material toxicity (b) Patient condition (c) Availability of decontamination 	HM Safety Officer
EMS(2)-4 NFPA 5.2.3	<p>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 these detection devices are available locally.</p>	OSHA Specialist NFPA SpEmp A & Tech Spec
EMS(2)-5 NFPA 5.2.4	<p>Given an emergency scenario involving potential criminal or terrorist activity, describe 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.</p>	OSHA SpEmp NFPA SpEmp B,C
		EMS Level 1
		EMS Level 2
		Hospital Personnel
		Special Topics
		Related Standards

Recommended Training

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: <ul style="list-style-type: none">(a) EMS control activities(b) EMS component of an incident management system(c) Medical monitoring of personnel utilizing chemical-protective and high temperature-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: <ul style="list-style-type: none">(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 victims from the hazard area relative to exposure and contamination concerns.

Recommended Training

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:	Response Training Issues
EMS(2)-9.1 NFPA 5.3.4(1)	...Identify the advantages and dangers of search and rescue missions at hazardous materials incidents.	Awareness
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.	Operations
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.	Technician
EMS(2)-9.4 NFPA 5.3.4(4)	...Demonstrate how to interpret a chemical compatibility chart for chemical-protective clothing.	Incident Commander
Implementing the Planned Response		HM Branch Officer
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.	HM Safety Officer
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.	OSHA Specialist NFPA SpEmp A & Tech Spec
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:	OSHA SpecEmpl NFPA SpEmp B,C
EMS(2)-12.1 NFPA 5.4.3(1)	...Given a simulated hazardous materials incident and using local available resources, demonstrate the implementation of the patient decontamination procedure.	EMS Level 1
EMS(2)-12.2 NFPA 5.4.3(2)	...Explain the principles of emergency decontamination and its application for critically ill patients.	EMS Level 2
EMS(2)-12.3 NFPA 5.4.3(3)	...Demonstrate the ability to coordinate patient care activities, including treatment, disposition, and transportation of patients.	Hospital Personnel
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.	Special Topics
		Related Standards

Recommended Training

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

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

Hazardous Materials

Hazardous Materials and Terrorist Incident Response Training Guidelines

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.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
HM Safety Officer
OSHA Specialist NFPA SpEmp A & Tech Spec
OSHA SpSpecEmpl NFPA SpEmp B,C
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Related Standards

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.	<ul style="list-style-type: none"> - Classroom, lab instruction with simulated emergencies, hands-on psychomotor skill training. - Competencies: <ul style="list-style-type: none"> - 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. 	<ol style="list-style-type: none"> 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.
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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.
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HOSP-2.1	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.
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HOSP-2.2	Determine the scope and intensity of any further patient assessment which is determined by: <ul style="list-style-type: none"> (a) The patient's diagnosis; (b) The care setting
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HOSP-2.3	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.
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Hospital Personnel
Recommended Training

HOSP-2.4	List and describe the hospital's hazardous materials information resources and assure that they are authoritative and up to date.	Response Training Issues
JCAHO <i>IM.9, IM.9.1, IM.9.2, IM.10.1</i>		Awareness
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	Operations
HOSP-2.6	Define the effect chemicals may have on a contaminated patient using the method of Dose-Response Relationship.	Technician
HOSP-2.7	Describe the routes by which chemicals may enter the body.	Incident Commander
HOSP-2.8	List the target organ systems which may be effected in the contaminated patient.	HM Branch Officer
HOSP-2.9	List the areas of the body that are most likely to have greater route of chemical absorption into the body.	HM Safety Officer
HOSP-2.10	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.	OSHA Specialist NFPA SpEmp A & Tech Spec
JCAHO <i>PE.1.1, PE.2.1, PE.2.2, PE.2.3, PE.2.4</i>		OSHA SpecEmp NFPA SpEmp B,C
HOSP-2.11	Demonstrate that patient care decisions are based on the identified patient needs and on care priorities.	EMS Level 1
JCAHO <i>PE.3.1, PE.4.2</i>		EMS Level 2
HOSP-2.12	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.	Hospital Personnel
JCAHO <i>PE.4.3</i>		Special Topics
HOSP-2.13	Describe the methods used to assure the pharmacy, medical, and nursing staff have access to poison control information.	Related Standards
JCAHO <i>IM.9.2, IM.10.1</i>		
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.	

