Hazardous Materials Incident Response
Curriculum Guidelines

Response Training Considerations

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

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 training requirements for public sector response personnel to hazardous materials emergencies. Existing regulatory requirements are defined and additional consensus standard recommendations are provided to help managers improve the quality and effectiveness of hazardous materials incident response training.

The *Response Guidelines* are organized into 15 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:

- Awareness Level Personnel
- First Responder Operations
- Core Competencies for the Responder at the Operations Level
- Mission Specific Competencies for the Responder at the Operations Level
- Hazardous Materials Technician
- Hazardous Materials Technicians with Specialties
- Incident Commander
- NFPA Specialist Employees C, B, and A and OSHA Specialist Employee
- Hazardous Materials Officer
- Hazardous Materials Safety Officer
- BLS- Hazardous Materials Basic Life Support Responder
- ALS- Hazardous Materials Advanced Life Support Responder
- ALS- Mission Specific Competencies for Haz Mat Advanced Life Support Responders
- Hospital First Receivers
- Appendix: Related Standards and Special Topics

In each of these competency areas, the minimum level of required training is defined by the regulatory specifications from OSHA 1910.120(q). In addition, a more extensive recommended level of training is defined primarily by the consensus standard specifications (from the National Fire Protection Association) delineated in 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. 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.

The Need to Train

All personnel 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.

Training managers face a significant challenge in ensuring that all responding personnel are fully prepared and competent to perform their assigned tasks while working within existing limited resources and conflicting priorities. Their challenge is compounded by many other factors that affect the ability 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 and changing team, expertise, and resource combinations during incident response.

These guidelines for training personnel who respond to hazardous materials and related terrorist emergencies are based on multiple sources. The minimum legal requirements are defined in OSHA 29 CFR 1910.120(q) and EPA 40 CFR 311 (EPA 311). More current and higher-level recommended levels of training for responders are defined in the voluntary consensus standards National Fire Protection Association (NFPA) 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents, and NFPA 473: Standard for Competence of EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents. In addition, recommended levels of training for hospital personnel handling victims of hazardous materials/weapons of mass destruction incidents are based on OSHA's Best Practices for Hospital-Based First Receivers of Victims of Mass Casualty Incidents Involving the Release of Hazardous Substances.

Employer's Legal Responsibilities

OSHA 29 CFR 1910.120(q) and EPA 40 CFR 311 (EPA 311) require that emergency response employees be trained and competent to perform their assigned tasks during an emergency. 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 response to hazardous materials emergencies.

The employer must certify annually that each employee has successfully completed the required training to perform their assigned tasks. The maintenance of skills and knowledge through refresher training can be accomplished through a range of training and exercise options. 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 SOPs.
- 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) or EPA 40 CFR 311 rules apply to all public sector agencies that are expected to respond to an emergency involving hazardous materials, including career or volunteer fire departments, emergency medical services, or law enforcement personnel.

OSHA 1910.120(q) and EPA 311 legal requirements 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 (e.g., medical monitoring for personnel assigned to Hazardous Materials Response Teams (HMRT), and documentation of chemical protective clothing and personnel exposure records)

Note that OSHA 1910.120(q) and EPA 311 provide the minimum legal requirements affecting hazardous materials/WMD training. However, many jurisdictions pursue the more current and much higher recommended levels of training as defined in NFPA 472 and NFPA 473. In keeping with the principle of fully preparing responders to respond, these standards are more current in definition of competencies and are designed to address more recent emergent hazards and response challenges.

Employer's Training Requirements

Employers must ensure that employees are trained and competent in emergency response to hazardous materials incidents, based on their expected and assigned duties and functions. Such training must be provided before employees are permitted to engage in emergency response activities, and refresher training must be provided annually.

- An employer is responsible for determining the appropriate level of training required, based on the assigned tasks and actions expected of employees as stated in the agency's SOPs.
- An employer is responsible for providing the required training. Emphasis should be on achieving the required competencies (i.e., skill and knowledge) 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, and releases from fixed facility operations, and terrorist or other criminal activity, training must be conducted for personnel who provide emergency planning, safety, response, and technical programs. A large number of personnel needing training related to hazardous materials and terrorist incident response are volunteers or part-time employees. Maintaining minimum competency levels for full-time career staff may be difficult, but training part-time or volunteer responders is an even bigger challenge. Two of the most significant challenges are (1) determining what constitutes a minimal level and ensuring that these minimal requirements are met, and (2) the time constraints and limited flexibility of part-time and volunteer responders' to attend training.

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

OSHA has defined a minimum number of hours for training at operations, technician, specialist, and incident commander levels. However, the key is the level of competency attained, not the hours expended in training. Each employer is responsible for employees being trained and competent, and agencies often exceed the minimum hours of training to deliver and test for competencies at the levels outlined by OSHA or in NFPA 472 and NFPA 473.

The amount of training needed to reach competency will also be influenced by 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.

Refresher Training

All personnel who may respond to hazardous materials emergencies must receive refresher training on an annual basis or have experience that ensures that they are maintaining 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(q). This may be accomplished through refresher training or demonstration of skills and 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

Keys to effective training include the competency of the instructor, and proper instructor training, monitoring, and certification by response program managers.

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 the 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?

Page Intentionally Left Blank

Hazardous Materials Incident Response Curriculum Guidelines

Awareness Level Personnel

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Introduction

Awareness level personnel shall be trained to meet all competencies of the awareness level. In addition, 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

The awareness level personnel are personnel who are likely to witness or discover a hazardous materials/WMD emergency or, in the course of their normal duties, may be the first persons on the scene of an emergency involving hazardous materials. The awareness level personnel 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.

Training Audience

Awareness level personnel 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, emergency medical services, 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 of Training Requirements

Awareness Level Personnel

Audience

Broad. All who might encounter a haz mat/WMD incident.

Prerequisites

None.

Training

- No length required. 4-16 hours is common practice.
- Traditional classroom or seminar format. E-learning may be appropriate for some audiences.
- Competencies:
  - Detect the presence of hazardous materials
  - Identify hazardous materials present
  - Collect hazard information
  - Initiate the notification process

Refresher

Annual. Refresh skills in detection and identification, instruct on new and emergent hazards, refresh skills in notification and instruct on notification protocol changes.

Federal Requirements for Awareness Training

OSHA establishes the following training requirements for the awareness level.

> *OSHA 29 CFR 1910.120(q)(6)(i)*
>
> *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. 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 Objectives

OSHA AWARE - A

Define the different types of hazardous substances and identify the risks associated with them in an incident.

OSHA AWARE - B

Given a simulated incident involving hazardous materials, identify the potential outcomes.

OSHA AWARE - C

Given the data available during an incident response, demonstrate recognition of the presence of hazardous substances.

OSHA AWARE - D

Given the data available during an incident response, identify hazardous substances present.

OSHA AWARE - E

Define the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the DOT Emergency Response Guidebook.

OSHA AWARE - F

Given a simulated incident, determine the need for additional resources, and make appropriate notifications to the communication center.

Recommended Training Objectives

The following training objectives are recommended for Awareness training. The primary source for this material is NFPA 472, Chapter 4: Competencies for Awareness Level Personnel. 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.

Objective Identification Legend

AWARE - 1.1.1 **Origin: NFPA 4.2.1(1)** *Supports OSHA AWARE - A*

This is the identification of the objective that is used in these guidelines.

This indicates the origin of the objective (usually NFPA 472 or 473).

This indicates which OSHA requirement this objective supports.

1. Analyzing the Incident

AWARE - 1.1 Origin: NFPA 4.2.1 *Supports OSHA AWARE-A,B,C,D*

Detecting the Presence of Hazardous Materials. Given examples of various situations, awareness level personnel shall identify those situations where hazardous materials/WMD are present.

AWARE - 1.1.1 Origin: NFPA 4.2.1 (1) *Supports OSHA AWARE-A*

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

AWARE - 1.1.2 Origin: NFPA 4.2.1 (2) *Supports OSHA AWARE-A,E*

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

AWARE - 1.1.3 Origin: NFPA 4.2.1 (3) *Supports OSHA AWARE-B,E*

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

AWARE - 1.1.4 Origin: NFPA 4.2.1 (4) *Supports OSHA AWARE-A,B*

Identify the difference between hazardous materials/WMD incidents and other incidents.

AWARE - 1.1.5 Origin: NFPA 4.2.1 (5) *Supports OSHA AWARE-C,D*

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

AWARE - 1.1.6	Origin: NFPA 4.2.1 (6)	*Supports OSHA AWARE-C,D*

Identify typical container shapes that can indicate hazardous materials/WMD.

AWARE - 1.1.7	Origin: NFPA 4.2.1 (7)	*Supports OSHA AWARE-C,D,E*

Identify facility and transportation markings and colors that indicate hazardous materials/WMD, including:

a. UN/NA identification numbers;
b. NFPA 704 markings;
c. military hazardous materials/WMD markings;
d. special hazard communication markings;
e. pipeline markings; and
f. container markings.

AWARE - 1.1.8	Origin: NFPA 4.2.1 (8)	*Supports OSHA AWARE-D*

Given an NFPA 704 marking, describe the significance of the colors, numbers, and special symbols.

AWARE - 1.1.9	Origin: NFPA 4.2.1 (9)	*Supports OSHA AWARE-D,E*

Identify U.S. and Canadian placards and labels that indicate hazardous materials/WMD.

AWARE - 1.1.10	Origin: NFPA 4.2.1 (10)	*Supports OSHA AWARE-B*

Identify the basic information on safety data sheets (SDS) and shipping papers that indicates hazardous materials, and be able to do the following:

AWARE - 1.1.10 a	Origin: NFPA 4.2.1 (10)a	*Supports OSHA AWARE-B*

Identify where to find safety data sheets (SDS).

AWARE - 1.1.10 b	Origin: NFPA 4.2.1 (10)b	*Supports OSHA AWARE-B*

Identify major sections of an SDS.

AWARE - 1.1.10 c	Origin: NFPA 4.2.1 (10)c	*Supports OSHA AWARE-B*

Identify entries on a safety data sheet that indicate the presence of hazardous materials.

AWARE - 1.10 d	Origin: NFPA 4.2.1 (10)d	*Supports OSHA AWARE-B*

Match the name of the shipping papers found in transportation (air, highway, rail, and water) with the mode of transportation.

AWARE - 1.1.10 e	Origin: NFPA 4.2.1 (10)e	*Supports OSHA AWARE-B*

Identify the person responsible for having the shipping papers in each mode of transportation.

AWARE - 1.1.10 f Origin: NFPA 4.2.1 (10) f *Supports OSHA AWARE-B*

Identify where the shipping papers are found in each mode of transportation.

AWARE - 1.1.10 g Origin: NFPA 4.2.1 (10) g *Supports OSHA AWARE-B*

Identify where the shipping papers are found in each mode of transportation.

AWARE - 1.1.11 Origin: NFPA 4.2.1 (11) *Supports 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/WMD.

AWARE - 1.1.12 Origin: NFPA 4.2.1 (12) *Supports OSHA AWARE-C*

Describe the limitations of using the senses in determining the presence or absence of hazardous materials/WMD.

AWARE - 1.1.13 Origin: NFPA 4.2.1 (13) *Supports OSHA AWARE-C*

Identify at least four types of locations that could become targets for criminal or terrorist activity using hazardous materials/WMD.

AWARE - 1.1.14 Origin: NFPA 4.2.1 (14) *Supports OSHA AWARE-C*

Describe the difference between a chemical and a biological incident.

AWARE - 1.1.15 Origin: NFPA 4.2.1 (15) *Supports OSHA AWARE-C*

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

AWARE - 1.1.16 Origin: NFPA 4.2.1 (16) *Supports OSHA AWARE-C*

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

AWARE - 1.1.17 Origin: NFPA 4.2.1 (17)

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

AWARE - 1.1.18 Origin: NFPA 4.2.1 (18)

Identify at least four locations, indicators, and hazards associated with illicit laboratories (clandestine laboratories, weapons lab, ricin lab).

AWARE – 1.2 Origin: NFPA 4.2.2 *Supports OSHA AWARE- D,E*

Surveying the Hazardous Materials Incident from a Safe Location

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

AWARE – 1.3 Origin: NFPA 4.2.3 *Supports OSHA AWARE- A,B,E*

Collecting Hazard Information

Given the identity of various hazardous materials/WMD (name, UN/NA identification number, or type placard), awareness level personnel shall identify the fire, explosion, and health hazard information for each material by using the current edition of the *Emergency Response Guidebook or equivalent document* and shall meet the following requirements:

AWARE – 1.3.1 Origin: NFPA 4.2.3(1) *Supports OSHA AWARE- A,B,E*

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

AWARE – 1.3.2 Origin: NFPA 4.2.3(2) Supports OSHA AWARE- A,B,E

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

2. Implementing the Planned Response

AWARE – 2.1 Origin: NFPA 4.4.1 Supports OSHA AWARE-A,B,C,E,F

Initiating Protective Actions

Given examples of hazardous materials/ WMD incidents, the emergency response plan, the standard operating procedures, and the current edition of the *Emergency Response Guidebook* or equivalent document, awareness level personnel shall be able to identify the actions to be taken to protect themselves and others and to control access to the scene.

AWARE - 2.1.1 Origin: NFPA 4.4.1 (1) *Supports OSHA AWARE-E*

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

AWARE - 2.1.2 Origin: NFPA 4.4.1 (2) *Supports OSHA AWARE-E,F*

Identify the role of the awareness level during hazardous materials/WMD incidents.

AWARE - 2.1.3 Origin: NFPA 4.4.1 (3) *Supports OSHA AWARE-E*

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

AWARE - 2.1.3a Origin: NFPA 4.4.1 (3)a *Supports OSHA AWARE-E,F*

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

AWARE - 2.1.3b Origin: NFPA 4.4.1 (3)b *Supports OSHA AWARE-E*

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

AWARE - 2.1.3c Origin: NFPA 4.4.1 (3)c *Supports OSHA AWARE-A,B*

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

AWARE - 2.1.3d Origin: NFPA 4.4.1 (3)d *Supports OSHA AWARE-E*

Identify the general routes of entry for human exposure to hazardous materials/WMD.

AWARE - 2.1.4 Origin: NFPA 4.4.1 (4) *Supports OSHA AWARE-E*

Identify Given the identity of various hazardous materials/WMD (name, UN/NA identification number, or type placard), identify the following response information:

a. Emergency action (fire, spill, or leak and first aid)
b. Personal protective equipment necessary
c. Initial isolation and protective action distances.

AWARE - 2.1.5 Origin: NFPA 4.4.1 (1) *Supports OSHA AWARE-E*

Given the name of a hazardous material, identify the recommended personal protective equipment from the following list:

a. Street clothing and work uniforms
b. Structural fire-fighting protective clothing
c. Positive pressure self-contained breathing apparatus
d. Chemical-protective clothing and equipment

AWARE - 2.1.6 Origin: NFPA 4.4.1 (6) *Supports OSHA AWARE-A,E*

Identify the definitions for each of the following protective actions:

a. Isolation of the hazard area and denial of entry
b. Evacuation
c. Sheltering in-place protection

AWARE - 2.1.7 Origin: NFPA 4.4.1 (7) *Supports OSHA AWARE-A,E*

Identify the size and shape of recommended initial isolation and protective action zones.

AWARE - 2.1.8 Origin: NFPA 4.4.1 (8) *Supports OSHA AWARE-B,C,E*

Describe the difference between small and large spills as found in the table of Initial Isolation and Protective Action Distances in the *Emergency Response Guidebook* or equivalent document.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

AWARE - 2.1.9	Origin: NFPA 4.4.1 (9)	*Supports OSHA AWARE-B,C,E*

Identify Identifying the circumstances under which the following distances are used at a hazardous materials/WMD incident:

a. Table of initial isolation and protective action distances
b. Isolation distances in the numbered guides.

AWARE - 2.1.10	Origin: NFPA 4.4.1 (10)	*Supports OSHA AWARE-B,C,E*

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

AWARE - 2.1.11	Origin: NFPA 4.4.1 (11)	*Supports OSHA AWARE-B,C,E*

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

AWARE - 2.1.12	Origin: NFPA 4.4.1 (12)	*Supports OSHA AWARE-E*

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

AWARE - 2.1.13	Origin: NFPA 4.4.1 (13)	

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

AWARE – 2.2	Origin: NFPA 4.4.2	Supports OSHA AWARE-E,F

Initiating the Notification Process

Given scenarios involving hazardous materials/WMD incidents, awareness level personnel shall identify the initial notifications to be made and how to make them, consistent with the emergency response plan and/or standard operating procedures.

Hazardous Materials Incident Response Curriculum Guidelines

Core Competencies for Operations Level Responders

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Introduction

Operations level responders as defined in NFPA 472 shall be trained to meet all competencies outlined in the specific NFPA 472 chapter (Chapter 5). Operations level (NFPA 472) responders also shall receive additional training to meet applicable governmental occupational health and safety regulations.

Operations level (NFPA 472) competencies are broken into the following categories: (a) Core competencies, required of all responders on the scene, no matter what their function; and (b) Mission- or agent-specific competencies as assigned by the authority having jurisdiction

Mission-specific operations level responders who are expected to perform additional missions beyond the core competencies in this chapter shall be trained to meet those mission-specific competencies, as found in the following chapter, “Mission-Specific Operations.”

Definition

Operations Level (NFPA 472) Responders are those persons who respond to hazardous materials/weapons of mass destruction (WMD) incidents for the purpose of protecting nearby persons, the environment, or property from the effects of the release; however, these persons can have additional competencies that are specific to their response mission, expected tasks, and equipment and training as determined by the authority having jurisdiction (AHJ).

Training Audience

Responders at the operations level (NFPA 472) are typically those persons who are the first to arrive at the scene of a hazardous materials incident, often in response to a 911 or equivalent call. 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 Recommendations

Operations level (NFPA 472) 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. Core Operations training typically ranges from 16 to 24 hours (sometimes delivered as a component of a longer 24-40 hour program) , depending on training environment conditions and specific training audience needs. 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 of Training Requirements

Core Competencies for Operations Level Responders

Audience

All personnel who respond to HM/WMD incidents for the purpose of protecting persons, the environment or property from the release.

Prerequisites

Awareness Level Training

Training

16-24 hours in classroom, with optional additional use of field exercise area.
Competencies:

- Analyzing a hazmat/WMD incident.
- Planning an initial response.
- Implementing a planned response.
- Evaluating progress.

Refresher

Annual. 8 hour refresher training of response cognitive skills, technical updates to hazards and response protocols, and simulated incident scene decision-making practice.

Federal Training Requirements

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 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 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 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.

Relationship of OSHA Operations to NFPA 472 Core Operations

Under 29 CFR 1910.120 (q) (6) (ii), OSHA defines operations level responder competencies differently than NFPA 472. Most OSHA Operations level competencies relate closely to NFPA Core Competencies for Operations Level Responders, but the ability to perform basic control, containment and confinement techniques under OSHA are found in NFPA 472 under the Mission-Specific Competencies for Operations Level Responders (the following chapter in these Guidelines). OSHA Operations Level Competencies are discussed in the preceding chapter of these guidelines, including training recommendations and the translation of that required standard into six principle objectives. The crosswalk described in the recommended training objectives in this section relates individual NFPA 472 objectives to OSHA objectives and references the coding of the six OSHA objectives as explained in the preceding chapter of these guidelines. In addition, because the recommended competencies recognize the responsibility of the operations level responder to implement their incident command system at the beginning of the emergency, several recommended objectives relate to OSHA requirements for the incident commander in addition to OSHA requirements for responder operations. To assist in assessing course compliance with OSHA 1910.120(q), the relationships between these objectives and the OSHA requirements are noted, as depicted in the legend below.

Recommended Training Objectives

The following training objectives are recommended for Awareness training. The primary source for this material is NFPA 472, Chapter 4: Competencies for Awareness Level Personnel. 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.

Objective Identification Legend

OPS-CORE - 1.1	**Origin: NFPA 5.2.1**	*Supports OSHA OPS-A, AWARE - B*
This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	This indicates which OSHA requirement this objective supports.

3. Analyzing the Incident

OPS-CORE - 1.1 Origin: NFPA 5.2.1 *Supports OSHA OPS-A, AWARE-B*

Surveying the Hazardous Materials/WMD Incidents

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall survey the incident to identify the containers and materials involved, determine whether hazardous materials/WMD have been released, and evaluate the surrounding conditions.

OPS-CORE - 1.1.1 Origin: NFPA 5.2.1.1 *Supports OSHA OPS-A, AWARE-C*

Given three examples each of liquid, gas, and solid hazardous materials or WMD, including various hazard classes, operations level personnel shall identify the general shapes of containers in which the hazardous materials/WMD are typically found.

OPS-CORE - 1.1.1.1 Origin: NFPA 5.2.1.1.1 *Supports OSHA OPS-A, AWARE-C*

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

1. Cryogenic liquid tank cars
2. Nonpressure tank cars (general service or low pressure cars)
3. Pressure tank cars

OPS-CORE - 1.1.1.2 Origin: NFPA 5.2.1.1.2 *Supports OSHA OPS-A, AWARE-C*

Given examples of the following intermodal tanks, identify each intermodal tank by type, as follows:

1. Nonpressure intermodal tanks
2. Pressure intermodal tanks

3. Specialized intermodal tanks, including the following:
    a. Cryogenic intermodal tanks
    b. Tube modules

OPS-CORE - 1.1.1.3 Origin: NFPA 5.2.1.1.3 *Supports OSHA OPS-A, AWARE-C*

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

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

OPS-CORE - 1.1.1.4 Origin: NFPA 5.2.1.1.4 *Supports OSHA OPS-A, AWARE-C*

Given examples of the following storage tanks, identify each tank by type, as follows:

1. Cryogenic liquid tank
2. Nonpressure tank
3. Pressure tank

OPS-CORE - 1.1.1.5 Origin: NFPA 5.2.1.1.5 *Supports OSHA OPS-A, AWARE-C*

Given examples of the following nonbulk packaging, identify each package by type, as follows:

1. Bags
2. Carboys
3. Cylinders
4. Drums
5. Dewars flask (cryogenic liquids)

OPS-CORE - 1.1.1.6 Origin: NFPA 5.2.1.1.6 *Supports OSHA OPS-A*

Given examples of the following packaging, the operations level responder shall identify the characteristics of each container or package by type as follows:

1. Intermediate bulk container (IBC)
2. Ton container.

OPS-CORE - 1.1.1.7 Origin: NFPA 5.2.1.1.7 *Supports OSHA OPS-A*

Given examples of the following radioactive material packages, identify the characteristics of each container/package by type, as follows:

1. Excepted
2. Industrial
3. Type A
4. Type B
5. Type C

OPS-CORE - 1.1.2 Origin: NFPA 5.2.1.2 *Supports OSHA OPS-A*

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

OPS-CORE - 1.1.2.1 Origin: NFPA 5.2.1.2.1 *Supports OSHA OPS-A*

Given examples of the following marked transport vehicles and their corresponding shipping papers, identify the vehicle or tank identification marking:

1. Highway transport vehicles, including cargo tanks
2. Intermodal equipment including tank containers
3. Rail transport vehicles, including tank cars

OPS-CORE - 1.1.2.2 Origin: NFPA 5.2.1.2.2 *Supports OSHA OPS-A*

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

OPS-CORE - 1.1.3 Origin: NFPA 5.2.1.3 *Supports OSHA OPS-A, AWARE-E*

Given examples of hazardous materials incidents, identify the name(s) of the hazardous material(s).

OPS-CORE - 1.1.3.1 Origin: NFPA 5.2.1.3.1 *Supports OSHA OPS-A, AWARE-E*

Identify the following information on a pipeline marker:

1. Emergency telephone number
2. Owner
3. Product

OPS-CORE - 1.1.3.2 Origin: NFPA 5.2.1.3.2 *Supports OSHA OPS-A, AWARE-E*

Given a pesticide label, identify each of the following pieces of information, then match the piece of information to its significance in surveying the hazardous materials incident:

1. Active ingredient
2. Hazard statement
3. Name of pesticide
4. Pest control product (PCP) number (in Canada)
5. Precautionary statement
6. Signal word

OPS-CORE - 1.1.3.3 Origin: NFPA 5.2.1.3.3 *Supports OSHA OPS-A*

Given a label for a radioactive material, identify the type or category of label, contents, activity, transport index, and criticality safety index as applicable.

OPS-CORE - 1.1.4 Origin: NFPA 5.2.1.4 *Supports OSHA OPS-A*

Identify and list the surrounding conditions that should be noted when a hazardous materials/WMD incident is surveyed.

OPS-CORE - 1.1.5 Origin: NFPA 5.2.1.5 *Supports OSHA OPS-A*

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

OPS-CORE - 1.1.6 Origin: NFPA 5.2.1.6 *Supports OSHA OPS-A*

The operations level responder shall identify at least three additional hazards that could be associated with an incident involving terrorist or criminal activities.

OPS-CORE - 1.2 Origin: NFPA 5.2.2 *Supports OSHA OPS-A*

Collecting Hazard and Response Information

Given scenarios involving hazardous materials/WMD, the operations level responder shall collect hazard and response information using SDS, CHEMTREC/CANUTEC/SETIQ, governmental authorities, and shipper/manufacturer.

OPS-CORE - 1.2.1 Origin: NFPA 5.2.2 (1) *Supports OSHA OPS-A, AWARE-E*

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

OPS-CORE - 1.2.2 Origin: NFPA 5.2.2 (2) *Supports OSHA OPS-A*

Identify two ways to obtain an SDS in an emergency.

OPS-CORE - 1.2.3 Origin: NFPA 5.2.2 (3) *Supports OSHA OPS-A,B,C,D,F, AWARE-A*

Using an SDS for a specified material, identify the following hazard and response information:

1. Physical and chemical characteristics
2. Physical hazards of the material
3. Health hazards of the material
4. Signs and symptoms of exposure
5. Routes of entry
6. Permissible exposure limits
7. Responsible party contact
8. Precautions for safe handling (including hygiene practices, protective measures, procedures for cleanup of spills or leaks)
9. Applicable control measures including personal protective equipment
10. Emergency and first-aid procedures

OPS-CORE - 1.2.4 Origin: NFPA 5.2.2 (4) *Supports OSHA OPS-A. AWARE-E*

Identify the following:

1. Type of assistance provided by CHEMTREC/CANUTEC/SETIQ, and governmental authorities
2. Procedure for contacting CHEMTREC/CANUTEC/SETIQ, and governmental authorities
3. Information to be furnished to CHEMTREC/CANUTEC/SETIQ, and governmental authorities

OPS-CORE - 1.2.5 Origin: NFPA 5.2.2 (5) *Supports OSHA OPS-A, AWARE-E*

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

OPS-CORE - 1.2.6 Origin: NFPA 5.2.2 (6) *Supports OSHA OPS-A. AWARE-E*

Identify the type of assistance provided by governmental authorities with respect to criminal or terrorist activities involving the release or potential release of hazardous materials/WMD.

OPS-CORE - 1.2.7 Origin: NFPA 5.2.2 (7) *Supports OSHA OPS-A, AWARE-E*

Identify the procedure for contacting local, state, and federal authorities as specified in the local emergency response plan and/or standard operating procedures.

OPS-CORE - 1.2.8 Origin: NFPA 5.2.2 (8) *Supports OSHA OPS-A,B,C,D,F AWARE-A*

Describe the properties and characteristics of the following:

1. Alpha radiation
2. Beta radiation
3. Gamma rays
4. Neutron radiation

OPS-CORE - 1.3 Origin: NFPA 5.2.3 *Supports OSHA OPS-A*

Predicting the Likely Behavior of a Material and its Container

Given scenarios involving hazardous materials/WMD incidents, each with a single hazardous material/WMD, the operations level responder shall predict the likely behavior of the material/agent and its container.

OPS-CORE - 1.3.1 Origin: NFPA 5.2.3 (1) *Supports OSHA OPS-A,C*

Interpret the hazard and response information obtained from the current edition of the Emergency Response Guidebook; SDS; CHEMTREC/CANUTEC/SETIQ; governmental authorities; and shipper/manufacturer contacts.

OPS-CORE - 1.3.1a Origin: NFPA 5.2.3 (1)(a) *Supports OSHA OPS-A,C*

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

- Boiling point
- Chemical reactivity
- Corrosivity (pH)
- Flammable (explosive) range (LEL & UEL)
- Flash point
- Ignition (autoignition) temperature
- Particle Size
- Persistence
- Physical state (solid, liquid, gas)
- Radiation (ionizing and non-ionizing)
- Specific gravity
- Toxic products of combustion
- Vapor density
- Vapor pressure
- Water solubility

OPS-CORE - 1.3.1b Origin: NFPA 5.2.3 (1)(b) *Supports OSHA OPS-A,C*

Identify the differences between the following terms:

1. Contamination and secondary contamination
2. Exposure and contamination
3. Exposure and hazard
4. Infectious and contagious
5. Acute effects and chronic effects
6. Acute exposures and chronic exposures

OPS-CORE - 1.3.2 Origin: NFPA 5.2.3 (2) *Supports OSHA OPS-A*

Identify three types of stress that could cause a container system to release its contents.

OPS-CORE - 1.3.3 Origin: NFPA 5.2.3 (3) *Supports OSHA OPS-A*

Identify five ways in which containers can breach.

OPS-CORE - 1.3.4 Origin: NFPA 5.2.3 (4) *Supports OSHA OPS-A*

Identify four ways in which containers can release their contents.

OPS-CORE - 1.3.5 Origin: *Rad..1st Responder. (see Special Topics)*

Identify the general testing requirements for “Type A,” ”Type B,” and “Special Form” packaging used for radioactive material transportation.

OPS-CORE - 1.3.6	Origin: *Rad.1st Responder (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-CORE - 1.3.7	Origin: NFPA 5.2.3 (7)	*Supports OSHA OPS-A*

Identify at least four dispersion patterns that can be created upon release of a hazardous material.

OPS-CORE - 1.3.8	Origin: NFPA 5.2.3 (8)	*Supports OSHA OPS-A*

Identify the time frames for estimating the duration that hazardous materials/WMD will present an exposure risk.

OPS-CORE - 1.3.9	Origin: NFPA 5.2.3 (9)	*Supports OSHA OPS-A*

Identify the health and physical hazards that could cause harm.

OPS-CORE - 1.3.10	Origin: NFPA 5.2.3 (10)	*Supports OSHA OPS-A,C*

Identify the health hazards associated with the following terms:

1. Alpha, beta, gamma, and neutron radiation
2. Asphyxiant
3. Carcinogen
4. Convulsant
5. Corrosive
6. Highly toxic
7. Irritant
8. Sensitizer/allergen
9. Target organ effects
10. Toxic

OPS-CORE - 1.3.11	Origin: NFPA 5.2.3 (11)	*Supports OSHA OPS-A,C*

Given the following, identify the corresponding UN/DOT hazard class and division:

1. Blood agents
2. Biological agents and biological toxins
3. Choking agents
4. Irritants (riot control agents)
5. Nerve agents
6. Radiological materials
7. Vesicants (blister agents)

OPS-CORE - 1.4 Origin: NFPA 5.2.4 *Supports OSHA OPS-A*

Estimating the Potential Harm

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall estimate the potential harm within the endangered area at each incident.

OPS-CORE - 1.4.1 Origin: NFPA 5.2.4 (1) *Supports OSHA OPS-A*

Identify a resource for determining the size of an endangered area of a hazardous materials/WMD incident.

OPS-CORE - 1.4.2 Origin: NFPA 5.2.4 (2) *Supports OSHA OPS-A*

Given the dimensions of the endangered area and the surrounding conditions at a hazardous materials/WMD incident, estimate the number and type of exposures within that endangered area.

OPS-CORE - 1.4.3 Origin: NFPA 5.2.4 (3) *Supports OSHA OPS-A*

Identify resources available for determining the concentrations of a released hazardous material/WMD within an endangered area.

OPS-CORE - 1.4.4 Origin: NFPA 5.2.4 (4) *Supports 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/WMD incident.

OPS-CORE - 1.4.5 Origin: NFPA 5.2.4 (5) *Supports OSHA OPS-A*

Describe the impact that time, distance, and shielding have on exposure to radioactive materials specific to the expected dose rate.

4. Planning the Response

OPS-CORE - 2.1 Origin: NFPA 5.3.1 *Supports OSHA OPS-B,D*

Describing Response Objectives

Given at least two scenarios involving hazardous materials/WMD incidents, the operations level responder shall describe the response objectives for each example.

OPS-CORE – 2.1.1 Origin: NFPA 5.3.1 (1) *Supports OSHA OPS-B,D*

Given an analysis of a hazardous materials/WMD incident and the exposures, determine the number of exposures that could be saved with the resources provided by the AHJ.

OPS-CORE – 2.1.2 Origin: NFPA 5.3.1 (2) *Supports OSHA OPS-B,D*

Given an analysis of a hazardous materials/WMD incident, describe the steps for determining response objectives.

OPS-CORE – 2.1.3 Origin: NFPA 5.3.1 (3) *Supports 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/WMD incident.

OPS-CORE – 2.1.4 Origin: NFPA 5.3.1 (4) *Supports OSHA OPS-B*

Assess the potential for secondary attacks/devices at criminal or terrorist events.

OPS-CORE - 2.2 Origin: NFPA 5.3.2 *Supports OSHA OPS-B*

Identifying Action Options

Given examples of hazardous materials/WMD incidents(facility and transportation), including the name of the hazardous material/WMD involved and the anticipated type of exposure, the operations level responder shall determine whether available personal protective equipment applicable to performing assigned tasks.

OPS-CORE – 2.2.1 Origin: NFPA 5.3.2 (1) *Supports OSHA OPS-B*

Identify the options to accomplish a given response objective.

OPS-CORE – 2.2.2 Origin: NFPA 5.3.2 (2) *Supports OSHA OPS-B*

Describe the prioritization of emergency medical care and removal of victims from the hazard area relative to exposure.

OPS-CORE - 2.3 Origin: NFPA 5.3.3 *Supports OSHA OPS-B*

Determining Suitability of Personal Protective Equipment.

Given examples of hazardous materials/WMD incidents, including the name of the hazardous material/WMD involved and the anticipated type of exposure, the operations level responder shall determine whether available personal protective equipment is applicable to performing assigned tasks.

OPS-CORE – 2.3.1 Origin: NFPA 5.3.3 (1) *Supports OSHA OPS-B*

Identify the respiratory protection required for a given response option.

OPS-CORE – 2.3.1a Origin: NFPA 5.3.3 (1)(a) *Supports OSHA OPS-B*

Describe the advantages, limitations, uses, and operational components of the following types of respiratory protection at hazardous materials/WMD incidents:

1. Positive pressure self-contained breathing apparatus (SCBA)
2. Positive pressure air-line respirators with required escape unit
3. Closed circuit SCBA
4. Powered air-purifying respirators (PAPR)
5. Air-purifying respirators (APR)
6. Particulate respirator

OPS-CORE – 2.3.1b Origin: NFPA 5.3.3 (1)(b) *Supports OSHA OPS-B*

Identify the required physical capabilities and limitations of personnel working in respiratory protection.

OPS-CORE – 2.3.2 Origin: NFPA 5.3.2 (2) *Supports OSHA OPS-B*

Identify the personal protective clothing required for a given option.

OPS-CORE – 2.3.2a Origin: NFPA 5.3.3 (2)(a) *Supports OSHA OPS-B*

Identify skin contact hazards encountered at hazardous materials/WMD incidents.

OPS-CORE – 2.3.2b Origin: NFPA 5.3.3 (2)(b) *Supports OSHA OPS-B*

Identify the purpose, advantages, and limitations of the following types of protective clothing at hazardous materials/WMD incidents:

1. Chemical-protective clothing
   a. Liquid splash–protective clothing
   b. Vapor-protective clothing
2. High temperature–protective clothing
   a. Proximity suit
   b. Entry suits
3. Structural fire-fighting protective clothing

OPS-CORE - 2.4 Origin: NFPA 5.3.4 *Supports OSHA OPS-E,F*

Identifying Decontamination Issues

Given scenarios involving hazardous materials/WMD incidents, operations level responders shall identify when emergency decontamination is needed.

OPS-CORE - 2.4.1 Origin: NFPA 5.3.4(1) *Supports OSHA OPS-A*

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

OPS-CORE - 2.4.2 Origin: NFPA 5.3.4(2) *Supports OSHA OPS-A*

Describe how the potential for cross contamination determines the need for decontamination.

OPS-CORE - 2.4.3 Origin: NFPA 5.3.4(3) *Supports OSHA OPS-E,F*

Explain the importance and limitations of decontamination procedures at hazardous materials incidents.

OPS-CORE - 2.4.4 Origin: NFPA 5.3.4(4) *Supports OSHA OPS-A,E,F*

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

OPS-CORE - 2.4.5 Origin: NFPA 5.3.4(5) *Supports OSHA OPS-A,E,F*

Identify the factors that should be considered in emergency decontamination.

OPS-CORE - 2.4.6 Origin: NFPA 5.3.4(6) *Supports OSHA OPS-A,E,F*

Identify the advantages and limitations of emergency decontamination procedures.

OPS-CORE - 2.4.7 Origin: Rad. 1st Responder (see Special Topics)

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.

5. Implementing the Planned Response

OPS-CORE - 3.1 Origin: NFPA 5.4.1 *Supports OSHA OPS-F, IC-B,D*

Establishing and Enforcing Scene Control Procedures

Given two scenarios involving hazardous materials/WMD incidents, the operations level responder shall identify how to establish and enforce scene control including control zones, emergency decontamination, and communications between responders and to the public.

OPS-CORE - 3.1.1 Origin: NFPA 5.4.1 (1) *Supports OSHA OPS-F, IC-B,D*

Identify the procedures for establishing scene control through control zones.

OPS-CORE - 3.1.2 Origin: NFPA 5.4.1 (2) *Supports OSHA IC-B,D*

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

OPS-CORE - 3.1.3 Origin: NFPA 5.4.1 (3) *Supports OSHA IC-B,D*

Identify the basic techniques for the following protective actions at hazardous materials/WMD incidents:

1. Evacuation
2. Sheltering in-place protection

OPS-CORE - 3.1.4 Origin: NFPA 5.4.1 (4) *Supports OSHA OPS-E*

Demonstrate the ability to perform emergency decontamination.

OPS-CORE - 3.1.5 Origin: NFPA 5.4.1 (5) *Supports OSHA OPS-F, IC-B*

Identify the items to be considered in a safety briefing prior to allowing personnel to work at the following:

1. Hazardous materials incidents
2. Hazardous materials/WMD incidents involving criminal activities

OPS-CORE - 3.1.6 Origin: NFPA 5.4.1 (6) *Supports OSHA OPS-E*

Identify the procedures for insuring coordinated communication between responders and to the public.

OPS-CORE - 3.2 Origin: NFPA 5.4.2

Preserving Evidence

Given two scenarios involving hazardous materials/WMD incidents, the operations level responder shall describe the process to preserve evidence as listed in the emergency response plan and/or standard operating procedures.

OPS-CORE - 3.3 Origin: NFPA 5.4.3 *Supports OSHA IC-A*

Initiating the Incident Command System

Given scenarios involving hazardous materials/WMD incidents, the operations level responder shall initiate the incident command system specified in the emergency response plan and/or standard operating procedures.

OPS-CORE - 3.3.1 Origin: NFPA 5.4.3 (1) *Supports OSHA OPS-F, IC-D*

Identify the role of the operations level responder during hazardous materials/WMD incidents as specified in the emergency response plan and/or standard operating procedures.

OPS-CORE - 3.3.2 Origin: NFPA 5.4.3 (2) *Supports OSHA IC-D*

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

OPS-CORE - 3.3.3 Origin: NFPA 5.4.3 (3) *Supports OSHA IC-A,B,D*

Identify the purpose, need, benefits, and elements of the incident command system (ICS) for hazardous materials/WMD incidents.

OPS-CORE - 3.3.4 Origin: NFPA 5.4.3 (4) *Supports OSHA IC-A,C*

Identify the duties and responsibilities of the following functions within the incident management system

1. Incident safety officer
2. Hazardous materials branch/group

OPS-CORE - 3.3.5 Origin: NFPA 5.4.3 (5) *Supports OSHA IC-A,B,D*

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

OPS-CORE - 3.3.6 Origin: NFPA 5.4.3 (6) *Supports OSHA IC-A,B,D*

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

Response Training Considerations
Awareness Level Personnel
Operations Level Responders: Core Competencies; Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

OPS-CORE - 3.3.7 Origin: NFPA 5.4.3 (7) *Supports OSHA OPS-B*

Describe the role and response objectives of other agencies that respond to hazardous materials/WMD incidents.

OPS-CORE - 3.4 Origin: NFPA 5.4.4 *Supports OSHA OPS-B*

Using Personal Protective Equipment

The operations level responder shall describe considerations for the use of personal protective equipment provided by the AHJ.

OPS-CORE - 3.4.1 Origin: NFPA 5.4.4 (1) *Supports OSHA IC-C*

Identify the importance of the buddy system.

OPS-CORE - 3.4.2 Origin: NFPA 5.4.4 (2) *Supports OSHA IC-C*

Identify the importance of the backup personnel.