Hospital Personnel

Recommended Training

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 Describe the need for the hospital to develop emergency response plans.
JCAHO
LD.1.1, EC.1.6

HOSP-3.1 Identify the necessity for the hospital administrators to communicate the hospital's plan(s) throughout the organization.
JCAHO
LD.1.2

HOSP-3.2 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.
JCAHO
LD.1.3

HOSP-3.3 Identify the hospital personnel, and, as appropriate, community leaders and organizations which need to collaborate to design services to be provided by the hospital.
JCAHO
LD.1.3.1

HOSP-3.4 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.
JCAHO
LD.1.3.2

HOSP-3.5 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.
JCAHO
LD.1.4

HOSP-3.6 Identify the need for the scope of service provided by each department as defined in writing and is approved by the hospital's administration, medical staff, or both, as appropriate.
JCAHO
LD.1.7

Implementing The Planned Response

HOSP-4 Describe the hospital's 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.
JCAHO
EC.1.2

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.

Hospital Personnel Recommended Training

HOSP-4.2	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.	Response Training Issues
JCAHO EC.1.4		Awareness
HOSP-4.3	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.	Operations
JCAHO EC.1.6		Technician
HOSP-4.4	List and describe the factors outlined in the hospital's emergency preparedness program.	Incident Commander
JCAHO EC.1.6		HM Branch Officer
HOSP-4.4.1	Describe the procedure for establishing, supporting and maintaining an emergency preparedness program.	HM Safety Officer
JCAHO EC.1.6		OSHA Specialist NFPA SpEmp A & Tech Spec
HOSP-4.4.2	Describe the steps for implementing specific procedures in response to a variety of disasters and/or emergencies, internal and external of the hospital.	OSHA SpecEmpl NFPA SpEmp B,C
JCAHO EC.1.6.a		EMS Level 1
HOSP-4.4.3	Describe the ways of defining and, when appropriate, integrating the hospital's role with community-wide emergency preparedness efforts.	EMS Level 2
JCAHO EC.1.6.b		Hospital Personnel
HOSP-4.4.4	Describe the procedure for notifying the proper authorities outside the hospital in an emergency.	Special Topics
JCAHO EC.1.6.c		Related Standards
HOSP-4.4.5	Describe the procedure for notifying hospital personnel of an implementation of the emergency preparedness plan.	
JCAHO EC.1.6.d		
HOSP-4.4.6	Describe the ways of defining, where appropriate, alternate roles and responsibilities of hospital personnel during disasters and/or emergencies.	
JCAHO EC.1.6.m		
HOSP-4.4.7	Describe the procedure for assigning available personnel to reflect current staffing patterns within the hospital during times of disaster and/or emergency.	
JCAHO EC.1.6.e		
HOSP-4.4.8	Describe the procedures for the management of space, supplies and security during disasters and/or emergencies.	
JCAHO EC.1.6.f		
HOSP-4.5	Describe the procedures for evacuating the entire facility if the organization's environment cannot continue to support adequate patient care and treatment.	
JCAHO EC.1.6.g		

Hospital Personnel

Recommended Training

HOSP-4.5.1 JCAHO <i>EC.1.6.h</i>	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 <i>EC.1.6.i</i>	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 <i>EC.1.6.i</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 <i>EC.1.6.n</i>	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
and Terrorist Incident
Response
Training Guidelines**

Special Topics

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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.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
HM Branch Officer
M 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

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.

Response Training Issues
Awareness
Operations
Technician
Incident Commander
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M Safety Officer
OSHA Specialist NFPA SpEmpl A & Tech Spec
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EMS Level 1
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Hospital Personnel
Special Topics
Related Standards

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

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 accommodated 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 threat 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.

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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;

Terrorism and Illicit Use of Hazardous Materials

- 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.

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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. Most of the biological agents manifest themselves in their early phases as flu-like symptoms – which makes them difficult to diagnose, especially during flu season.

Category A Agents

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 before exposure.

Botulism: Actually a group of related neuro-toxins this is the most poisonous naturally occurring substance known. It can be dispersed 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 long 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 protec-

tion. 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.

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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 vesicants 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.

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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.

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 O₂ 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.