OPS-CORE - 3.4.3 Origin: NFPA 5.4.4 (3) *Supports OSHA OPS-F*

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

OPS-CORE - 3.4.4 Origin: NFPA 5.4.4 (4) *Supports OSHA OPS-F*

Identify the signs and symptoms of heat and cold stress and procedures for their control.

OPS-CORE - 3.4.5 Origin: NFPA 5.4.4 (5) *Supports OSHA IC-C*

Identify the capabilities and limitations of personnel working in the personal protective equipment as provided by the AHJ.

OPS-CORE - 3.4.6 Origin: NFPA 5.4.4 (6) *Supports OSHA IC-C*

Identify the procedures for cleaning, disinfecting, and inspecting personal protective equipment provided by the AJH.

OPS-CORE - 3.4.7 Origin: NFPA 5.4.4 (7) *Supports OSHA 29 CFR 1910.134*

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

6. Evaluating Progress

OPS-CORE - 4.1 Origin: NFPA 5.5.1 *Supports OSHA OPS-D*

Evaluating the Status of the Planned Response

Given two scenarios involving hazardous materials/WMD incidents, including the incident action plan, the operations level responder shall evaluate the status of the actions taken in accomplishing the response objectives.

OPS-CORE - 4.1.1 Origin: NFPA 5.5.1(1) *Supports OSHA OPS-A,D, IC-A,D*

Identify the considerations for evaluating whether actions taken were effective in accomplishing the objectives.

OPS-CORE - 4.1.2 Origin: NFPA 5.5.1(2) *Supports OSHA OPS-A,D, IC-A,D*

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

OPS-CORE - 4.2 Origin: NFPA 5.5.2 *Supports OSHA OPS-D*

Communicating the Status of the Planned Response

Given two scenarios involving hazardous materials/WMD incidents, including the incident action plan, the operations level responder shall communicate the status of the planned response through the normal chain of command.

OPS-CORE - 4.2.1 Origin: NFPA 5.5.2(1) *Supports OSHA OPS-D*

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

OPS-CORE - 4.2.2 Origin: NFPA 5.5.2(2) *Supports 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.

Page Intentionally Left Blank

Hazardous Materials Incident Response Curriculum Guidelines

Operations Level Responders Assigned Mission-Specific Responsibilities

Introduction

It is recommended that all responders, regardless of function or discipline and participating in any capacity in the organized response to hazmat/WMD incidents be trained at least to the *Core Competencies for Operations Level Responders* (previous chapter in these guidelines). In addition, some operations level responders may be expected by the Authority Having Jurisdiction (AHJ) to perform certain mission-specific tasks that are beyond the core competencies. Those operations level responders shall be trained by the AHJ to meet all the competencies necessary to perform the mission-specific task to which they will be assigned, in addition to the core competencies previously defined for the operations level responder. They shall also receive additional training to meet applicable governmental occupational health and safety regulations.

The AHJ is responsible for determining which operations level responders within the jurisdiction will need to be trained to perform which, if any, additional mission-specific assignments at the operations level. This determination should be made in concert with jurisdiction-wide response planning, to ensure timely training and equipping of sufficient operations level responders and thereby to ensure jurisdictional preparedness to perform any mission-specific functions that may be needed based upon local risks. Jurisdiction-wide response planning should also include all emergency services agencies and disciplines, to ensure that all appropriate agencies with mission leads within the jurisdiction have appropriately trained personnel for their areas of responsibility. For example, the AHJ may decide to have law enforcement personnel trained to perform the mission specific assignment of evidence preservation and sampling, and have fire personnel trained to perform the mission specific assignment of product control. This chapter of these guidelines will provide recommended competencies for each of the following eight different mission specific assignments, as defined in NFPA 472, Chapter 6, *Competencies for Operations Level Responders Assigned Mission-Specific Responsibilities*.

Definition

Mission-Specific Competency Areas for the Operations Level Responder

1. Using Personal Protective Equipment
2. Performing Mass Decontamination
3. Preserving Evidence and Sampling
4. Performing Technical Decontamination
5. Performing Product Control
6. Performing Air Monitoring and Sampling
7. Performing Victim Rescue/Recovery
8. Responding to Illicit Laboratory Incidents

9. Disablement/Disruption of Improvised Explosive Devices (IEDs), Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories

Training Audience

The audience for this training is the responder at the operations level who has received Core Operations Level Training and who the AHJ has determined will also need to be trained to perform a mission-specific task during response to a hazardous materials/WMD incident. These are typically responders at the operations level who will be called upon to perform assignments within the warm or hot zones of the incident, requiring competency in one of the mission-specific areas listed above. They may be implemented by law enforcement, public service, fire or emergency services, or a variety of private organizations.

Methodology Recommendations

Performance of mission-specific tasks shall be under the guidance of a hazardous material technician, an emergency response plan or standard operating procedures, or an allied professional. In order to perform these mission-specific tasks, the AHJ shall provide the operations level responder with the necessary tools, equipment, and training in order to be competent in the use of these tools, equipment, and procedures. The training shall be based on the tools and equipment provided by the AHJ for the task(s) assigned. Mission-specific competency training is best conducted in a classroom or lab environment with facilities to conduct appropriate labs/activities.

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 Training Requirements

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 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 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:*
>
> - *(G) Knowledge of the basic hazard and risk assessment techniques*
> - *(H) Know how to select and use proper personal protective equipment provided to the first responder operational level*
> - *(I) An understanding of basic hazardous materials terms*
> - *(J) 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*
> - *(K) Know how to implement basic decontamination procedures*
> - *(L) An understanding of the relevant standard operating procedures and termination procedures.*

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.

Relationship of OSHA Operations to NFPA 472 Mission-Specific Competencies for the Operations Level Responder

Under 29 CFR 1910.120 (q) (6) (ii), OSHA defines operations level responder competencies differently than NFPA 472. Most OSHA Operations level competencies relate closely to NFPA Core Competencies for Operations Level Responders, but the ability to perform basic control, containment and confinement techniques under OSHA are found in NFPA 472 under the Mission-Specific Competencies for Operations Level Responders. Many of the Mission-Specific Competencies for Operations Level Responders are more advanced than the competencies in OSHA, or are simply not addressed in the OSHA competencies. The crosswalk described in the recommended training objectives in this section relates individual NFPA 472 (2013 edition) objectives to OSHA objectives and references the coding of the six OSHA objectives as explained in the preceding chapter of these guidelines and below. In addition, because the recommended competencies recognize the responsibility of the operations level responder to establish command using an incident command system at the beginning of the emergency, several recommended objectives relate to OSHA requirements for the incident commander in addition to OSHA requirements for responder operations. To assist in assessing course compliance with OSHA 1910.120(q), the relationships between these objectives and the OSHA requirements are noted next to each objective.

Objective Identification Legend

OPS-PPE - 1.1	**Origin: NFPA 6.2.3.1**	*Supports OSHA OPS - B*
This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	This indicates which OSHA requirement this objective supports.

Recommended Training

Mission-Specific Competency Areas for the Operations Level Responder

Mission-Specific Competency Area for the Operations Level Responder

Using Personal Protective Equipment

The AHJ may anticipate that many of the responders in the jurisdiction who have already received training in the core competencies for operations level responders will also need to be able to use Personal Protective Equipment (PPE) beyond the level of PPE normally provided by the AHJ for their typical emergency response duties. All operations level responders who will be assigned to use such PPE shall be trained to the mission-specific competencies in this section, in order to ensure that the operations level responders are prepared to use such PPE safely and effectively. All operations level responders who have been so trained to use such PPE during a hazmat/WMD response shall then do so at the incident scene under the guidance of a hazardous materials technician, an appropriate allied professional, and/or under appropriate standard operating procedures.

Mission-Specific Competencies for the Operations Level Responder

Using Personal Protective Equipment

Audience

All operations level responders who might be assigned to use PPE at an incident

Prerequisites

Awareness Level and Core Operations Level Training Training

Training

4-8 hours in classroom and physical skills lab.

Competencies:

- Selection of personal protective equipment.
- Donning personal protective equipment.
- Working in personal protective equipment.
- Doffing personal protective equipment.

Refresher

Annual refresher training recommended to include retesting of PPE selection skills and re-demonstrating donning, working in, and doffing skills.

OPS-PPE 1. Planning the Response

OPS-PPE - 1.1 Origin: NFPA 6.2.3.1 *Supports OSHA OPS- B*

Selecting Personal Protective Equipment

Given scenarios involving hazardous materials/WMD incidents with known and unknown hazardous materials/WMD, the operations level responder assigned to use personal protective equipment shall select the personal protective equipment required to support mission-specific tasks at hazardous materials/WMD incidents based upon local procedures.

OPS-CORE - 1.1.1 Origin: NFPA 6.2.3.1(1) *Supports OSHA OPS-B*

Describe the types of personal protective equipment available for response based upon NFPA standards and how these items related to EPA levels of protection.

OPS-CORE - 1.1.2 Origin: NFPA 6.2.3.1(2) *Supports OSHA OPS-B*

Describe personal protective equipment options for the following hazards:

1. Thermal
2. Radiological
3. Asphyxiating;
4. Chemical
5. Etiological/biological
6. Mechanical

OPS-CORE - 1.1.3 Origin: NFPA 6.2.3.1(3) *Supports OSHA OPS-B*

Select personal protective equipment for mission-specific tasks at hazardous materials/WMD incidents based on local procedures.

OPS-CORE - 1.1.3 (a) Origin: NFPA 6.2.3.1(3)(a) *Supports OSHA OPS-B*

Given Describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:

1. Degradation
2. Penetration
3. Permeation

OPS-CORE - 1.1.3 (b) Origin: NFPA 6.2.3.1(3)(b) *Supports OSHA OPS-B*

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

OPS-CORE - 1.1.3 (c) Origin: NFPA 6.2.3.1(3)(c) *Supports OSHA OPS-B*

Identify the different designs of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type.

OPS-CORE - 1.1.3 (d) Origin: NFPA 6.2.3.1(3)(d) *Supports OSHA OPS-B*

Identify the relative advantages and disadvantages of the following heat exchange units used for cooling personnel operating in PPE:

1. Air cooled
2. Ice cooled
3. Water cooled
4. Phase change cooling technology

OPS-CORE - 1.1.3 (e) Origin: NFPA 6.2.3.1(3)(e) *Supports OSHA OPS-B*

Identify the physiological and psychological stresses of using personal protective equipment.

OPS-CORE - 1.1.3 (f) Origin: NFPA 6.2.3.1(3)(f) *Supports OSHA OPS-B*

Describe local procedures for going through the technical decontamination process.

OPS-PPE 2. Implementing the Planned Response

OPS-PPE - 2.1 Origin: NFPA 6.2.4.1 *Supports OSHA OPS- B*

Using Protective Clothing and Respiratory Protection

Given the personal protective equipment provided by the AHJ, the operations level responder assigned to use personal protective equipment shall demonstrate the ability to don, work in, and doff the equipment provided to support mission specific tasks by completing the following requirements:

OPS- PPE - 2.1.1 Origin: NFPA 6.2.4.1(1) *Supports OSHA OPS-B*

Describe at least three safety procedures for personnel wearing protective clothing.

OPS- PPE - 2.1.2 Origin: NFPA 6.2.4.1(2) *Supports OSHA OPS-B*

Describe at least three emergency procedures for personnel wearing protective clothing

OPS- PPE - 2.1.3 Origin: NFPA 6.2.4.1(3) *Supports OSHA OPS-B*

Demonstrate the ability to don, work in, and doff personal protective equipment provided by the AHJ.

OPS- PPE - 2.1.4 Origin: NFPA 6.2.4.1(4) *Supports OSHA OPS-B*

Demonstrate local procedures for responders undergoing the technical decontamination process.

OPS- PPE - 2.1.5 Origin: NFPA 6.2.4.1(5) *Supports OSHA OPS-B*

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

OPS-PPE 3. Terminating the Incident

OPS-PPE - 3.1 Origin: NFPA 6.2.5.1 *Supports OSHA OPS- B*

Reporting and Documenting the Incident

Given a scenario involving a hazardous materials/WMD incident, the operations level responder assigned to use personal protective equipment shall document use of the personal protective equipment by completing the documentation requirements of the emergency response plan or standard operating procedures regarding personal protective equipment.

Mission-Specific Competency Area for the Operations Level Responder

Performing Mass Decontamination

Operations level responders assigned to perform mass decontamination during hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, emergency response plan or standard operating procedures, or an allied professional. They shall be trained to meet all competencies at the awareness and operations levels, competencies for personal protective equipment, and the competencies in this section. Operations level responders with mass decontamination operations training shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Performing Mass Decontamination

Audience

All operations level responders who might be assigned to perform mass decontamination.

Prerequisites

Awareness Level and Core Operations Level, Mission-Specific PPE Training.

Training

4 hours in classroom and physical skills lab.
Competencies:

- Selecting Decontamination Procedures.
- Performing Incident Management Duties.
- Performing and Evaluating Decontamination Procedures.
- Reporting and Documenting the Incident.

Refresher

Annual refresher training recommended to include retesting of mass decontamination skills and re-demonstrating how to set up and implement mass decontamination operations for amublatory and non-ambulatory victims.

OPS-MD 1. Planning the Response

OPS- MD - 1.1	Origin: NFPA 6.3.3.1	*Supports OSHA OPS- E*

Selecting Personal Protective Equipment

Given an emergency response plan or standard operating procedures, the operations level responder assigned to mass decontamination shall select the personal protective equipment required to support mass decontamination at hazardous materials/WMD incidents based upon local procedures.

OPS- MD - 1.2	Origin: NFPA 6.3.3.2	*Supports OSHA OPS- E*

Selecting Decontamination Procedures

Given scenarios involving hazardous materials/WMD incidents, the operations level responder assigned to mass decontamination operations shall select a mass decontamination procedure that will minimize the hazard and spread of contamination, determine the equipment required to implement that procedure.

OPS- MD - 1.2.1 Origin: NFPA 6.2.3.2 (1) *Supports OSHA OPS-E*

Identify the advantages and limitations of mass decontamination operations.

OPS- MD - 1.2.2 Origin: NFPA 6.2.3.2 (2) *Supports OSHA OPS-E*

Describe the advantages and limitations of each of the following mass decontamination methods:

1. Dilution
2. Isolation
3. Washing

OPS- MD - 1.2.3 Origin: NFPA 6.2.3.2 (3) *Supports OSHA OPS-E*

Identify sources of information for determining the correct mass decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident.

OPS- MD - 1.2.4 Origin: NFPA 6.2.3.2 (4) *Supports OSHA OPS-E*

Given resources provided by the AHJ, identify the supplies and equipment required to set up and implement technical decontamination operations.

OPS- MD - 1.2.5 Origin: NFPA 6.2.3.2 (5) *Supports OSHA OPS-E*

Identify procedures, equipment, and safety precautions for communicating with crowds and crowd management techniques that can be used at incidents where a large number of people might potentially be contaminated.

OPS-MD 2. Implementing the Planned Response

OPS- MD - 2.1 Origin: NFPA 6.3.4.1 *Supports OSHA OPS- E,F*

Selecting Personal Protective Equipment

Given a scenario involving a hazardous materials/WMD incident and the emergency response plan and/or standard operating procedures, the operations level responder assigned to mass decontamination operations shall demonstrate the mass decontamination duties assigned in the incident action plan by describing the local procedures for the implementation of the mass decontamination function within the incident command system.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

OPS- MD - 2.2	Origin: NFPA 6.3.4.2	*Supports OSHA OPS- E*

Selecting Decontamination Procedures

The operations level responder assigned to mass decontamination operations shall demonstrate the ability to set up and implement mass decontamination operations for ambulatory and nonambulatory victims.

OPS-MD 3. Evaluating Progress

OPS- MD - 3.1	Origin: NFPA 6.3.5.1	*Supports OSHA OPS- E*

Selecting Personal Protective Equipment

Given examples of contaminated items that have undergone the required decontamination, the operations level responder assigned to mass decontamination operations shall identify procedures for determining whether the items have been fully decontaminated according to the standard operating procedures of the authority having jurisdiction and/or incident action plan.

OPS-MD 4. Terminating the Incident

OPS- MD - 4.1	Origin: NFPA 6.3.6.1	*Supports OSHA OPS- E,F*

Reporting and Documenting the Incident

Given a scenario involving a hazardous materials/WMD incident, the operations level responder assigned to mass decontamination operations shall complete the reporting and documentation requirements consistent with the emergency response plan and/or standard operating procedures.

OPS- MD – 4.1.1	Origin: NFPA 6.2.6.1 (1)	*Supports OSHA OPS-E*

Identify the reports and supporting documentation required by the emergency response plan and/or standard operating procedures.

OPS- MD – 4.1.2	Origin: NFPA 6.2.6.1 (2)	*Supports OSHA OPS-E*

Describe the importance of personnel exposure records.

OPS- MD – 4.1.3	Origin: NFPA 6.2.6.1 (3)	*Supports OSHA OPS-E*

Identify the steps in keeping an activity log and exposure records.

OPS- MD – 4.1.4	Origin: NFPA 6.2.6.1 (4)	*Supports OSHA OPS-E*

Identify the requirements for filing documents and maintaining records.

Mission-Specific Competency Area for the Operations Level Responder

Performing Technical Decontamination

Operations level responders assigned to perform technical decontamination during hazardous materials/WMD incidents shall operate under the guidance of a hazardous materials technician, emergency response plan or standard operating procedures, or an allied professional. They shall be trained to meet all competencies at the awareness and operations levels, competencies for personal protective equipment, and the competencies in this section. Operations level responders with technical decontamination operations training shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Performing Technical Decontamination

Audience

All operations level responders who might be assigned to perform technical decontamination at an incident.

Prerequisites

Awareness Level and Core Operations Level, Mission-Specific PPE Training.

Training

4 hours in classroom and physical skills lab.
Competencies:

- Selecting Technical Decontamination Procedures.
- Performing Incident Management Duties.
- Performing and Evaluating Technical Decontamination Procedures.
- Reporting and Documenting the Incident.

Refresher

Annual refresher training recommended to include retesting of technical decontamination skills and re-demonstrating how to set up and implement technical decontamination operations in support of entry operations as well as for ambulatory and non-ambulatory victims.

OPS-TD 1. Planning the Response

OPS- TD - 1.1 Origin: NFPA 6.4.3.1

Selecting Personal Protective Equipment

Given an emergency response plan or standard operating procedures, the operations level responder assigned to technical decontamination operations shall select personal protective equipment required to support technical decontamination at hazardous materials/WMD incidents based upon local procedures.

OPS- TD - 1.2 Origin: NFPA 6.4.3.2

Selecting Decontamination Procedures

Given scenarios involving hazardous materials/WMD incidents, the operations level responder assigned to technical decontamination operations shall select a technical decontamination procedure that will minimize the hazard and spread of contamination, determine the equipment required to implement that procedure.

OPS- TD - 1.2.1 Origin: NFPA 6.4.3.2 (1)

Identify the advantages and limitations of technical decontamination operations.

OPS- TD - 1.2.2 Origin: NFPA 6.4.3.2 (2)

Describe the advantages and limitations of each of the following technical decontamination methods:

1. Absorption
2. Adsorption
3. Chemical degradation
4. Dilution
5. Disinfection
6. Evaporation
7. Isolation and disposal
8. Neutralization
9. Sterilization
10. Solidification
11. Vacuuming
12. Washing

OPS- TD - 1.2.3 Origin: NFPA 6.4.3.2 (3)

Identify sources of information for determining the correct technical decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident.

OPS- TD - 1.2.4 Origin: NFPA 6.4.3.2 (4)

Given resources provided by the AHJ, identify the supplies and equipment required to set up and implement technical decontamination operations.

OPS- TD - 1.2.5 Origin: NFPA 6.4.3.2 (5)

Identify the procedures equipment, and safety precautions for processing evidence during technical decontamination operations at hazardous materials/WMD incidents.

OPS- TD - 1.2.6 Origin: NFPA 6.4.3.2 (6)

Identify procedures, equipment, and safety precautions for handling tools, equipment, weapons, criminal suspects, and law enforcement/search canines brought to the decontamination corridor at hazardous materials/WMD incidents.

OPS-TD 2. Implementing the Planned Response

OPS- TD - 2.1 Origin: NFPA 6.4.4.1

Performing Incident Management Duties

Given a scenario involving hazardous materials/WMD incident and the emergency response plan and/or standard operating procedures, the operations level responder assigned to technical decontamination operations shall demonstrate the technical decontamination duties assigned in the incident action plan.

OPS- TD - 2.1.1 Origin: NFPA 6.4.4.1 (1)

Identify the role of the operations level responder assigned to technical decontamination operations during hazardous materials/WMD incidents.

OPS- TD – 2.1.2 Origin: NFPA 6.4.4.1 (2)

Describe the procedures for implementing technical decontamination operations within the incident command system.

OPS- TD - 2.2 Origin: NFPA 6.4.4.2

Performing Decontamination Operations Identified in Incident Action Plan.

The responder assigned to technical decontamination operations shall demonstrate the ability to set up and implement the following types of decontamination operations:

1. Technical decontamination operations in support of entry operations.
2. Technical decontamination operations for ambulatory and non-ambulatory victims.

OPS-TD 3. Evaluating Progress

OPS- TD - 3.1 Origin: NFPA 6.4.5.1

Evaluating the Effectiveness of the Technical Decontamination Process.

Given examples of contaminated items that have undergone the required decontamination, the operations level responder assigned to technical decontamination operations shall identify procedures for determining whether the items have been fully decontaminated according to the standard operating procedures of the authority having jurisdiction and/or incident action plan.

OPS-TD 4. Terminating the Incident

OPS- TD - 4.1 Origin: NFPA 6.4.6.1

Reporting and Documenting the Incident

Given a scenario involving a hazardous materials/WMD incident, the operations level responder assigned to technical decontamination operations shall complete the reporting and documentation requirements consistent with the emergency response plan and/or standard operating procedures.

OPS- TD – 4.1.1 Origin: NFPA 6.4.6.1 (1)

Identify the reports and supporting technical documentation required by the emergency response plan and/or standard operating procedures.

OPS- TD – 4.1.2 Origin: NFPA 6.4.6.1 (2)

Describe the importance of personnel exposure records.

OPS- TD – 4.1.3 Origin: NFPA 6.4.6.1 (3)

Identify the steps in keeping an activity log and exposure records.

OPS- TD – 4.1.4 Origin: NFPA 6.2.6.1 (4)

Identify the requirements for filing documents and maintaining records.

Mission-Specific Competency Area for the Operations Level Responder

Evidence Preservation and Sampling

Operations Level responders assigned to evidence preservation and sampling and assigned to perform forensic evidence preservation, take samples, and/or seize evidence during hazardous materials/WMD incidents involving potential violations of criminal statutes or governmental regulations shall be trained to meet all competencies at the awareness and operations levels, the mission-specific competencies for personal protective equipment, and the competencies in this section. They shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Evidence Preservation and Sampling

Audience

All operations level responders who might be assigned to preserve evidence, take samples, and/or seize evidence at an incident involving potential criminal activity.

Prerequisites

Awareness, Core Operations, and Mission-Specific PPE Training.

Training

24 hours in classroom and physical skills lab.
Competencies:

- Determining whether a hazardous materials/ WMD incident involves criiminal intent.
- Identifying unique aspects of criminal hazardous materials/WMD incidents.
- Identifying the law enforcement agency with investigative jurisdiction.
- Describing the local procedures for the evidence preservation and sampling process.

Refresher

Annual refresher training recommended to include retesting of evidence preservation and sampling skills, and re-demonstrating appropriate evidence preservation and sampling techniques and documentation procedures.

OPS-PS 1. Analyzing the Incident

OPS- PS - 1.1 Origin: NFPA 6.5.2.1

Determine if the Incident is Potentially Criminal in Nature and Identify the Law Enforcement Agency Having Investigative Jurisdiction

Given examples of hazardous materials/WMD incidents involving potential criminal intent, the operations level responder assigned to evidence preservation and sampling shall describe the potential criminal violation and identify the law enforcement agency having investigative jurisdiction.

OPS- PS - 1.1.1 Origin: NFPA 6.5.2.1 (1)

Response Training Considerations
Awareness Level Personnel
Operations Level Responders Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Given examples of the following hazardous materials/WMD incidents, the operations level responder shall describe products potentially encountered in the incident associated with each situation:

1. Hazardous materials/WMD suspicious letter
2. Hazardous materials/WMD suspicious package
3. Hazardous materials/WMD illicit laboratory
4. Release/attack with a WMD agent
5. Environmental crimes.

OPS- PS - 1.1.2 Origin: NFPA 6.5.2.1 (2)

Given examples of the following hazardous materials/WMD incidents, identify the agency(s) with investigative authority and the incident response considerations associated with each situation:

1. Hazardous materials/WMD suspicious letter
2. Hazardous materials/WMD suspicious package
3. Hazardous materials/WMD illicit laboratory
4. Release/attack with a WMD agent
5. Environmental crimes

OPS-PS 2. Planning the Response

OPS- PS - 2.1 Origin: NFPA 6.5.3.1

Identify Unique Aspects of Criminal Hazardous Materials/WMD Incidents

The operations level responder assigned to evidence preservation and sampling shall be capable of identifying the unique aspects associated with illicit laboratories, hazardous materials/WMD incidents, and environmental crimes.

OPS- PS - 2.1.1 Origin: NFPA 6.5.3.1 (1)(a-e)

Given an incident involving illicit laboratories, a hazardous materials/ WMD incident, or an environmental crime, the responder shall be able to describe the following procedures:

1. Secure, characterize, and preserve the scene.
2. Document personnel and scene activities associated with incident.
3. Determine whether or not the responders are within their legal authority to perform evidence preservation and sampling tasks.
4. Notify the agency with investigative authority.
5. Notify the Explosive Ordnance Disposal (EOD) personnel.

OPS- PS - 2.1.2 Origin: NFPA 6.5.3.1 (1) (f-g)

Given an incident involving illicit laboratories, a hazardous materials/ WMD incident, or an environmental crime, the responder shall be able to identify:

1. Potential sample/evidence
2. The applicable sampling equipment.

OPS- PS - 2.1.3 Origin: NFPA 6.5.3.1 (1)(h-o)

Given an incident involving illicit laboratories, a hazardous materials/ WMD incident, or an environmental crime, the responder shall be able to describe the following procedures:

1. procedures to protect samples and evidence from cross contamination
2. documentation procedures
3. evidentiary sampling techniques
4. field screening protocols for sample/evidence collected
5. evidence labeling and packaging procedures
6. evidence decontamination procedures
7. evidence packaging procedures for evidence transportation
8. chain of custody procedures

OPS- PS - 2.1.4 Origin: NFPA 6.5.3.1 (2) (a-d)

Given an example of an illicit laboratory, the operations level responder assigned to evidence preservation and sampling shall be able to describe:

1. hazards, safety procedures, decontamination, and tactical guidelines for this type of incident
2. factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample/evidence packaging and transport containers
3. sampling options associated with liquid and solid sample/evidence collection.
4. field screening protocols for samples/evidence collected.

OPS- PS - 2.1.5 Origin: NFPA 6.5.3.1 (3)(a-d)

Given an example of an environmental crime, the operations level responder assigned to evidence preservation and sampling shall be able to:

1. Describe the hazards, safety procedures, decontamination, and tactical guidelines for this type of incident.
2. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample/evidence packaging and transport containers.
3. Describe the sampling options associated with liquid and solid sample/evidence collection.
4. Describe the field screening protocols for samples/evidence collected.

OPS- PS - 2.1.6 Origin: NFPA 6.5.3.1 (4) (a-d)

Given an example of a hazardous materials/WMD suspicious letter, the responder assigned to evidence preservation and sampling shall be able to perform the following tasks:

1. Describe the hazards, safety procedures, decontamination, and tactical guidelines for this type of incident.
2. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample/evidence packaging and transport containers.
3. Describe the sampling options associated with liquid and solid sample/evidence collection.
4. Describe the field screening protocols for samples/evidence collected.

OPS- PS - 2.1.7 Origin: NFPA 6.5.3.1 (5)(a-d)

Given an example of a hazardous materials/WMD suspicious package, the responder assigned to evidence preservation and sampling shall be able to perform the following tasks:

1. Describe the hazards, safety procedures, decontamination, and tactical guidelines for this type of incident.
2. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample/evidence packaging and transport containers.
3. Describe the sampling options associated with liquid and solid sample/evidence collection.
4. Describe the field screening protocols for samples/evidence collected.

OPS- PS - 2.1.8 Origin: NFPA 6.5.3.1 (6)

Given an example of a release/attack involving a hazardous material/WMD agent, the operations level responder assigned to evidence preservation and sampling shall be able to perform the following tasks:

1. Describe the hazards, safety procedures, decontamination and tactical guidelines for this type of incident.
2. Describe the factors to be evaluated in selecting the personal protective equipment, sampling equipment, detection devices, and sample/evidence packaging and transport containers.
3. Describe the sampling options associated with liquid and solid sample/evidence collection.
4. Describe the field screening protocols for samples/evidence collected.

OPS- PS - 2.1.9 Origin: NFPA 6.5.3.1 (7)

Given examples of different types of potential criminal hazardous materials/WMD incidents, the operations level responder shall identify and describe the application, use, and limitations of the various types field screening tools that can be utilized for screening the following:

1. Corrosivity
2. Flammability
3. Oxidation
4. Radioactivity
5. Volatile organic compounds (VOC).

OPS- PS - 2.1.10 Origin: NFPA 6.5.3.1 (8)

Describe the potential adverse impact of using destructive field screening techniques.

OPS- PS - 2.1.11 Origin: NFPA 6.5.3.1 (9)

Describe the procedures for maintaining the evidentiary integrity of any item removed from the crime scene.

OPS- PS - 2.2 Origin: NFPA 6.5.3.2

Selecting Personal Protective Equipment

The operations level responder assigned to evidence preservation and sampling shall select the personal protective equipment required to support evidence preservation and sampling at hazardous materials/WMD incidents based upon local procedures.

OPS-PS 3. Implementing the Planned Response

OPS- PS - 3.1 Origin: NFPA 6.5.4.1

Implementing the Planned Response

Given the incident action plan for a criminal incident involving hazardous materials/WMD, the operations level responder assigned to evidence preservation and sampling shall implement, or oversee the implementation of, the selected response actions safely and effectively:

OPS- PS - 3.1.1 Origin: NFPA 6.5.4.1 (1)

Secure, characterize, and preserve the scene.

OPS- PS - 3.1.2 Origin: NFPA 6.5.4.1 (2)

Document personnel and scene activities associated with incident.

OPS- PS - 3.1.3 Origin: NFPA 6.5.4.1 (3)

Describe whether or not the responders are within their legal authority to perform evidence preservation and sampling tasks.

OPS- PS - 3.1.4 Origin: NFPA 6.5.4.1 (4)

Notify the agency with investigative authority.

OPS- PS - 3.1.5 Origin: NFPA 6.5.4.1 (5)

Notify the EOD personnel.

OPS- PS - 3.1.6 Origin: NFPA 6.5.4.1 (6)

Identify potential sample/evidence to be collected.

OPS- PS - 3.1.7 Origin: NFPA 6.5.4.1 (7)

Demonstrate the procedures to protect samples and evidence from cross contamination.

OPS- PS - 3.1.8 Origin: NFPA 6.5.4.1 (8)

Demonstrate the correct techniques to collect samples utilizing the equipment provided.

OPS- PS - 3.1.9 Origin: NFPA 6.5.4.1 (9)

Demonstrate the documentation procedures.

OPS- PS - 3.1.10 Origin: NFPA 6.5.4.1 (10)

Demonstrate the sampling protocols.

OPS- PS - 3.1.11 Origin: NFPA 6.5.4.1 (11)

Demonstrate field screening protocols for sample/evidence collected.

OPS- PS - 3.1.12 Origin: NFPA 6.5.4.1 (12)

Demonstrate evidence labeling and packaging procedures.

OPS- PS - 3.1.13 Origin: NFPA 6.5.4.1 (13)

Demonstrate evidence decontamination procedures.

OPS- PS - 3.1.14 Origin: NFPA 6.5.4.1 (14)

Demonstrate evidence packaging procedures for evidence transportation.

OPS- PS - 3.2 Origin: NFPA 6.5.4.2

The operations level responder assigned to evidence preservation and sampling shall describe local procedures for the technical decontamination process.

Mission-Specific Competency Area for the Operations Level Responder

Performing Product Control

Operations Level responders assigned to product control at hazardous materials/WMD incidents shall be trained to meet all competencies at the awareness and operations levels, the mission-specific competencies for personal protective equipment, and the competencies in this section. They shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Performing Product Control

Audience

All operations level responders who might be assigned to perform product control at an incident.

Prerequisites

Awareness Level and Core Operations Level, Mission-Specific PPE Training.

Training

8 hours in classroom and physical skills lab.
Competencies:

- Identifying Control Options.
- Performing Control Options.
- Evaluating Progress.
- Terminating the Incident.
- Describing the local procedures for the product control process.

Refresher

Annual refresher training recommended to include retesting of product control skills and re-demonstrating control functions set out in the incident action plan.

OPS-PC 1. Planning the Response

OPS- PC - 1.1 Origin: NFPA 6.6.3.1 *OSHA Ops-D*

Identifying Control Options

Given examples of hazardous materials/WMD incidents, the operations level responder assigned to perform product control shall identify control options at the operations level for each response objective by completing the following requirements as prescribed by the AHJ:

OPS- PC - 1.1.1 Origin: NFPA 6.6.3.1 (1) *OSHA Ops-D*

Identify the options to accomplish a given response objective.

OPS- PC - 1.1.2 Origin: NFPA 6.6.3.1 (2) *OSHA Ops-D*

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

(a) Absorption
(b) Adsorption
(c) Damming

(d) Diking
(e) Dilution
(f) Diversion
(g) Remote valve shutoff
(h) Retention
(i) Vapor dispersion
(j) Vapor suppression

OPS-PC 2. Implementing the Planned Response

OPS- PC - 2.1 Origin: NFPA 6.6.4.1 *OSHA Ops-D*

Performing Control Options

Given an incident action plan for a hazardous materials/WMD incident, within the capabilities and equipment provided by the AHJ, the operations level responder assigned to perform product control shall demonstrate control functions set out in the plan by completing the following requirements as prescribed by the AHJ:

OPS- PC - 2.1.1 Origin: NFPA 6.6.4.1 (1) *OSHA Ops-D*

Using the type of special purpose or hazard suppressing foams or agents and foam equipment furnished by the AHJ, demonstrate the application of the foam(s) or agent(s) on a spill or fire involving hazardous materials/WMD.

OPS- PC - 2.1.2 Origin: NFPA 6.6.4.1 (2) *OSHA Ops-D*

Identify the characteristics and applicability of the following Class B foams if supplied by the AHJ:

(a) Aqueous film-forming foam (AFFF)
(b) Alcohol-resistant concentrates
(c) Fluoroprotein
(d) High expansion foam

OPS- PC - 2.1.3 Origin: NFPA 6.6.4.1 (3) *OSHA Ops-D*

Given the required tools and equipment, demonstrate how to perform the following control activities:

(a) Absorption
(b) Adsorption
(c) Damming
(d) Diking
(e) Dilution
(f) Diversion
(g) Retention
(h) Remove valve shut-off

(i) Vapor dispersion
(j) Vapor suppression

OPS- PC - 2.1.4 Origin: NFPA 6.6.4.1 (4) *OSHA Ops-D*

Identify the location and describe the use of emergency remote shutoff devices on MC/DOT-306/406, MC/DOT-307/407, and MC-331 cargo tanks containing flammable liquids or gases.

OPS- PC - 2.1.5 Origin: NFPA 6.6.4.1 (5) *OSHA Ops-D*

Describe the use of emergency remote shutoff devices at fixed facilities.

OPS- PC - 2.12 Origin: NFPA 6.6.4.2 *OSHA Ops-E*

The operations level responder assigned to perform product control shall describe local procedures for going through the technical decontamination process.

Mission-Specific Competency Area for the Operations Level Responder

Performing Air Monitoring and Sampling

Operations level responders assigned to perform air monitoring and sampling shall operate under the guidance of a hazardous materials technician, written standard operating procedures, or an allied professional. They shall be trained to meet all competencies at the awareness and operations levels, the mission-specific competencies for personal protective equipment, and the competencies in this section. Operations level responders assigned to perform air monitoring and sampling shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Performing Air Monitoring and Sampling

Audience

All operations level responders who might be assigned to perform air monitoring and sampling at an incident.

Prerequisites

Awareness, Core Operations, and Mission-Specific PPE Training.

Training

8-24 hours in classroom and physical skills lab.
Competencies:

- Selecting detection or monitoring equipmnet suitable for solid, liquid, or gaseous hazardous materials/WMD.
- Describing capabilities and limitations of local monitoring, field testing and maintenance procedures associated with each monitoring device.
- Describing the local procedures for technical decontaminaion o fthemselves and their detection and monitoring devices.

Refresher

Annual refresher training recommended to include retesting of air monitoring and sampling skills and re-demonstrating how to field test and operate each monitoring device and how to interpret readings based on local procedures.

OPS-AMS 1. Planning the Response

OPS- AMS - 1.1 Origin: NFPA 6.7.3.1

Given the air monitoring and sampling equipment provided by the AHJ, the operations level responder assigned to perform air monitoring and sampling shall select the detection/monitoring equipment suitable for detecting or monitoring for solid, liquid, or gaseous hazardous materials/WMD.

OPS- AMS - 1.2 Origin: NFPA 6.7.3.2

Given detection/monitoring devices(s) provided by the AHJ, the operations level responders assigned to perform air monitoring and sampling shall describe the operation, capabilities and limitations, local monitoring procedures, field testing, and maintenance procedures associated with each device.

OPS- AMS - 1.3 Origin: NFPA 6.7.3

Selecting Personal Protective Equipment

The operations level responder assigned to perform air monitoring and sampling shall select the personal protective equipment required to support air monitoring and sampling at hazardous materials/WMD incidents based upon local procedures.

OPS-AMS 2. Implementing the Planned Response

OPS- AMS - 2.1 Origin: NFPA 6.7.4.1

Given a scenario involving hazardous materials/WMD and detection/ monitoring devices provided by the AHJ, the operations level responders assigned to perform air monitoring and sampling shall demonstrate the field test and operation of each device and interpret the readings based on local procedures.

OPS- AMS - 2.2 Origin: NFPA 6.7.4.2

Describe procedures for post-air monitoring and sampling decontamination.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Mission-Specific Competency Area for the Operations Level Responder

Performing Victim Rescue and Recovery

Operations level responders assigned to perform victim rescue and recovery during hazardous materials/WMD incidents shall perform these tasks under the guidance of a hazardous materials technician, written standard operating procedures, or an allied professional. They shall be trained to meet all competencies at the awareness and operations levels, the mission-specific competencies for personal protective equipment, and the competencies in this section. Operations level responders assigned to perform victim rescue and recovery shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Performing Victim Rescue and Recovery

Audience

All operations level responders who might be assigned to perform victim rescue and recovery at an incident.

Prerequisites

Awareness, Core Operations, and Mission-Specific PPE and Mass Decontamination training .

Training

8 hours in classroom and physical skills lab.

Competencies:

- Describing the safety procedures and tactical guidelines for line-of-sight, non-line-of-sight, ambulatory and non-ambulatory victims.
- Discriminating between victim rescue and victim recovery operations.
- Selecting and using specialized rescue equipment and procedures provided by the AHJ.
- Describing local procedures for performing decontamination upon completing the victim rescue/removal mission.

Refresher

Annual refresher training recommended to include re-demonstrating the following skills:

- Determining the feasibility of conducting victim rescue and recovery operations at an incident involving a hazardous material/WMD.
- Selecting and using specialized rescue equipment and procedures provided by the AHJ.

OPS-VRR 1. Planning the Response

OPS- VRR - 1.1 Origin: NFPA 6.8.3.1

Given scenarios involving hazardous materials/WMD incidents, the operations level responder assigned to victim rescue/recovery shall determine the feasibility of conducting victim rescue/recovery operations at an incident involving a hazardous material/WMD and shall be able to perform the following tasks:

.

OPS- VRR - 1.1.1 Origin: NFPA 6.8.3.1 (1)

Determine the feasibility of conducting rescue and recovery operations.

OPS- VRR - 1.1.2 Origin: NFPA 6.8.3.1 (2)

Describe the safety procedures, tactical guidelines, and incident response considerations to affect a rescue associated with each of the following situations:

(a) Line-of-sight with ambulatory victims
(b) Line-of-sight with non-ambulatory victims
(c) Non-line-of-sight with ambulatory victims
(d) Non-line-of-sight with non-ambulatory victims
(e) Victim rescue operations versus victim recovery operations

OPS- VRR - 1.1.3 Origin: NFPA 6.8.3.1 (3)

Determine if the options are within the capabilities of available personnel and personal protective equipment.

OPS- VRR - 1.1.4 Origin: NFPA 6.8.3.1 (4)

Describe the procedures for implementing victim rescue and recovery operations within the incident command system.

OPS- VRR - 1.2 Origin: NFPA 6.8.3.2

Given the PPE provided by the AHJ, the operations level responder assigned to perform victim rescue and recovery shall select the personal protective equipment required to support victim rescue and recovery at hazardous materials/WMD incidents based on local procedures.