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Carbon Monoxide Response

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 drug laboratory. Clandestine drug 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 drug 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 drug 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

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Clandestine Drug Lab Operations

- 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.

Competencies

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, methamphetamine. 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.

Clandestine Drug Lab Operations

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 O₂ 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.

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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.

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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 com-

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pleted 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 occurring 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.

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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.

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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 to the 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 be 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.

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.

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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 LEPCs⁷, 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 chart⁸, 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

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!

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- 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 hydroscopic (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.

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

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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.

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*

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M Safety Officer
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OSHA SpecEmpl NFPA SpEmp B,C
EMS Level 1
EMS Level 2
Hospital Personnel
Special Topics
Related Standards

Special Topics

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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 not 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 an 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.

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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.

¹¹ See Cowie, "Beyond Rural . . ." concerning response level determination.

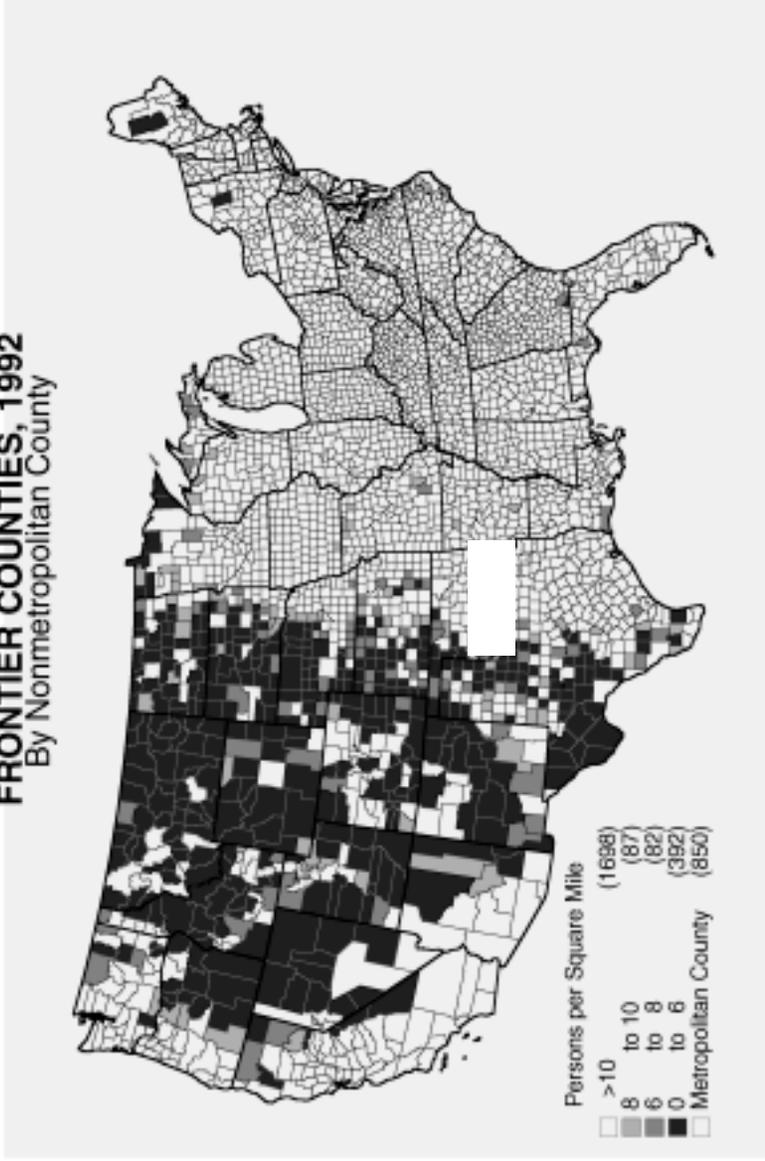
¹² See Cowie, "Visioning . . ." for fundamental basics of this process.

Response Training Issues	Awareness	Operations	Technician	Incident Commander	HM Branch Officer	M 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
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Figure 1

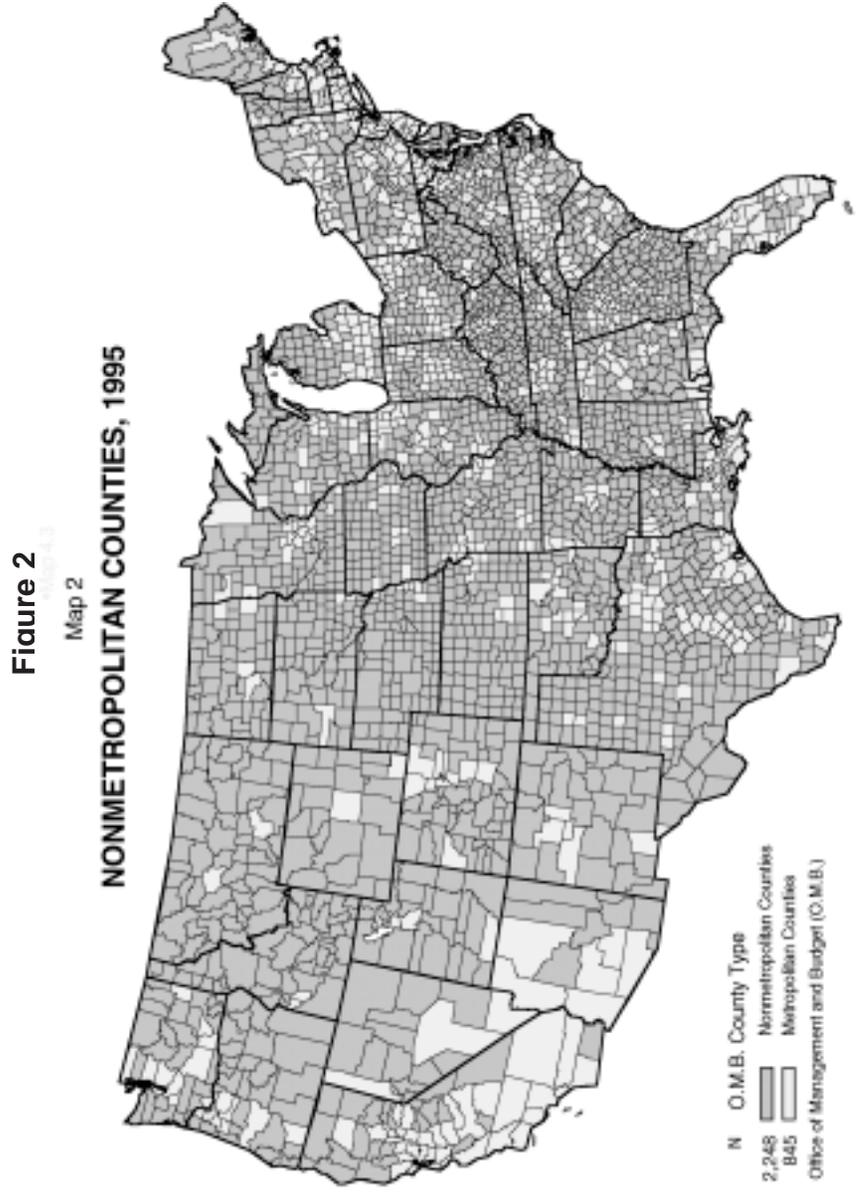
Map 11

FRONTIER COUNTIES, 1992
 By Nonmetropolitan County



Source: Area Resource File, OHPAR, BHPF, 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.

Response Training Issues	Awareness	Operations	Technician	Incident Commander	HM Branch Officer	M 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
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Data Source: US Bureau of Census, Office of Management and Budget, 1995.
 Produced by: NC Rural Health Research Program, Cecil G. Shaps Center for Health Services Research, University of North Carolina at Chapel Hill.



Response Training Issues	Awareness	Operations	Technician	Incident Commander	HM Branch Officer	M 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
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Figure 3