OPS-VRR 2. Implementing the Planned Response

OPS- VRR - 2.1 Origin: NFPA 6.8.4.1

Given a scenario involving hazardous materials/WMD, the operations level responder assigned to victim rescue and recovery shall perform the following tasks:

OPS- VRR - 2.1.1 Origin: NFPA 6.8.4.1 (1)

Identify the different team positions and describe their main functions.

OPS- VRR - 2.1.2 Origin: NFPA 6.8.4.1 (2)

Select and use specialized rescue equipment and procedures provided by the AHJ to support victim rescue/recovery operations.

OPS- VRR - 2.1.3 Origin: NFPA 6.8.4.1 (3)

Demonstrate safe and effective methods for victim rescue/recovery.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

OPS- VRR - 2.1.4 Origin: NFPA 6.8.4.1 (4)

Demonstrate the ability to triage victims.

OPS- VRR - 2.1.5 Origin: NFPA 6.8.4.1 (5)

Describe local procedures for performing decontamination upon completing the victim rescue/removal mission.

Mission-Specific Competency Area for the Operations Level Responder

Responding to Illicit Laboratory Incidents

Operations level responders assigned to respond to illicit laboratory incidents shall perform these tasks under the guidance of a hazardous materials technician, written standard operating procedures, or an allied professional. They shall be trained to meet all competencies at the awareness and operations levels, the mission-specific competencies for personal protective equipment, and the competencies in this section. Operations level responders assigned to respond to illicit laboratory incidents shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Responding to Illicit Laboratory Incidents

Audience

All operations level responders who might be assigned to respond to incidents involving illicit laboratories.

Prerequisites

Awareness, Core Operations, and Mission-Specific PPE training .

Training

8 hours in classroom and physical skills lab.
Competencies:

- Determining if a hazardous materials/WMD incident is an illicit laboratory incident.
- Identifying the possible response options to an illicit laboratory incident.
- Identifying the law enforcement agency having investigative jurisdiction.
- Describe safe and effective methods of securing the scene.
- Demonstrate decontamination procedures for tactical law enforcements personnel securing an illicit laboratory.
- Demonstrate methods of conducting joint hazardous materials/EOD operations in identifying safety hazards and implementing control procedures.

Refresher

Annual refresher training recommended to include retesting of skills required for response to illicit laboratory incident, and re-demonstrating the following skills:

- Demonstrate appropriate decontamination procedures for tactical law enforcement personnel.
- Demonstrate methods to identify potential safety hazards associated with the potential manufacture of illicit drugs or WMD.
- Demonstrate methods to conduct joint hazardous materials/EOD operations to identify safety hazards and implement control procedures.

OPS-IL 1. Analyzing the Incident

OPS- IL - 1.1 Origin: NFPA 6.9.2.1

Determine If a Hazardous Materials/WMD Incident Is an Illicit Laboratory Operation

Given examples of hazardous materials/WMD incidents involving illicit laboratory operations, the operations level responder assigned to respond to illicit laboratory incidents shall identify the potential drugs/WMD being manufactured.

OPS- IL - 1.1.1 Origin: NFPA 6.9.2.1 (1)

Given examples of illicit drug manufacturing methods, describe the operational considerations, hazards, and products involved in the illicit process.

OPS- IL - 1.1.2 Origin: NFPA 6.9.2.1 (2)

Given examples of illicit chemical WMD methods, describe the operational considerations, hazards, and products involved in the illicit process.

OPS- IL - 1.1.3 Origin: NFPA 6.9.2.1 (3)

Given examples of illicit biological WMD methods, describe the operational considerations, hazards, and products involved in the illicit process.

OPS- IL - 1.1.4 Origin: NFPA 6.9.2.1 (4)

Given examples of illicit laboratory operations, describe the potential booby-traps that have been encountered by response personnel.

OPS- IL - 1.1.5 Origin: NFPA 6.9.2.1 (5)

Given examples of illicit laboratory operations, describe the agencies that have investigative authority and operational responsibility to support the response.

OPS-IL 2. Planning the Response

. OPS- IL - 2.1 Origin: NFPA 6.9.3.1

Determining the Response Options

Given an analysis of hazardous materials/WMD incidents involving illicit laboratories, the operations level responder assigned to respond to illicit laboratory incidents shall identify possible response options.

OPS- IL - 2.2 Origin: NFPA 6.9.3.2.1

Identifying Unique Aspects of Criminal Hazardous Materials/WMD Incidents

The operations level responder assigned to respond to illicit laboratory incidents shall identify the unique operational aspects associated with illicit drug manufacturing and illicit WMD manufacturing.

OPS- IL - 2.2.1 Origin: NFPA 6.9.3.2.2

Given an incident involving illicit drug manufacturing or illicit WMD manufacturing, the operations level responder assigned to illicit laboratory incidents shall describe the following tasks:

1) Law enforcement securing and preserving the scene
2) Joint hazardous materials and EOD personnel site reconnaissance and hazard identification
3) Determining atmospheric hazards through air monitoring and detection
4) Mitigation of immediate hazards while preserving evidence
5) Coordinated crime scene operation with the law enforcement agency having investigative authority
6) Documenting personnel and scene activities associated with incident

OPS- IL - 2.3 Origin: NFPA 6.9.3.3

Identifying the Law Enforcement Agency Having Investigative Jurisdiction

The operations level responder assigned to respond to illicit laboratory incidents shall identify the law enforcement agency having investigative jurisdiction..

OPS- IL - 2.3.1 Origin: NFPA 6.9.3.2 (1) (a-c)

Given scenarios involving illicit drug manufacturing or illicit WMD, identify the law enforcement agency(s) with investigative authority for the following situations:

(a) Illicit drug manufacturing
(b) Illicit WMD manufacturing
(c) Environmental crimes resulting from illicit laboratory operations

OPS- IL - 2.4 Origin: NFPA 6.9.3.4.1

Identifying Unique Tasks and Operations at Sites Involving Illicit Laboratories

The operations level responder assigned to respond to illicit laboratory incidents shall identify and describe the unique tasks and operations encountered at illicit laboratory scenes.

OPS- IL - 2.4.1 Origin: NFPA 6.9.3.4.2 (1-5)

Given scenarios involving illicit drug manufacturing or illicit WMD manufacturing describe the following:

1) Hazards, safety procedures and tactical guidelines for this type emergency
2) Factors to be evaluated in selecting the appropriate personal protective equipment for each type of tactical operation
3) Factors to be considered in selecting appropriate decontamination procedures
4) Factors to be evaluated in selection detection devices

5) Factors to consider in developing a remediation plan

OPS- IL - 2.5 Origin: NFPA 6.9.3.5

Selecting Personal Protective Equipment

The operations level responder assigned to respond to illicit laboratory incidents shall select the personal protective equipment required to respond to illicit laboratory incidents based upon local procedures.

OPS-IL 3. Implementing the Planned Response

OPS- IL - 3.1 Origin: NFPA 6.9.4.1

Given scenarios involving an illicit drug/WMD laboratory operation involving hazardous materials/WMD, the operations level responder assigned to respond to illicit laboratory incidents shall implement or oversee the implementation of the selected response options safely and effectively.

OPS- IL - 3.1.1 Origin: NFPA 6.9.4.1.1 (1)

Describe safe and effective methods for law enforcement to secure the scene.

OPS- IL - 3.1.2 Origin: NFPA 6.9.4.1.1 (2)

Demonstrate decontamination procedures for tactical law enforcement personnel (SWAT/K-9) securing an illicit laboratory.

OPS- IL - 3.1.3 Origin: NFPA 6.9.4.1.1 (3)

Describe methods to identify and/or avoid potential unique safety hazards found at illicit laboratories such as booby-traps and releases of hazardous materials.

OPS- IL - 3.1.4 Origin: NFPA 6.9.4.1.1 (4)

Describe methods to conduct joint hazardous materials/EOD operations to identify safety hazards and implement control procedures.

OPS- IL - 3.2 Origin: NFPA 6.9.4.1.2

Given a simulated illicit drug/WMD laboratory entry operation, the operations level responders assigned to respond to illicit laboratory incidents shall demonstrate methods of identifying the following:

1) The potential manufacture of illicit drugs during reconnaissance operations
2) The potential manufacture of illicit WMD materials during reconnaissance operations

3) Potential environmental crimes associated with the manufacture of illicit drugs/WMD materials during reconnaissance operations

OPS- IL - 3.3 Origin: NFPA 6.9.4.1.3

Given a simulated illicit drug/WMD laboratory incident, the operations level responder assigned to respond to illicit laboratory incidents shall describe joint agency crime scene operations, including support to forensic crime scene processing teams.

OPS- IL - 3.4 Origin: NFPA 6.9.4.4

Given a simulated illicit drug/WMD laboratory incident, the operations level responder assigned to respond to illicit laboratory incidents shall describe the policy and procedures for post–crime scene processing and site remediation operations.

OPS- IL - 3.5 Origin: NFPA 6.9.4.1.5

The operations level responder assigned to respond to illicit laboratory incidents shall be able to describe local procedures for performing decontamination upon completing the illicit laboratory mission.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Mission-Specific Competency Area for the Operations Level Responder

Disablement/Disruption of Improvised Explosive Devices (IEDs), Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories

Operations level responders assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be that person, competent at the operations level, who is assigned to perform these tasks under the guidance of a hazardous materials technician, written standard operating procedures, or an allied professional. Operations level responders assigned to perform these tasks shall possess current certification as a Hazardous Device Technician from the FBI Hazardous Devices School, Department of Defense, or equivalent certifying agency as determined by the AHJ and be functioning as a member of a bomb squad or recognized military unit. They shall be trained to meet all competencies at the awareness and operations levels, the mission-specific competencies for personal protective equipment, the mission-specific competencies for response to illicit laboratories, and the competencies in this section. Operations level responders assigned to perform these tasks shall also receive additional training necessary to meet specific needs of the jurisdiction.

Mission-Specific Competencies for the Operations Level Responder

Disablement/Disruption of Improvised Explosive Devices (IEDs),Improvised WMD Dispersal Devices, and Operations at Improvised Explosives Laboratories

Audience

All operations level responders who might be assigned to respond to incidents involving IEDs, Improvised WMD Dispersal Devices, and Improvised Explosives Labs.

Prerequisites

Awareness, Core Ops, Mission-Specific PPE training, and Response to Illicit Labs training, and FBI, DOD or equivalent certification as a Hazardous Device Technician

Training

Training in classroom and physical skills lab.
Competencies:

- Determine if an incident involves the potential presence of an IED, an improvised WMD dispersal device or is an improvised explosives laboratory.
- Identify response options and plan the response for incidents involving IEDs, Improvised WMD dispersal devices, and Improvised Explosives laboratories.
- Demonstrate the ability to select and use detection devices, to identify and avoid unique safety hazards, to perform disablement disruption techniques safely and effectively.
- Select and use appropriate combination of chemical protective clothing, respiratory protection and ballistic protection.

Refresher

Annual refresher training recommended to include retesting and re-demonstrating the following skills:

- Assessing simultated incidents, identifying response options and planning the response
- Selecting and using detection devices, identifying and avoiding unique safety hazards, and performing disablement and disruption techniques safely and effectively.
- Selecting and using appropriate combination of chemical protective clothing, respiratory protection and ballistic protection.

OPS-IED 1. Analyzing the Incident

OPS- IED - 1.1 Origin: NFPA 6.10.2.1

Determining If the Incident Involves the Potential Presence of an Improvised WMD Dispersal Device

Given examples of hazardous materials/WMD incidents involving an IED or improvised WMD dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall identify and/or categorize the hazard by completing the following:

OPS- IED - 1.1.1 Origin: NFPA 6.10.2.1 (1)

Given examples of the following hazardous materials/WMD incidents involving an IED or improvised WMD dispersal device, describe products that might be encountered in the incident associated with each situation:

(a) Letter/package-based improvised dispersal device
(b) Briefcase/backpack-based improvised dispersal device
(c) Transportation-borne WMD dispersal device
(d) Fixed location hazards where an IED has been placed to cause the deliberate release of a material

OPS- IED - 1.2 Origin: NFPA 6.10.2.2

Given examples of hazardous materials/WMD incidents involving improvised explosives laboratories, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratory incidents shall identify the potential explosives/WMD being manufactured by completing the following related requirements:

OPS- IED - 1.2.1 Origin: NFPA 6.10.2.2 (1)

Given examples of improvised explosives manufacturing methods, describe the operational considerations, hazards, and products involved in the illicit process.

OPS- IED - 1.2.2 Origin: NFPA 6.10.2.2 (2)

Given examples of improvised explosives laboratory operations, describe the potential booby-traps that have been encountered by response personnel.

OPS- IED - 1.2.3 Origin: NFPA 6.10.2.2 (3)

Given examples of improvised explosives laboratory operations, describe the agencies that have investigative authority and operational responsibility to support the response.

OPS-IED 2. Planning the Response

OPS- IED - 2.1 Origin: NFPA 6.10.3.1

Identifying Unique Aspects of Improvised WMD Dispersal Device Related Hazardous Materials/WMD Incidents

When responding to hazardous materials/WMD incidents, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratory incidents shall be capable of identifying the unique aspects associated with such incidents by completing the following requirements:

OPS- IED - 2.1.1 Origin: NFPA 6.10.3.1 (1)

Given an incident involving a nonvehicle based WMD dispersal device, shall be able to perform the following tasks:

(a) Describe the hazards, safety procedures, and tactical guidelines for this type of incident
(b) Describe the factors to be evaluated in selecting the personal protective equipment
(c) Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption activities

OPS- IED - 2.1.2 Origin: NFPA 6.10.3.1 (2)

Given an incident involving a vehicle-borne WMD dispersal device, shall be able to perform the following tasks:

(a) Describe the hazards, safety procedures, and tactical guidelines for this type of incident
(b) Describe the factors to be evaluated in selecting the personal protective equipment
(c) Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption activities

OPS- IED - 2.1.3 Origin: NFPA 6.10.3.1 (3)

Given examples of different types of incidents involving an improvised WMD dispersal device, shall identify and describe the application use and limitations of various types of field screening tools that can be utilized for determining the presence of the following materials:

(a) Gamma and neutron radiation
(b) Explosive materials [commercial and home-made explosives (HME)

OPS- IED - 2.2 Origin: NFPA 6.10.3.2

Identifying Unique Aspects of Improvised Explosives Laboratory Related Hazardous Materials/WMD Incidents

When responding to conduct mitigation procedures on energetic materials at an improvised explosive laboratory, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be capable of identifying the unique aspects associated with such incidents.

OPS- IED - 2.2.1 Origin: NFPA 6.10.3.2 (1)

Given a scenario involving an improvised explosive laboratory and detection devices provided by the AHJ, complete the following:

OPS- IED - 2.2.1a Origin: NFPA 6.10.3.2 (1)(a)

Describe the hazards, safety procedures, and tactical guidelines for this type of incident.

OPS- IED - 2.2.1b Origin: NFPA 6.10.3.2 (1)(b)

Describe the factions to be evaluated in selecting the personal protective equipment.

OPS- IED - 2.2.1c Origin: NFPA 6.10.3.2 (1)(c)

Describe the application, use, and limitations of various types of field screening tools that can be utilized for determining the presences of the following materials:

i. Radioactive materials that emit alpha, beta, gamma, or neutron radiation, including radio-nuclide identification of gamma emitting radioactive materials.
ii. Explosive materials (commercial and HME).

OPS- IED - 2.2.1d Origin: NFPA 6.10.3.2 (1)(d)

Demonstrate the field test and operation of each detection device and interpret the readings based on local procedures.

OPS- IED - 2.2.1e Origin: NFPA 6.10.3.2 (1)(e)

Describe local procedures for decontamination of themselves and their detection devices upon completion of the material detection mission.

OPS- IED - 2.2.1f Origin: NFPA 6.10.3.2 (1)(f)

Describe the procedure for identifying and obtaining the appropriate emergency response elements to support disablement/disruption or mitigation activities.

OPS-IED 3. Identifying Potential Response Options

OPS- IED - 3.1 Origin: NFPA 6.10.3.3.1

Given scenarios involving a potential IED or improvised WMD materials dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall identify possible response options.

OPS- IED - 3.2 Origin: NFPA 6.10.3.3.2

Given scenarios involving potential improvised explosives laboratories, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall identify possible response options.

OPS- IED - 3.3 Origin: NFPA 6.10.3.3.4

Selecting Personal Protective Equipment

Given the personal protective equipment provided by the AHJ, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall select the persona protective equipment required to support such operations at hazardous materials/WMD incidents based on the National Guidelines for Bomb Technicians adopted by the National Bomb Squad Commanders Advisory Board (NBSCAB).

OPS-IED 4. Implementing the Planned Response

OPS- IED - 4.1 Origin: NFPA 6.10.4.1

Given scenarios involving a potential IED or improvised WMD dispersal device, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be able to complete the following tasks:

OPS- IED - 4.1.1 Origin: NFPA 6.10.4.1 (1)

Using detection and monitoring devices provided by the AHJ, demonstrate the field test and operation of each device and interpret the readings based on local or agency procedures.

OPS- IED - 4.1.2 Origin: NFPA 6.10.4.1 (2)

Perform diagnostics based on procedures instructed by a nationally accredited hazardous devices school or program.

OPS- IED - 4.1.3 Origin: NFPA 6.10.4.1 (3)

Perform disablement/disruption techniques in accordance with the FBI Hazardous Devices School “logic tree”, the NBSCAB *A Model for Bomb Squad Standard Operating Procedures*, established protocol for military units, or established protocol of the AHJ.

OPS- IED - 4.1.4 Origin: NFPA 6.10.4.1 (4)

Assist in planning the air monitoring and sampling activities within the capabilities and competencies of available personnel, personal protective equipment, and control equipment; and in accordance with the AHJ, describe the air monitoring and sampling options available.

OPS- IED - 4.1.5 Origin: NFPA 6.10.4.1 (5)

Given the air monitoring and sampling equipment provided by the AHJ, shall complete the following:

(a) Select the detection or monitoring suitable for detecting or monitoring of the IED or improvised WMD dispersal device
(b) Describe the operation, capabilities, limitations, local monitoring procedures, field-testing, and maintenance procedures associated with each device provided by the AHJ
(c) Describe local procedures for decontamination of the detection and monitoring devices upon completion of the mission

OPS- IED - 4.2 Origin: NFPA 6.10.4.2

Given a simulated explosives laboratory incident, the operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall be able to perform the following tasks:

OPS- IED - 4.2.1 Origin: NFPA 6.10.4.2 (1)

Describe safe and effective methods for law enforcement to secure the scene.

OPS- IED - 4.2.2 Origin: NFPA 6.10.4.2 (2)

Demonstrate methods to identify and avoid unique safety hazards at improvised explosives laboratories such as booby traps, releases of hazardous materials, and initiating components.

OPS- IED - 4.2.3 Origin: NFPA 6.10.4.2 (3)

Using detection and monitoring devices provided by the AHJ, demonstrate the field test and operation of each device and interpret the readings based on local or agency procedures.

OPS- IED - 4.2.4 Origin: NFPA 6.10.4.2 (4)

Describe the methods that could be utilized to mitigate the hazards identified.

OPS- IED - 4.3 Origin: NFPA 6.10.4.3

The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall demonstrate the ability to wear an appropriate combination of chemical protective clothing, respiratory protection, and ballistic protection for the hazards identified in OPS-IED 1.1 (NFPA 6.10.2.1) and OPS-IED 1.2 (NFPA 6.10.2.2)Hazar.

OPS- IED - 4.4 Origin: NFPA 6.10.4.4

The operations level responder assigned to perform disablement/disruption of IEDs, improvised WMD dispersal devices, and operations at improvised explosives laboratories shall describe the local procedures for the technical decontamination process.

Hazardous Materials Incident Response Curriculum Guidelines

Hazardous Materials Technician

Introduction

Hazardous materials technicians shall be trained to meet all requirements of the first responder at the awareness and core operations level and to meet all requirements at the technician level of emergency hazardous materials response. Technicians must also be trained and certified on any Ops Mission Specific competencies that they plan on supervising during the incident if not part of core Technician training. 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

As defined in NFPA 472, hazardous materials technicians shall be that person who responds to hazardous materials/WMD incidents using a risk-based response process by which he or she analyzes a problem involving hazardous materials/WMD, selects applicable decontamination procedures, and controls a release using specialized protective clothing and control equipment.

Training 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 risk-based response assessments, firefighting, rescue, containment and confinement operations; 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 hazard analysis may suggest modifications. Emphasis should be placed on the most prevalent types of chemicals and incidents, based on a community risk assessment process.

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 Recommendations

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 (OSHA Hazardous Materials Technician) to 240 hours. There should be a strong emphasis on the application and use risk-based response processes, incident decision-making, and hands-on practice and skills. Content instruction should be synthesized in student activities requiring risk-based 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, (3) critique of incident scene decision making using simulated emergencies, and (4) assessment of retained cognitive knowledge with written examinations.

Summary of Training Requirements

Hazardous Materials Technician

Audience

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.

Prerequisites

Awareness, Core Operations, and Mission-Specific training.

Training

40-240 hours in classroom and simulator/field instruction, with an emphasis on hands-on training. Competencies:

- Knowledge of role of technician within incident command system and responsibilities within the employer's emergency response plan.
- Knowledge of hazardous materials terminology and 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 implement decontamination procedures.
- Knowledge of termination procedures.

Refresher

Annual refresher training recommended to include competency retesting of all response skills, technical information updates including new response protocols and recent lessons learned, and incident scene decision-making using simulated emergencies.

Federal Training Requirements

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 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 areas 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 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.

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.

Recommended Training Objectives

The following training objectives are recommended for hazardous materials technician training. The primary source for this material is NFPA 472 (2013 edition), Chapter 7: 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.

To assist in assessing course compliance with OSHA 1910.120(q), the relationships between these objectives and the OSHA requirements are noted. References to OSHA 29 CFR 1910.120(q)(6)(iii)(A to I) are abbreviated as OSHA TECH-A to I.

Objective Identification Legend

TECH - 1.1	**Origin: NFPA 7.2.1**	*Supports OSHA TECH - B,E*
This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	This indicates which OSHA requirement this objective supports.

TECH 1 - Analyzing the Incident

TECH - 1.1 Origin: NFPA 7.2.1 *Supports OSHA TECH - B,E*

Surveying the Hazardous Materials/WMD Incidents

Given examples of hazardous materials/WMD incidents, the hazardous materials technician shall identify containers involved and, given the necessary equipment, identify or classify unknown materials involved, verify the identity of the hazardous materials/WMD involved, determine the concentration of hazardous materials, and shall meet the requirements of TECH-1.1.1 (NFPA 7.2.1.1) through TECH 1.1.5 (NFPA 7.2.1.5).

TECH - 1.1.1 Origin: NFPA 7.2.1.1 *Supports OSHA TECH – B,E*

Given examples of various containers for hazardous materials/WMD, the hazardous materials technician shall identify each container by name and specification and identify the typical contents by name and hazard class.

TECH - 1.1.1.1 Origin: NFPA 7.2.1.1.1 *Supports OSHA TECH – B,E*

Given examples of the following railroad cars, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:

1) Cryogenic liquid tank cars
2) Nonpressure tank cars

3) Pneumatically unloaded hopper cars
4) Pressure tank cars

TECH - 1.1.1.2 Origin: NFPA 7.2.1.1.2 *Supports OSHA TECH – B,E*

Given examples of the following intermodal tanks, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:

1) Nonpressure intermodal tanks, as follows:
    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, as follows:
    a. Cryogenic intermodal tanks (DOT Specification 51; IMO Type 7 internationally)
    b. Tube modules

TECH - 1.1.1.3 Origin: NFPA 7.2.1.1.3 *Supports OSHA TECH – B,E*

Given examples of the following cargo tanks, the hazardous materials technician shall identify the container by name and specification and identify the typical contents by name and hazard class:

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

TECH - 1.1.1.4 Origin: NFPA 7.2.1.1.4 *Supports OSHA TECH – B,E*

Given examples of the following facility storage tanks, the hazardous materials technician shall identify the container by name and identify the typical contents by name and hazard class:

1) Nonpressure tank
2) Pressure tank
3) Cryogenic liquid tank

TECH - 1.1.1.5 Origin: NFPA 7.2.1.1.5 *Supports OSHA TECH – B,E*

Given examples of the following nonbulk packaging, the hazardous materials technician shall identify the package by name and identify the typical contents by name and hazard class:

1) Bags

2) Carboys
3) Cylinders
4) Drums

TECH - 1.1.1.6 Origin: NFPA 7.2.1.1.6 *Supports OSHA TECH – B,E*

Given examples of the following nonbulk packaging, the hazardous materials technician shall identify the package by name and identify the typical contents by name and hazard class:

1) Bags
2) Carboys
3) Cylinders
4) Drums

TECH - 1.1.1.7 Origin: NFPA 7.2.1.1.7 *Supports OSHA TECH – B,E*

Given examples of the following packaging, the hazardous materials technician shall identify the container/package by name and identify the typical contents by name and hazard class:

1) Intermediate bulk container (IBC)
2) Ton container

TECH - 1.1.2 Origin: NFPA 7.2.1.2 *Supports OSHA TECH – B,E*

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

TECH - 1.1.2.1 Origin: NFPA 7.2.1.2.1 *Supports OSHA TECH – B,E*

Using the markings on the container and other available resources, the hazardous materials technician shall identify the capacity (by weight and/or volume) of the following containers:

1) Cargo tanks
2) Tank cars
3) Tank containers

TECH - 1.1.2.2 Origin: NFPA 7.2.1.2.2 *Supports OSHA TECH – B,E*

Using the markings on the container and other available resources, the hazardous materials technician shall identify the capacity (by weight and/or volume) of each of the following facility containers:

1) Nonpressure tank (general service or low pressure tank)
2) Pressure tank
3) Cryogenic liquid tank

TECH - 1.1.3 Origin: NFPA 7.2.1.3 *Supports OSHA TECH – B,E*

Given at least three unknown hazardous materials/WMD, one of which is a solid, one a liquid, and one a gas, the hazardous materials technician shall identify or classify by hazard each unknown material.

TECH - 1.1.3.1	Origin: NFPA 7.2.1.3.1	*Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the steps in an analysis process for identifying unknown solid and liquid materials.

TECH - 1.1.3.2	Origin: NFPA 7.2.1.3.2	*Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the steps in an analysis process for identifying an unknown atmosphere.

TECH - 1.1.3.3	Origin: NFPA 7.2.1.3.3	*Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the type(s) of monitoring technology used to determine the following hazards:

1) Corrosivity
2) Flammability
3) Oxidation potential
4) Oxygen deficiency
5) Radioactivity
6) Toxicity
7) Pathogenicity

TECH - 1.1.3.4	Origin: NFPA 7.2.1.3.4	*Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the capabilities and limiting factors associated with the selection and use of the following monitoring equipment, test strips, and reagents:

1) Biological immunoassay indicators
2) Chemical agent monitors (CAM)
3) Colorimetric indicators [colorimetric detector tubes, indicating paper (pH paper and meters), reagents, test strips]
4) Combustible gas indicators
5) DNA fluoroscopy
6) Electrochemical cells (carbon monoxide meter, oxygen meter)
7) Flame ionization detector
8) Gas chromatograph/mass spectrometer (GC/MS)
9) Infrared spectroscopy
10) Ion mobility spectroscopy
11) Gamma Spectrometer (radioisotope identification device – RID)
12) Metal oxide sensor
13) Photoionization detectors
14) Polymerase chain reaction (PCR)

15) Radiation detection and measurement instruments
16) Raman spectroscopy
17) Surface acoustical wave (SAW)
18) Wet chemistry

TECH - 1.1.3.5	Origin: NFPA 7.2.1.3.5	*Supports OSHA TECH – B,E*

Given three hazardous materials/WMD, one of which is a solid, one a liquid, and one a gas, and the following monitoring equipment, test strips, and reagents, the hazardous materials technician shall select the equipment and demonstrate the correct techniques to identify the hazards (corrosivity, flammability, oxidation potential, oxygen deficiency, radioactivity, toxicity, and pathogenicity) using the following equipment:

1) Carbon monoxide meter
2) Colorimetric tubes
3) Combustible gas indicator
4) Oxygen meter
5) Passive dosimeters
6) pH indicators and/or pH meters
7) Photoionization and/or flame ionization detectors
8) Radiation detection instruments
9) Reagents
10) Test Strips
11) WMD detectors (chemical and biological)
12) Other equipment provided by the AHJ

TECH - 1.1.3.6	Origin: NFPA 7.2.1.3.6	*Supports OSHA TECH – B,E*

Given monitoring equipment, test strips, and reagents provided by the AHJ, the hazardous materials technician shall demonstrate the field maintenance and testing procedures for these items.

TECH - 1.1.4	Origin: NFPA 7.2.1.4	*Supports OSHA TECH – B,E*

Given a label for a radioactive material, the hazardous materials technician shall identify the type or category of label, contents, activity, transport index, and criticality safety index as applicable, then describe the radiation dose rates associated with each label.

TECH - 1.1.5	Origin: NFPA 7.2.1.5	*Supports OSHA TECH – B,E*

The hazardous materials technician shall demonstrate a method for collecting samples of the following:

1) Gas
2) Liquid
3) Solid

TECH - 1.2 Origin: NFPA 7.2.2 *Supports OSHA TECH - B,E*

Collecting and Interpreting Hazard and Response Information

Given access to printed resources, technical resources, computer databases, and monitoring equipment, the hazardous materials technician shall collect and interpret hazard and response information not available from the current edition of the Emergency Response Guidebook or a (SDS), and shall meet the requirements of TECH- 1.2.1 (NFPA 7.2.2.1) through TECH- 1.2.6 (NFPA 7.2.2.6).

TECH - 1.2.1 Origin: NFPA 7.2.2.1 *Supports OSHA TECH – B,E*

The hazardous materials technician shall 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 databases
2) Monitoring equipment
3) Reference manuals
4) Technical information centers (i.e., CHEMTREC/CANUTEC/SETIQ)
5) Technical information specialists

TECH - 1.2.2 Origin: NFPA 7.2.2.2 *Supports OSHA TECH – B,E*

The hazardous materials technician shall describe terms related to chemistry and toxicity terms and explain their significance in the risk assessment process.

TECH - 1.2.3 Origin: NFPA 7.2.2.3 *Supports OSHA TECH – B,E*

The hazardous materials technician shall describe the heat transfer processes that occur as a result of a cryogenic liquid spill.

TECH - 1.2.4 Origin: NFPA 7.2.2.4 *Supports OSHA TECH – B,E*

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

TECH - 1.2.5 Origin: NFPA 7.2.2.5 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify two methods for determining the pressure in bulk packaging or facility containers.

TECH - 1.2.6 Origin: NFPA 7.2.2.6 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify one method for determining the amount of lading remaining in damaged bulk packaging or facility containers.

TECH - 1.3 Origin: NFPA 7.2.3 *Supports OSHA TECH - B,E*

Describing the Condition of the Container Involved in the Incident

Given examples of container damage, the hazardous materials technician shall describe the damage and shall meet the related requirements of TECH 1.3.1 (NFPA 7.2.3.1) through TECH 1.3.5 (NFPA 7.2.3.5).

TECH - 1.3.1 Origin: NFPA 7.2.3.1 *Supports OSHA TECH – B,E*

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

TECH - 1.3.1.1 Origin: NFPA 7.2.3.1.1 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the basic design and construction features, including closures, of the following bulk containers:

1) Cargo tanks:
    a. Compressed gas tube trailers
    b. Corrosive liquid tanks
    c. Cryogenic liquid tanks
    d. Dry bulk cargo tanks
    e. High-pressure chemical tanks
    f. Low-pressure chemical tanks
    g. Nonpressure liquid tanks
2) Fixed facility tanks:
    a. Cryogenic liquid tank
    b. Nonpressure tank
    c. Pressure tank
3) Intermodal bulk containers (also known as tote tanks):
4) Intermodal tanks
    a. Nonpressure intermodal tanks:
        i. IM- 101 portable tank (IMO Type 1 Internationally)
        ii. IM-102 portable tank (Imo Type 2 Internationally)
    b. Pressure intermodal tanks (DOT Specification 51; IMO Type 5 Internationally)
    c. Specialized intermodal tanks:
        i. Cryogenic intermodal tanks (DOT Specification 51; IMO Type 7 Internationally)
        ii. Tube modules
5) One-ton containers (pressure drums)
6) Pipelines
7) Railroad cars:
    a. Cryogenic liquid tank cars
    b. Nonpressure tank cars

c. Pneumatically unloaded hopper cars
d. Pressure tank cars

TECH - 1.3.1.2 Origin: NFPA 7.2.3.1.2 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the basic design and construction features including closures of the following nonbulk containers:

1) Bags
2) Carboys
3) Drums
4) Cylinders

TECH - 1.3.1.3 Origin: NFPA 7.2.3.1.3 *Supports OSHA TECH – B,E*

Identify the basic design and construction features of the following radioactive materials containers:

1) Expected
2) Industrial
3) Type A
4) Type B
5) Type C

TECH - 1.3.2 Origin: NFPA 7.2.3.2 *Supports OSHA TECH – B,E*

The hazardous materials technician shall describe how a liquid pipeline can carry different products.

TECH - 1.3.3 Origin: NFPA 7.2.3.3 *Supports OSHA TECH – B,E*

Given an example of a pipeline, the hazardous materials technician shall identify the following:

1) Ownership of the line
2) Procedures for checking for gas migration
3) Procedure for shutting down the line or controlling the leak
4) Type of product in the line

TECH - 1.3.4 Origin: NFPA 7.2.3.4 *Supports OSHA TECH – B,E*

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

TECH - 1.3.5 Origin: NFPA 7.2.3.5 *Supports OSHA TECH – B,E*

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

TECH - 1.4 Origin: NFPA 7.2.4 *Supports OSHA TECH - B,E*

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

Given examples of hazardous materials/WMD incidents involving multiple hazardous materials or WMD, the hazardous materials technician shall predict the likely behavior of the material in each case and meet the requirements of TECH 1.4.1 (NFPA 7.2.4.1) through TECH 1.4.3 (NFPA 7.2.4.3).

TECH - 1.4.1 Origin: NFPA 7.2.4.1 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify at least three resources available that indicate the effects of mixing various hazardous materials.

TECH - 1.4.2 Origin: NFPA 7.2.4.2 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the impact of the following fire and safety features on the behavior of the products during an incident at a bulk storage facility and explain their significance in the risk assessment process:

1) Fire protection systems
2) Monitoring and detection systems
3) Pressure relief and vacuum relief protection
4) Product spillage and control (impoundment and diking)
5) Tank spacing
6) Transfer operations

TECH - 1.4.3 Origin: NFPA 7.2.4.3 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify the impact of the following fire and safety features on the behavior of the products during an incident at a bulk gas facility and explain their significance in the analysis process:

1) Fire protection systems
2) Monitoring and detection systems
3) Pressure relief protection
4) Transfer operations

TECH - 1.5 Origin: NFPA 7.2.5 *Supports OSHA TECH - B,E*

Estimating the Likely Size of an Endangered Area

Given examples of hazardous materials/WMD, the hazardous materials technician shall 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 shall meet the requirements of TECH 1.5.1 (NFPA 7.2.5.1) through TECH 1.5.4 (NFPA 7.2.5.4).

TECH - 1.5.1 Origin: NFPA 7.2.5.1 *Supports OSHA TECH – B,E*

Given the emergency response plan, the hazardous materials technician shall identify local resources for dispersion pattern prediction and modeling including computers, monitoring equipment, or specialists in the field.

TECH - 1.5.2 Origin: NFPA 7.2.5.2 *Supports OSHA TECH – B,E*

Given the quantity, concentration, and release rate of a material, the hazardous materials technician shall identify the steps for determining the likely extent of the physical, safety, and health hazards within the endangered area of a hazardous materials/WMD incident.

TECH - 1.5.2.1 Origin: NFPA 7.2.5.2.1 *Supports OSHA TECH – B,E*

The hazardous materials technician shall describe the following terms and exposure values and explain their significance in the analysis process:

1) Counts per minute (cpm) and kilocounts per minute (kcpm)
2) Immediate dangerous to life and health (IDLH) value
3) Infectious dose
4) Incubation period
5) Lethal concentrations (LC50)
6) Lethal dose (LC50)
7) Parts per billion (ppb)
8) Parts per million (ppm)
9) Permissible exposure limit (PEL)
10) Radiation absorbed dose (rad)
11) Roentgen equivalent Man (Rem); Millirem (mrem), micromem (µrem)
12) Threshold limit value time-weighted average (TLV-TWA)
13) Threshold limit value short-term exposure limit (TLV-STEL)
14) Threshold limit value ceiling (TLV-C)

TECH - 1.5.2.2 Origin: NFPA 7.2.5.2.2 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify two methods for predicting the areas of potential harm within the endangered area of a hazardous materials incident.

TECH - 1.5.3 Origin: NFPA 7.2.5.3 *Supports OSHA TECH – B,E*

The hazardous materials technician shall identify a method for estimating the outcomes within an endangered area of a hazardous materials/WMD incident.

TECH 2 – Planning the Response

TECH - 2.1 Origin: NFPA 7.3.1 & 7.3.1.1 *Supports OSHA TECH - F*

Identifying Response Objectives

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall describe the response objectives for each problem.

TECH - 2.1.1 Origin: NFPA 7.3.1.2 *Supports OSHA TECH – F*

Given an analysis of a hazardous materials/WMD incident, the hazardous materials technician shall be able to describe the steps for determining response options (defensive, offensive, nonintervention).

TECH - 2.2 Origin: NFPA 7.3.3 *Supports OSHA TECH - F*

Selecting Personal Protective Equipment

Given scenarios of hazardous materials/WMD incidents with known and unknown hazardous materials/WMD, the hazardous materials technician shall determine the personal protective equipment for the response options specified in the incident action plan in each situation and shall meet the requirements of 7.3.3.1 through 7.3.3.4.73.

TECH - 2.2.1 Origin: NFPA 7.3.2.2 *Supports OSHA TECH – F*

Given three examples each of liquid, gas, and solid hazardous materials or WMD, including various hazard classes, operations level personnel shall identify the general shapes of containers in which the hazardous materials/WMD are typically found.

TECH - 2.3 Origin: NFPA 7.3.3 *Supports OSHA TECH - D*

Selecting Personal Protective Equipment

Given scenarios of hazardous materials/WMD incidents with known and unknown hazardous materials/WMD, the hazardous materials technician shall determine the personal protective equipment for the response options specified in the incident action plan in each situation and shall meet the requirements of TECH 2.3.1 (NFPA 7.3.3.1) through TECH 2.3.4 (NFPA 7.3.3.4).

TECH - 2.3.1 Origin: NFPA 7.3.3.1 *Supports OSHA TECH – D*

The hazardous materials technician shall identify and describe the types of personal protective equipment that are available for the response based on NFPA standards and how these items related to Environmental Protection Agency (EPA) levels of protection.

TECH - 2.3.2 Origin: NFPA 7.3.3.2 *Supports OSHA TECH – D*

The hazardous materials technician shall identify and describe personal protective equipment options available for the following hazards:

1) Thermal
2) Radiological
3) Asphyxiating
4) Chemical (liquids and vapors)
5) Etiological (biological)
6) Mechanical (explosives)

TECH - 2.3.3 Origin: NFPA 7.3.3.3 *Supports OSHA TECH – D*

The hazardous materials technician shall identify the process to be considered in selecting respiratory protection for a specified action option.

TECH - 2.3.4 Origin: NFPA 7.3.3.4 *Supports OSHA TECH – D*

The hazardous materials technician shall identify the factors to be considered in selecting the proper chemical-protective clothing for a specified action option.

TECH - 2.3.4.1 Origin: NFPA 7.3.3.4.1 *Supports OSHA TECH – D*

The hazardous materials technician shall describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:

1) Degradation
2) Penetration
3) Permeation

TECH - 2.3.4.2 Origin: NFPA 7.3.3.4.2 *Supports OSHA TECH – D*

The hazardous materials technician shall identify the process to be considered in selecting respiratory protection for a specified action option.

TECH - 2.3.4.3 Origin: NFPA 7.3.3.4.3 *Supports OSHA TECH – D*

The hazardous materials technician shall identify the different designs of vapor-protective and splash-protective clothing and describe the advantages and disadvantages of each type.

TECH - 2.3.4.4 Origin: NFPA 7.3.3.4.4 *Supports OSHA TECH – D*

The hazardous materials technician shall identify the relative advantages and disadvantages of the following heat exchange units used for the cooling of personnel in chemical-protective clothing:

1) Air cooled
2) Ice cooled
3) Water cooled
4) Phase change cooling technology

TECH - 2.3.4.5	Origin: NFPA 7.3.3.4.5	*Supports OSHA TECH – D*

The hazardous materials technician shall identify the process for selecting protective clothing at hazardous materials/WMD incidents.

TECH - 2.3.4.6	Origin: NFPA 7.3.3.4.6	*Supports OSHA TECH – D*

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

TECH - 2.3.4.7	Origin: NFPA 7.3.3.4.7	*Supports OSHA TECH – D*

The hazardous materials technician shall identify the physical and psychological stresses that can affect users of specialized protective clothing.