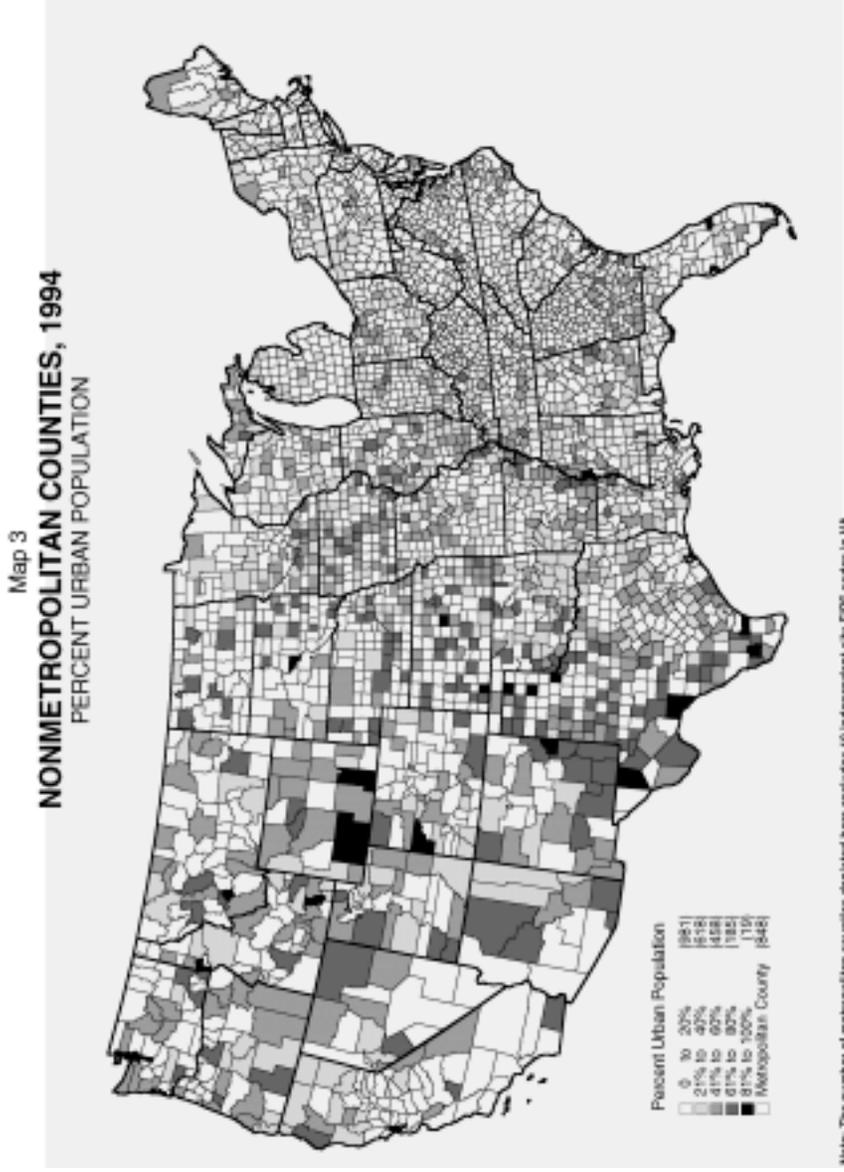
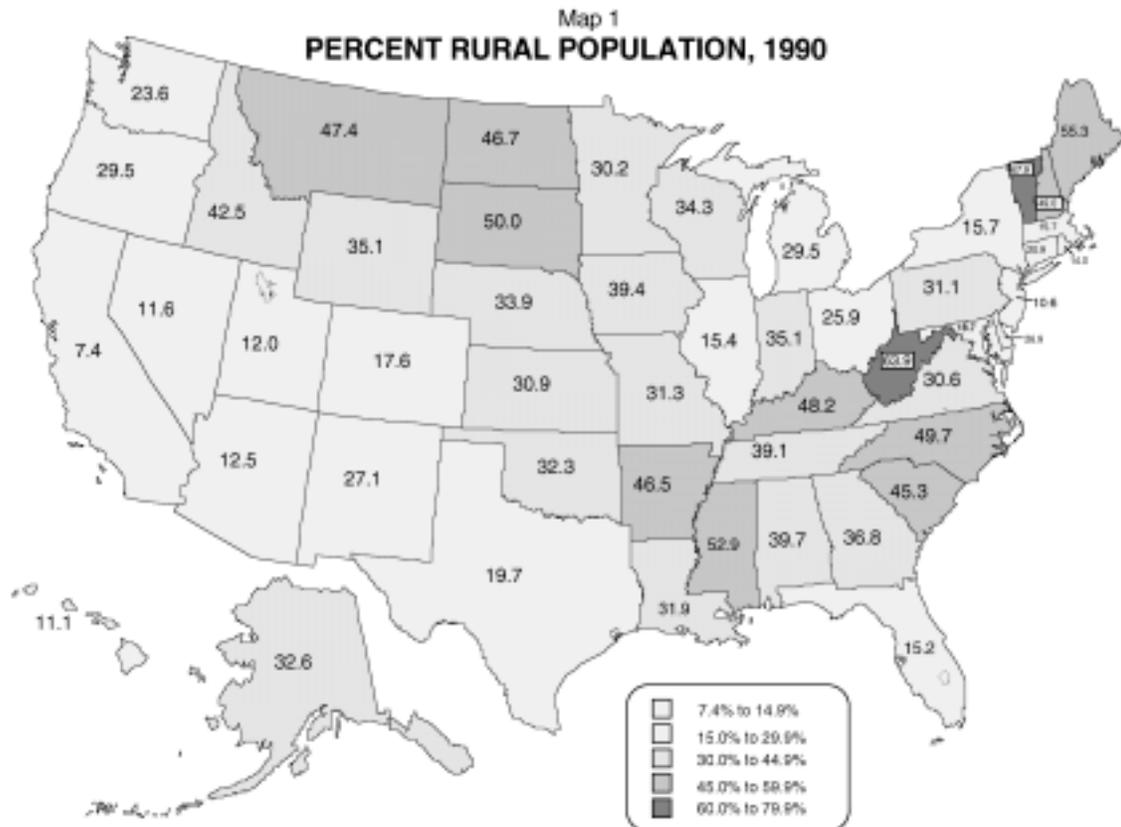