TECH - 2.3.4.8	Origin: NFPA 7.3.3.4.8	*Supports OSHA TECH – D*

The hazardous materials technician shall identify the process for inspecting, testing and maintenance of PPE provided by the AHJ.

TECH - 2.4	Origin: NFPA 7.3.4	*Supports OSHA TECH – A,G*

Selecting Decontamination Procedures

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall select a decontamination procedure that will minimize the hazard, determine the equipment required to implement that procedure, and shall complete the following tasks:

1) Describe the advantages and limitations of each of the following decontamination methods:
   a. Absorption
   b. Adsorption
   c. Chemical degradation
   d. Dilution
   e. Disinfecting
   f. Evaporation
   g. Isolation and disposal
   h. Neutralization
   i. Sterilization
   j. Solidification
   k. Vacuuming
   l. Washing
2) Identify three sources of information for determining the applicable decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident.

TECH - 2.5 Origin: NFPA 7.3.5 *Supports OSHA TECH – F*

Developing a Plan of Action

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall develop a plan of action including site safety and control plan that is consistent with the emergency response plan and standard operating procedures and within the capability of available personnel, personal protective equipment, and control equipment for that incident, and shall meet the requirements of TECH 2.5.1 (NFPA 7.3.5.1) through TECH 2.5.2 (NFPA 7.3.5.5):

TECH - 2.5.1 Origin: NFPA 7.3.5.1 *Supports OSHA TECH – F*

The hazardous materials technician shall describe the purpose of, procedures for, equipment required, and safety precautions used with the following techniques for hazardous materials/WMD control:

1) Absorption
2) Adsorption
3) Blanketing
4) Covering
5) Damming
6) Diking
7) Dilution
8) Diversion
9) Dispersion
10) Fire suppression
11) Neutralization
12) Overpacking
13) Patching
14) Plugging
15) Pressure isolation and reduction (flaring; venting; vent and burn; isolation of valves, pumps, or energy sources)
16) Retention
17) Solidification
18) Transfer
19) Vapor control: dispersion, suppression

TECH - 2.5.2 Origin: NFPA 7.3.5.2 *Supports OSHA TECH – F*

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall develop the site safety and control plan that must be included as part of the Incident Action Plan:

TECH - 2.5.2.1	Origin: NFPA 7.3.5.2.1	*Supports OSHA TECH – F*

The hazardous materials technician shall list and describe the safety considerations to be included.

TECH - 2.5.2.2	Origin: NFPA 7.3.5.2.2	*Supports OSHA TECH – F*

The hazardous materials technician shall identify the points that should be made in a safety briefing prior to working at the scene.

TECH - 2.5.3	Origin: NFPA 7.3.5.3	*Supports OSHA TECH – F*

The hazardous materials technician shall identify the atmospheric and physical safety hazards associated with hazardous materials/WMD incidents involving confined spaces.

TECH - 2.5.4	Origin: NFPA 7.3.5.4	*Supports OSHA TECH – F*

The hazardous materials technician shall identify the pre-entry activities to be performed.

TECH - 2.5.5	Origin: NFPA 7.3.5.5	*Supports OSHA TECH – F*

The hazardous materials technician shall identify the procedures, equipment, and safety precautions for preserving and collecting legal evidence at hazardous materials/WMD incidents.

TECH 3 – Implementing the Planned Response

TECH - 3.1	Origin: NFPA 7.4.1	*Supports OSHA TECH – C,H*

Performing Incident Management Duties

Given the emergency response plan and/or standard operating procedures and a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall demonstrate the duties of an assigned function in the hazardous materials branch/group within the incident command system and shall identify the role of the hazardous materials technician during hazardous materials/WMD incidents.

TECH - 3.1.1	Origin: NFPA 7.4.1.1	*Supports OSHA TECH – C,H*

Describe the duties of an assigned function in the hazardous materials branch or group within the incident command system.

TECH - 3.1.2	Origin: NFPA 7.4.1.2	*Supports OSHA TECH – C,H*

Identify the role of the hazardous materials technician during hazardous materials/WMD incidents.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders: Core Competencies; Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

TECH - 3.2 Origin: NFPA 7.4.2 *Supports OSHA TECH – D*

Using Protective Clothing and Respiratory Protection

The hazardous materials technician shall demonstrate the ability to don, work in, and doff liquid splash, vapor-protective, and chemical-protective clothing and any other specialized personal protective equipment provided by the AHJ, including respiratory protection, and shall complete the following tasks:

TECH - 3.2.1 Origin: NFPA 7.4.2(1) *Supports OSHA TECH – D*

Describe three safety procedures for personnel working in chemical protective clothing.

TECH - 3.2.2 Origin: NFPA 7.4.2(2) *Supports OSHA TECH – D*

Describe three emergency procedures for personnel working in chemical protective-clothing.

TECH - 3.2.3 Origin: NFPA 7.4.2(3) *Supports OSHA TECH – D*

Demonstrate the ability to don, work in, and doff self-contained breathing apparatus in addition to any other respiratory protection provided by the AHJ.

TECH - 3.2.4 Origin: NFPA 7.4.2(3) *Supports OSHA TECH – D*

Demonstrate the ability to don, work in, and doff liquid splash-protective, vapor-protective, and chemical-protective clothing in addition to any other specialized protective equipment provided by the AHJ.

TECH - 3.3 Origin: NFPA 7.4.3 *Supports OSHA TECH – F*

Performing Control Functions Identified in Plan of Action

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials technician shall select the tools, equipment, and materials for the control of hazardous materials/WMD incidents and identify the precautions for controlling releases from those packaging/containers and shall complete the following tasks:

TECH - 3.3.1 Origin: NFPA 7.4.3 (1) *Supports OSHA TECH – F*

Given a pressure vessel, select the material or equipment and demonstrate a method(s) to contain leaks from the following locations:

1) Fusible plug
2) Fusible plug threads
3) Side wall of cylinder
4) Valve blowout
5) Valve gland
6) Valve inlet threads
7) Valve seat
8) Valve stem assembly blowout

TECH - 3.3.2 Origin: NFPA 7.4.3 (2) *Supports OSHA TECH – F*

Given the fittings on a pressure container, demonstrate the ability to perform the following:

1) Close valves that are open
2) Replace missing plugs
3) Tighten loose plugs

TECH - 3.3.3 Origin: NFPA 7.4.3 (3) *Supports OSHA TECH – F*

Given a 208 L (55 gal) drum and applicable tools and materials, demonstrate the ability to contain the following types of leaks using the following:

1) Bung leak
2) Chime leak
3) Forklift puncture
4) Nail puncture

TECH - 3.3.4 Origin: NFPA 7.4.3 (4) *Supports OSHA TECH – F*

Given a 208 L (55 gal) drum and an overpack drum, demonstrate the ability to place the 208 L drum into the overpack drum using the following methods:

1) Rolling slide-in
2) Slide-in
3) Slip-over

TECH - 3.3.5 Origin: NFPA 7.4.3 (5) *Supports OSHA TECH – F*

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

TECH - 3.3.6 Origin: NFPA 7.4.3 (6) *Supports OSHA TECH – F*

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

TECH - 3.3.7 Origin: NFPA 7.4.3 (7) *Supports OSHA TECH – F*

Identify three safety considerations for product transfer operations.

TECH - 3.3.8 Origin: NFPA 7.4.3 (8) *Supports OSHA TECH – F*

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

TECH - 3.3.9 Origin: NFPA 7.4.3 (9) *Supports OSHA TECH – F*

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

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

TECH - 3.3.10 Origin: NFPA 7.4.3 (10) *Supports OSHA TECH – F*

Describe at least one method for containing each of the following types of leaks in MC-306/DOT-406, MC-307/DOT-407, and MC-312/DOT- 412 cargo tanks:

1) Dome cover leak
2) Irregular-shaped hole
3) Puncture
4) Split or tear

TECH - 3.3.11 Origin: NFPA 7.4.3 (11) *Supports OSHA TECH – F*

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

TECH - 3.4 Origin: NFPA 7.4.4 *Supports OSHA TECH – A,E,F*

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

TECH - 3.4 Origin: NFPA 7.4.5 *Supports OSHA TECH – A,E,F*

Performing Decontamination Operations Identified in Incident Action Plan

The hazardous materials technician shall demonstrate the ability to set up and implement the following types of decontamination operations:

1) Technical decontamination operations in support of entry operations
2) Technical decontamination operations involving ambulatory and nonabulatory victims
3) Mass decontamination operations involving ambulatory and nonambulatory victims

TECH 4 – Evaluating Progress

TECH - 4.1 Origin: NFPA 7.5.1 *Supports OSHA TECH – A,E,F*

Evaluating the Effectiveness of the Control Functions

Given scenarios involving hazardous materials/WMD incidents and the incident action plan, the hazardous materials technician shall evaluate the effectiveness of any control functions identified in the incident action plan.

TECH - 4.2 Origin: NFPA 7.5.2 *Supports OSHA TECH – A,E,F*

Evaluating the Effectiveness of the Decontamination Process

Given an incident action plan for a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall evaluate the effectiveness of any decontamination procedures identified in the incident action plan.

TECH 5 – Terminating the Incident

TECH - 5.1 Origin: NFPA 7.6.1 *Supports OSHA TECH –H*

Assisting in the Debriefing

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall participate in the debriefing of the incident and shall meet the following requirements:

TECH - 5.1.1 Origin: NFPA 7.6.1 (1) *Supports OSHA TECH – H*

Describe three components of an effective debriefing.

TECH - 5.1.2 Origin: NFPA 7.6.1 (2) *Supports OSHA TECH – H*

Describe the key topics of an effective debriefing.

TECH - 5.1.3 Origin: NFPA 7.6.1 (3) *Supports OSHA TECH – H*

Describe when a debriefing should take place.

TECH - 5.1.4 Origin: NFPA 7.6.1 (4) *Supports OSHA TECH – H*

Describe who should be involved in a debriefing.

TECH - 5.2 Origin: NFPA 7.6.2 *Supports OSHA TECH –H*

Assisting in the Incident Critique

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall provide the operational observations of the activities that were performed in the hot and warm zones during the incident and shall complete the following tasks:

TECH - 5.2.1 Origin: NFPA 7.6.2 (1) *Supports OSHA TECH – H*

Describe three components of an effective critique.

TECH - 5.2.2 Origin: NFPA 7.6.2 (2) *Supports OSHA TECH – H*

Describe who should be involved in a critique.

TECH - 5.2.3 Origin: NFPA 7.6.2 (3) *Supports OSHA TECH – H*

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

TECH - 5.2.4 Origin: NFPA 7.6.2 (4) *Supports OSHA TECH – H*

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

TECH - 5.3	Origin: NFPA 7.6.3	*Supports OSHA TECH –A,H*

Reporting and Documenting the Incident

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials technician shall complete the reporting and documentation requirements consistent with the emergency response plan and/or standard operating procedures and shall meet the following requirements:

TECH - 5.3.1	Origin: NFPA 7.6.3 (1)	*Supports OSHA TECH – A,H*

Identify the reports and supporting documentation required by the emergency response plan and/or standard operating procedures.

TECH - 5.3.2	Origin: NFPA 7.6.3 (2)	*Supports OSHA TECH – A,H*

Demonstrate completion of the reports required by the emergency response plan and/or standard operating procedures.

TECH - 5.3.3	Origin: NFPA 7.6.3 (3)	*Supports OSHA TECH – A,H*

Describe the importance of personnel exposure records.

TECH - 5.3.4	Origin: NFPA 7.6.3 (4)	*Supports OSHA TECH – A,H*

Describe the importance of debriefing records.

TECH - 5.3.5	Origin: NFPA 7.6.3 (5)	*Supports OSHA TECH – A,H*

Describe the importance of critique records.

TECH - 5.3.6	Origin: NFPA 7.6.3 (6)	*Supports OSHA TECH – A,H*

Identify the steps in keeping an activity log and exposure records.

TECH - 5.3.7	Origin: NFPA 7.6.3 (7)	*Supports OSHA TECH – A,H*

Identify the steps to be taken in compiling incident reports that meet federal, state, local, and organizational requirements.

TECH - 5.3.8	Origin: NFPA 7.6.3 (8)	*Supports OSHA TECH – A,H*

Identify the requirements for compiling hot zone entry and exit logs.

TECH - 5.3.9	Origin: NFPA 7.6.3 (9)	*Supports OSHA TECH – A,H*

Identify the requirements for compiling personal protective equipment logs.

TECH - 5.3.10	Origin: NFPA 7.6.3 (10)	*Supports OSHA TECH – A,H*

Identify the requirements for filing documents and maintaining records.

Hazardous Materials Incident Response Curriculum Guidelines

Hazardous Materials Technician with a Specialty Area Competency

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Specialty
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Introduction

Hazardous Materials Specialists are defined in OSHA 29 CFR 1910.120 (q)(6)(iv), but have not been used within NFPA 472 since the initial 1989 edition. Based upon tasks analyses, NFPA uses the concept of a Hazardous Materials Technicians with an additional specialty in either a specific container or hazard class. This chapter focuses upon the NFPA 472 application of specialty areas.

As recommended in NFPA 472 (2013 edition), hazardous materials technicians with specialty areas shall be trained to meet all competencies at the awareness level, all core competencies at the operations level, all competencies at the technician level, and all competencies defined below for the specialty area. There are seven different specialty areas defined in NFPA 472 (2013 edition):

- Tank Car Specialty
- Cargo Tank Specialty
- Intermodal Tank Specialty
- Marine Tank Vessel Specialty
- Flammable Liquids Bulk Storage Specialty
- Flammable Gases Bulk Storage Specialty
- Radioactive Material Specialty

Under OSHA, 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 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. 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.

Methodology Recommendations

Training for hazardous materials technicians with specialty areas 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 the application of risk-based response processes and the analysis of incident information to determine the plan 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. 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 Training Requirements

OSHA 1910.120(q) does not address the competencies for technicians with an area of specialty, but the OSHA requirements for hazardous materials specialists have some similarity and establish 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 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:

- *(J) Know how to implement the local emergency response plan*
- *(K) Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment*
- *(L) Know the state emergency response plan*
- *(M) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist*
- *(N) Understand in-depth hazard and risk assessment techniques*
- *(O) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available*
- *(P) Be able to determine and implement decontamination procedures.*
- *(Q) Have the ability to develop a site safety and control plan*
- *(R) Understand chemical, radiological and toxicological terminology and behavior*

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.

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.

Recommended Training Objectives

The following training objectives are recommended for Hazardous Materials Technicians with a Specialty Area training. The sources for this material are NFPA 472 (2013 edition):

1) NFPA 472, Chapter 12: Competencies for the Technician with a Tank Car Specialty;
2) NFPA 472, Chapter 13: Competencies for the Technician with a Cargo Tank Specialty;
3) NFPA 472, Chapter 14: Competencies for the Technician with an Intermodal Tank Specialty.
4) NFPA 472, Chapter 15: Competencies for the Technician with a Marine Tank Vessel Specialty
5) NFPA 472, Chapter 16: Competencies for the Technician with a Flammable Liquids Bulk Storage Specialty.
6) NFPA 472 Chapter 17: Competencies for the Technician with a Flammable Gases Bulk Storage Specialty
7) NFPA 472 Chapter 18: Competencies for the Technician with a Radioactive Material Specialty

Recommended objectives for each of the specialty areas begin at the following pages:

Page 113	**Technician with a Tank Car Specialty**
Page 122	**Technician with a Cargo Tank Specialty**
Page 128	**Technician with an Intermodal Tank Specialty**
Page 134	**Technician with a Marine Tank Vessel Specialty**
Page 142	**Technician with a Flammable Liquids Bulk Storage Specialty**
Page 148	**Technician with a Flammable Gases Bulk Storage Specialty**
Page 153	**Technician with a Radioactive Material Specialty**

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

TANK - 1.1 **Origin: NFPA 12.1.3.2(1)** ***Supports OSHA HMSPEC- E***

This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	This indicates which OSHA requirement this objective supports.

Hazardous Materials Technician with a Tank Car Specialty

Technicians with a Tank Car Specialty are those persons who provide technical support pertaining to railroad tank cars, 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 12, “Competencies for Hazardous Materials Technicians with a Tank Car Specialty” 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 8, “Competencies for Hazardous Materials Technicians”, 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.

The hazardous materials technician with a tank car specialty shall be trained to meet all competencies for the awareness, operations, and technician levels and the competencies listed in this section. They shall also receive training to meet governmental occupational health and safety regulations.

(Reference: NFPA 472 (2013 edition), Chapter 12, “Competencies for Hazardous Materials Technicians with a Tank Car Specialty”, Section 12.1.1.1)

TANK 1 – Analyzing the Incident

TANK - 1.1 Origin: NFPA 12.2.1 *Supports OSHA HMSPEC-B,E*

Determining the Type and Extent of Damage to Tank Cars

Given examples of damaged tank cars, technicians with a tank car specialty shall describe the type and extent of damage to each tank car and its fittings and shall complete the following tasks:

TANK - 1.1.1 Origin: NFPA 12.2.1(1) *Supports OSHA HMSPEC-B,E*

Given the specification mark for a tank car and the reference materials, describe the car’s basic construction and features.

TANK - 1.1.2 Origin: NFPA 12.2.1(2) *Supports OSHA HMSPEC-B,E*

Point out the “B” end of the car.

TANK - 1.1.3 Origin: NFPA 12.2.1(3) *Supports OSHA HMSPEC-B,E*

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Given examples of various tank cars, point out and explain the design and purpose of each of the following tank car components, when present:

1) Body bolster
2) Head shield
3) Heater coils – interior vs. exterior
4) Jacket
5) Lining/cladding
6) Shelf couplers
7) Tank, including shell, and head
8) Trucks (pin and bowl)
9) Underframe – continuous vs. stub sill

TANK - 1.1.4 Origin: NFPA 12.2.1(4) *Supports OSHA HMSPEC-B,E*

Given examples of tank cars (some jacketed; some not jacketed), point out the jacketed tank cars.

TANK - 1.1.5 Origin: NFPA 12.2.1(5) *Supports OSHA HMSPEC-B,E*

Describe the difference between “insulation” and “thermal protection” on tank cars.

TANK - 1.1.6 Origin: NFPA 12.2.1(6) *Supports OSHA HMSPEC-B,E*

Describe the difference between “jacketed” and “sprayed-on” thermal protection on tank cars.

TANK - 1.1.7 Origin: NFPA 12.2.1(7) *Supports OSHA HMSPEC-B,E*

Describe the difference between “interior” and “exterior” heater coils on tank cars.

TECH - 1.1.8 Origin: NFPA 12.2.1(8) *Supports OSHA HMSPEC-B,E*

Given examples of various fittings arrangements for pressure, nonpressure, cryogenic, and carbon dioxide tank cars (including examples of each of the following fittings), identify and describe the design, construction, and operation of each of the following fittings, when present:

Fittings for loading and unloading tank cars, including the following:

1) Air valve
2) Bottom outlet nozzle
3) Bottom outlet valves (top operated with stuffing box, bottom operated – internal or external ball, wafersphere)
4) Carbon dioxide tank car fittings
5) Cryogenic liquid tank car fittings
6) Excess flow valve
7) Flange for manway, valves, and so forth
8) Liquid valve/vapor valve (ball vs. plug type)
9) Quick fill hole cover

Fittings for pressure relief, including the following:

1) Pressure regulators on carbon dioxide cars and liquefied atmospheric gases in cryogenic liquid tank cars
2) Pressure relief devices (pressure relief valve, safety vent, combination pressure relief valve)
3) Staged pressure relief system for a carbon dioxide car
4) Vacuum relief valve (negative pressure or vacuum)
5) Breather vent

Fittings for gauging, including the following:

1) Closed gauging devices (e.g., magnetic)
2) Open gauging devices (e.g., slip tube)
3) Other gauging devices (T-bar, long/short pole)

Miscellaneous fittings, including the following:

1) Manway, manway cover plate, hinged and bolted manway cover, protective housing
2) Sample line
3) Sump
4) Thermometer well
5) Washout
6) GPS transponders

TANK - 1.1.9 Origin: NFPA 12.2.1(9) *Supports OSHA HMSPEC-B,E*

Given examples of various fitting arrangements on tank cars (including carbon dioxide 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:

1) Air valve
2) Bottom outlet nozzle
3) Bottom outlet valve/top-operated bottom outlet valve (with stuffing box)
4) Closed gauging devices (e.g., magnetic)
5) Combination pressure relief valve
6) Flange for manway, valves, and so forth
7) Liquid valve/vapor valve (ball vs. plug type)
8) Manway, manway cover plate, hinged and bolted manway cover, protective housing
9) Open gauging devices (e.g., slip tube)
10) Pressure regulators on carbon dioxide cars and liquefied atmospheric gases in cryogenic liquid tank cars
11) Quick fill hole cover
12) Combination pressure relief valve
13) Safety vent (with rupture/frangible) disk

14) Sample line
15) Thermometer well
16) Vacuum relief valve (negative pressure or vacuum)
17) Washout

TANK - 1.1.10 Origin: NFPA 12.2.1(10) *Supports OSHA HMSPEC-B,E*

Given examples of each of the following types of tank car damage, identify the type of damage:

1) Corrosion
2) Crack
3) Dent
4) Flame impingement
5) Puncture
6) Score, gouge, wheel burn, rail burn

TANK - 1.1.11 Origin: NFPA 12.2.1(11) *Supports OSHA HMSPEC-B,E*

Given examples (actual or simulated) of scores, gouges, wheel burns, and rail burns, perform each of the following tasks:

TANK - 1.1.11(a) Origin: NFPA 12.2.1(11)(a) *Supports OSHA HMSPEC-B,E*

Use a depth gauge to measure the depth of each score, gouge, wheel burn, and rail burn.