Figure 4



Source: US Bureau of the Census, 1990.

Produced by: North Carolina Rural Health Research Program, Cecil G. Stegman Center for Health Services Research, University of North Carolina at Chapel Hill.

Hazardous Materials

Incident Response Training Guidelines

Hazardous Materials Response-Related Standards

<u>Page</u>	<u>Topic</u>
211	Hazardous Waste Operations and Emergency Response (HAZWOPER) 29 CFR 1910.120
219	First Responder Operations Level Offensive Operations: OSHA Quips
223	Employee Records 29 CFR 1910.20
225	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
229	Confined Space Operations 29 CFR 1910.146
235	Ventilation for Confined Space Operations
237	Bloodborne Diseases 29 CFR 1910.1030
241	Lockout / Tagout 29 CFR 1910.147
245	Right-to-Know and Material Safety Data Sheets (MSDS) 29 CFR 1910.1200
251	Joint Commission on Accreditation of Healthcare Organizations
253	Process Safety Management of Highly Hazardous Chemicals 29 CFR 1910.119

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 a 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 Data 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

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Response Related Standards

HAZWOPER 29CFR 1910.120

- 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 instruction 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

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HAZWOPER 29CFR 1910.120

- (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 themselves 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

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- (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 competencies
- (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 demonstrate 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

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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

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- 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.

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Operations Level Offensive Operations: OSHA Quips

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.

Operations Level Offensive Operations: OSHA Quips

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 took 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 if 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.

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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*)

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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 explanation 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*)

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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 Assessment 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 employees 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.

Response Related Standards

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 of 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 respirator 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

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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

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Permit-Required Confined Spaces

(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 measures 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 there is a change in assigned duties, 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.

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Permit-Required Confined Spaces

(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.

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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.

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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.

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- “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 updated 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.

**Response Related Standards
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<ul style="list-style-type: none"> - 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. <p>(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.</p> <p>(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.</p>	Response Training Issues
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<p>(e) HIV and HBV Research Laboratories and Production Facilities</p> <p>(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.</p> <p>(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.</p> <p>(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.</p> <p>(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.</p> <p>(f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up</p> <p>(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.</p> <p>(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.</p> <p>(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.</p>	

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Bloodborne Diseases

- (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 professional's 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 of 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.

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- “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.

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(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.

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- “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.

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<ul style="list-style-type: none"> • “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. 	Awareness
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(d) Hazard determination	
<ol style="list-style-type: none"> (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	
<ol style="list-style-type: none"> (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. 	EMS Level 1
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(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, except 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.

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- (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

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

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Process Safety Management of Highly Hazardous Chemicals

**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.

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(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/recommendations 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 paragraph 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.

Process Safety Management of Highly Hazardous Chemicals

(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.

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