TANK - 1.1.11(b) Origin: NFPA 12.2.1(11)(b) *Supports OSHA HMSPEC-B,E*

Point out where each score, gouge, wheel burn, and rail burn crossed a weld, if that condition exists.

TANK - 1.1.11(c) Origin: NFPA 12.2.1(11)(c) *Supports OSHA HMSPEC-B,E*

Measure the depth of the weld metal removed for any point where the score, gouge, wheel burn, and rail burn crosses a weld.

TANK - 1.1.11(d) Origin: NFPA 12.2.1(11)(d) *Supports OSHA HMSPEC-B,E*

Given examples (actual or simulated) of where a score, gouge, wheel burn, and rail burn crosses a weld, determine if the “heat-affected zone” has been damaged.

TANK - 1.1.12 Origin: NFPA 12.2.1(12) *Supports OSHA HMSPEC-B,E*

Given examples (actual or simulated) of dents and rail burns, perform each of the following tasks:

1) Use a dent gauge to measure the radius of curvature for each dent or rail burn

2) Identify those examples that include cracks at the point of minimum curvature

TANK - 1.1.13 Origin: NFPA 12.2.1(13) *Supports OSHA HMSPEC-B,E*

Given examples of damaged tank car fittings, describe the extent of damage to those fittings.

TANK - 1.1.14 Origin: NFPA 12.2.1(14) *Supports OSHA HMSPEC-B,E*

Given examples of tank car tank damage, describe the extent of damage to the tank car tank.

TANK - 1.1.15 Origin: NFPA 12.2.1(15) *Supports OSHA HMSPEC-B,E*

Given a tank car and the applicable equipment and reference material, determine the pressure in the tank car, using either of the following methods:

1) Pressure gauge
2) The temperature of the contents

TANK - 1.1.16 Origin: NFPA 12.2.1(16) *Supports OSHA HMSPEC-B,E*

Given a tank car, use the car's gauging device to determine the amount of lading in it.

TANK - 1.2 Origin: NFPA 12.2.2 *Supports OSHA HMSPEC-B,E*

Predicting the Likely Behavior of the Tank Car and its Contents

Technicians with a tank car specialty shall predict the likely behavior of the tank car and its contents and shall complete the following tasks:

TANK - 1.2.1 Origin: NFPA 12.2.2(1) *Supports OSHA HMSPEC-B,E*

Given the following types of tank cars, describe the likely breach/release mechanisms associated with each type.

1. Cryogenic liquid tank cars
2. Nonpressure tank cars
3. Pneumatically unloaded covered hopper cars
4. Pressure tank cars

TANK - 1.2.2 Origin: NFPA 12.2.2(2) *Supports 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:

1. Alloy steel
2. Aluminum
3. Carbon steel

TANK - 1.2.3 Origin: NFPA 12.2.2(3) *Supports OSHA HMSPEC-B,E*

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Discuss the significance of selection of lading for compatibility with tank car construction material.

TANK - 1.2.4 Origin: NFPA 12.2.2(4) *Supports OSHA HMSPEC-B,E*

Describe the significance of “lining” and “cladding” on tank cars in assessing tank damage.

TANK - 1.2.5 Origin: NFPA 12.2.2(5) *Supports OSHA HMSPEC-B,E*

Describe the significance of the jacket on tank cars in assessing tank damage.

TANK - 1.2.6 Origin: NFPA 12.2.2(6) *Supports OSHA HMSPEC-B,E*

Describe the significance of “insulation” and “thermal protection” on tank cars in assessing tank damage.

TANK - 1.2.7 Origin: NFPA 12.2.2(7) *Supports OSHA HMSPEC-B,E*

Describe the significance of “jacketed” and “sprayed-on” thermal protection on tank cars in assessing tank damage.

TANK - 1.2.8 Origin: NFPA 12.2.2(8) *Supports OSHA HMSPEC-B,E*

Describe the significance of “interior” and “exterior” heater coils on tank cars in assessing tank damage.

TANK - 1.2.9 Origin: NFPA 12.2.2(9) *Supports 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:

1. Corrosion
2. Crack
3. Dent
4. Flame impingement
5. Puncture
6. Score, gouge, wheel burn, rail burn

TANK - 1.2.10 Origin: NFPA 12.2.2(10) *Supports 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 - 1.2.11 Origin: NFPA 12.2.2(11) *Supports 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 - 1.2.12 Origin: NFPA 12.2.2(12) *Supports OSHA HMSPEC-B,E*

Describe the significance of a critical dent on a tank car in assessing tank damage.

TANK - 1.2.13 Origin: NFPA 12.2.2(13) *Supports OSHA HMSPEC-B,E*

Given various types of tank cars, describe the significance of pressure increases in assessing tank damage.

TANK - 1.2.14	Origin: NFPA 12.2.2(14)	*Supports OSHA HMSPEC-B,E*

Given various types of tank cars, describe the significance of the amount of lading in the tank in assessing tank damage.

TANK - 1.2.15	Origin: NFPA 12.2.2(15)	*Supports OSHA HMSPEC-B,E*

Describe the significance of flame impingement on the vapor space and liquid space as it relates to a tank car.

TANK 2 – Planning the Response

TANK - 2.1	Origin: NFPA 12.3.1	*Supports OSHA HMSPEC-D,F*

Determining the Response Options

Given the analysis of an emergency involving tank cars, technicians with a tank car specialty shall determine the response options for each tank car involved and shall complete the following tasks:

TANK - 2.1.1	Origin: NFPA 12.3.1(1)	*Supports OSHA HMSPEC-D,F*

Describe the purpose of, potential risks associated with, procedures for, equipment required to implement, and safety precautions for the following product removal techniques for tank cars:

1) Flaring liquids and vapors
2) Hot and cold tapping
3) Transferring liquids and vapors
4) Vent and burn
5) Venting

TANK - 2.1.2	Origin: NFPA 12.3.1(2)	*Supports OSHA HMSPEC-D,F*

Describe the inherent risks associated with, procedures for, equipment required to implement, and safety precautions for leak control techniques on various tank car fittings.

TECH - 2.1.3	Origin: NFPA 12.3.1(3)	*Supports OSHA HMSPEC-D,F*

Describe the effect flaring or venting gas or liquid has on the pressure in the tank (flammable gas or flammable liquid product).

TECH - 2.1.4	Origin: NFPA 12.3.1(4)	*Supports OSHA HMSPEC-D,F*

Describe the inherent risks associated with, procedures for, equipment required to implement, and safety precautions for lifting of tank cars.

TECH - 2.1.5	Origin: NFPA 12.3.1(5)	*Supports OSHA HMSPEC-D,F*

Describe the inherent risks associated with, procedures for, and safety precautions for the following operations:

1) Setting and releasing brakes on rail cars
2) Shutting off locomotives using the fuel shutoff and the battery disconnect
3) Uncoupling rail cars

TECH - 2.1.6 Origin: NFPA 12.3.1(6) *Supports OSHA HMSPEC-D,F*

Given the specification mark for a tank car and the reference materials, describe the car's basic construction and features.

TANK 3 – Implementing the Planned Response

TANK - 3.1 Origin: NFPA 12.4.1 *Supports OSHA HMSPEC- F*

Given an analysis of an emergency involving tank cars and the planned response, technicians with a tank car specialty shall implement or oversee the implementation of the selected response options safely and effectively and shall complete the following tasks::

TECH - 3.1.1 Origin: NFPA 12.4.1(1) *Supports OSHA HMSPEC- F*

Given a leaking manway cover plate (loose bolts), control the leak.

TECH - 3.1.2 Origin: NFPA 12.4.1(2) *Supports OSHA HMSPEC- F*

Given leaking packing on the following tank car fittings, control the leak:

1) Gauging device packing nut
2) Liquid or vapor valve packing nut
3) Top-operated bottom outlet valve packing gland

TECH - 3.1.3 Origin: NFPA 12.4.1(3) *Supports OSHA HMSPEC- F*

Given an open bottom outlet valve with a defective gasket in the cap, control the leak.

TECH - 3.1.4 Origin: NFPA 12.4.1(4) *Supports OSHA HMSPEC- F*

Given a leaking top-operated bottom outlet valve, close valve completely to control leak.

TECH - 3.1.5 Origin: NFPA 12.4.1(5) *Supports OSHA HMSPEC- F*

Given leaking fittings on a pressure tank car, use an applicable capping kit to control the leak.

TECH - 3.1.6 Origin: NFPA 12.4.1(6) *Supports OSHA HMSPEC- F*

Given the following types of leaks on various types of tank cars, plug or patch those leaks:

1) Cracks, splits, or tears
2) Puncture

TECH - 3.1.7 Origin: NFPA 12.4.1(7) *Supports OSHA HMSPEC- F*

Given the applicable equipment and resources, demonstrate the following:

1) Flaring of liquids and vapors
2) Transferring of liquids and vapors
3) Venting

TECH - 3.1.8 Origin: NFPA 12.4.1(8) *Supports OSHA HMSPEC- F*

Given the applicable resources, perform the following tasks:

1) Set and release brakes on rail cars
2) Shut off locomotives using the fuel shutoff and the battery disconnect
3) Uncouple rail cars

TECH - 3.1.9 Origin: NFPA 12.4.1(9) *Supports 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:

1) Selection of proper equipment
2) Establishment of ground field
3) Sequence of bonding and grounding connections
4) Testing of bonding and grounding connections

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Specialty
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Hazardous Materials Technician with a Cargo Tank Specialty

Technicians with a cargo tank specialty are those persons who provide technical support pertaining to cargo tanks, provide oversight for product removal and movement of damaged cargo tanks, and act as a liaison between technicians and other outside resources.

Note that NFPA 472, Chapter 13, “Competencies for Hazardous Materials Technicians with a Cargo Tank Specialty”, 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 7, are able to intervene at cargo tank 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.

The hazardous materials technician with a cargo tank specialty shall be trained to meet all competencies for the awareness, operations, and technician levels and the competencies listed in this section. They shall also receive training to meet governmental occupational health and safety regulations.

(Reference: NFPA 472 (2013 edition), Chapter 13, “Competencies for Hazardous Materials Technicians with a Cargo Tank Specialty”)

CARGO 1 – Analyzing the Incident

CARGO - 1.1 Origin: NFPA 13.2.1 *Supports OSHA HMSPEC-B,E*

Determining the Type and Extent of Damage to Cargo Tanks

Given examples of damaged cargo tanks, technicians with a cargo tank specialty shall describe the type and extent of damage to each cargo tank and its fittings and shall complete the following tasks:

CARGO - 1.1.1 Origin: NFPA 13.2.1(1) *Supports OSHA HMSPEC-B,E*

Given the specification mark for a cargo tank and the reference materials, describe the tank’s basic construction and features.

CARGO - 1.1.2 Origin: NFPA 13.2.1(2) *Supports OSHA HMSPEC-B,E*

Given examples of cargo tanks (some jacketed and some not jacketed), point out the jacketed cargo tanks.

CARGO - 1.1.3 Origin: NFPA 13.2.1(3) *Supports OSHA HMSPEC-B,E*

Given examples of the following types of cargo tank damage, identify the type of damage in each example:

1) Corrosion
2) Crack
3) Dent
4) Flame impingement
5) Puncture
6) Scrape, score, gouge, or loss of metal

CARGO - 1.1.4 Origin: NFPA 13.2.1(4) *Supports OSHA HMSPEC-B,E*

Given examples of damage to an MC-331 cargo tank, determine the extent of damage to the heat-affected zone.

CARGO - 1.1.5 Origin: NFPA 13.2.1(5) *Supports OSHA HMSPEC-B,E*

Given an MC-331 cargo tank containing a liquefied gas, determine the amount of liquid in the tank.

CARGO - 1.1.6 Origin: NFPA 13.2.1(6) *Supports OSHA HMSPEC-B,E*

Given an MC-306/DOT-406, MC-307/DOT-407, and MC-312/DOT-412 cargo tanks, point out and explain the design, construction, and operation of each of the following safety devices:

1) Dome cover design
2) Emergency remote shutoff device
3) Internal safety valve or external valve with accident protection, including method of activation (air, cable, hydraulic)
4) Pressure and vacuum relief protection devices
5) Shear-type breakaway piping
6) Fusible caps, plugs, links and nuts

CARGO - 1.1.7 Origin: NFPA 13.2.1(7) *Supports 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:

1) Emergency remote shutoff device
2) Excess flow valve
3) Fusible link and nut assemblies
4) Internal safety valve or external valve with accident protection, including method of activation (air, cable, hydraulic)
5) Pressure relief protection devices

CARGO - 1.1.8 Origin: NFPA 13.2.1(8) *Supports OSHA HMSPEC-B,E*

Given an MC-306/DOT-406 cargo tank, identify and describe the following normal methods of loading and unloading:

1) Bottom loading
2) Top loading
3) Vapor recovery system

CARGO - 1.1.9 Origin: NFPA 13.2.1(9) *Supports 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:

1) MC-307/DOT-407
2) MC-312/DOT-412
3) MC-331
4) MC-338
5) Compressed gas tube trailer

CARGO - 1.1.10 Origin: NFPA 13.2.1(10) *Supports OSHA HMSPEC-B,E*

Describe the normal and emergency methods of activation for the following types of cargo tank truck valve systems:

1) Pneumatic (Air)
2) Cable
3) Hydraulic

CARGO - 1.1.11 Origin: NFPA 13.2.1(11) *Supports OSHA HMSPEC-B,E*

Given a cargo tank involved in an emergency, identify the factors to be evaluated as part of the cargo tank damage assessment process, including the following:

1) Amount of product both released and remaining in the cargo tanks
2) Container stress applied to the cargo tank
3) Nature of the emergency (e.g., rollover, vehicle accident, struck by object)
4) Number of compartments
5) Pressurized or nonpressurized
6) Type and nature of tank damage (e.g., puncture, dome cover leak, valve failure,)
7) Type of cargo tank (MC or DOT specification)
8) Type of tank metal (e.g., aluminum, stainless steel, composites)

CARGO - 1.2 Origin: NFPA 13.2.2 *Supports OSHA HMSPEC-B,E*

Determining the Likely Behavior of the Cargo Tank and its Contents

Technicians with a cargo tank specialty shall predict the likely behavior of the cargo tank and its contents and shall complete the following tasks:

CARGO - 1.2.1 Origin: NFPA 13.2.2(1) *Supports OSHA HMSPEC-B,E*

Given the following types of cargo tanks (including a tube trailer), describe the likely breach/release mechanisms:

1) MC-306/DOT-406 cargo tanks
2) MC-307/DOT-407 cargo tanks
3) MC-312/DOT-412 cargo tanks
4) MC-331 cargo tanks
5) MC-338 cargo tanks
6) Compressed gas tube trailer

CARGO - 1.2.2 Origin: NFPA 13.2.2(2) *Supports OSHA HMSPEC-B,E*

Describe the difference in types of construction materials used in cargo tanks and their significance in assessing tank damage.

CARGO - 1.2.3 Origin: NFPA 13.2.2(3) *Supports OSHA HMSPEC-B,E*

Describe the significance of the jacket on cargo tanks in assessing tank damage.

CARGO - 1.2.4 Origin: NFPA 13.2.2(4) *Supports OSHA HMSPEC-B,E*

Describe the significance of each of the following types of damage on different types of cargo tanks in assessing tank damage:

1) Corrosion (internal/external)
2) Crack
3) Dent
4) Flame impingement
5) Puncture
6) Scrape, score, gouge, or loss of metal

CARGO - 1.2.5 Origin: NFPA 13.2.2(5) *Supports OSHA HMSPEC-B,E*

Given examples of damage to the heat-affected zone on a MC-331 cargo tank, describe the significance of the damage in assessing tank damage.

CARGO 2 – Planning the Response

CARGO - 2.1 Origin: NFPA 13.3.1 *Supports OSHA HMSPEC-D,F*

Determining the Response Options

Given the analysis of an emergency involving cargo tanks, technicians with a cargo tank specialty shall determine the response options for each cargo tank involved and shall complete the following tasks:

CARGO - 2.1.1 Origin: NFPA 13.3.1(1) *Supports 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 - 2.1.2 Origin: NFPA 13.3.1(2) *Supports OSHA HMSPEC-D,F*

Given an overturned cargo tank, describe the factors to be evaluated for up-righting, including the following:

1) Condition and weight of the cargo tank
2) Lifting capabilities of the wreckers and cranes
3) Preferred lifting points
4) Selection of lifting straps and/or air bags
5) Site safety precautions
6) Type and nature of stress applied to the cargo tank
7) Type of cargo tank and material of construction

CARGO 3 – Implementing the Planned Response

CARGO - 3.1 Origin: NFPA 13.4.1 *Supports OSHA HMSPEC-F*

Given an analysis of an emergency involving a cargo tank and the planned response, technicians with a cargo tank specialty shall implement or oversee the implementation of the selected response options safely and effectively and shall complete the following tasks:

CARGO - 3.1.1 Origin: NFPA 13.4.1(1) *Supports 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):

1) Dome cover leak
2) Irregular-shaped hole
3) Pressure relief devices (e.g., vents, burst disc)
4) Puncture
5) Split or tear
6) Valves and piping

CARGO - 3.1.2 Origin: NFPA 13.4.1(2) *Supports OSHA HMSPEC-F*

Describe the methods for containing the following leaks in MC-331 and MC-338 cargo tanks:

1) Crack
2) Failure of pressure relief device (e.g., relief valve, burst disc)
3) Valves and piping
4) Puncture
5) Split or tear

CARGO - 3.1.3 Origin: NFPA 13.4.1(3) *Supports 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:

1. Selection of proper equipment
2. Establishment of ground field
3. Sequence of bonding and grounding connections
4. Proper testing of bonding and grounding connections

CARGO - 3.1.4 Origin: NFPA 13.4.1(4) *Supports OSHA HMSPEC-F*

Given the following product transfer and recovery equipment, demonstrate the safe application and use of each of the following:

1. Portable pumps (air, electrical, gasoline/diesel)
2. Compressors or compressed gas
3. Vacuum trucks
4. Vehicles with power-take-off (PTO) driven pumps

CARGO - 3.1.5 Origin: NFPA 13.4.1(5) *Supports OSHA HMSPEC-F*

Given a scenario involving an overturned MC-306/DOT-406 cargo tank, demonstrate the safe procedures for the following methods of product removal and transfer:

1. Drilling
2. Internal safety valve
3. Unloading lines
4. Vapor recovery lines

CARGO - 3.1.6 Origin: NFPA 13.4.1(6) *Supports OSHA HMSPEC-F*

Given a scenario involving an overturned MC-307/DOT-407 cargo tank, demonstrate the safe procedures for product removal and transfer.

1. Cleanout cap
2. Product loading and unloading lines
3. Product lines

CARGO - 3.1.7 Origin: NFPA 13.4.1(7) *Supports OSHA HMSPEC-F*

Given a scenario involving an overturned MC-331 cargo tank, demonstrate the safe procedures for product removal and transfer.

1. Vapor line
2. Liquid line
3. Hot tap

CARGO - 3.1.8 Origin: NFPA 13.4.1(8) *Supports OSHA HMSPEC-F*

Given the necessary resources, demonstrate the flaring of a MC-331 flammable gas cargo tank.

Hazardous Materials Technician with an Intermodal Tank Specialty

Technicians with an intermodal tank specialty are those persons who provide technical support pertaining to intermodal tanks, provide oversight for product removal and movement of damaged intermodal tanks, and act as a liaison between technicians and other outside resources.

Note that NFPA 472, Chapter 14, "Competencies for Hazardous Technicians with an Intermodal Tank Specialty", 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 7, 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.

The hazardous materials technician with an intermodal tank specialty shall be trained to meet all competencies for the awareness, operations, and technician levels and the competencies of this chapter. They shall also receive training to meet governmental occupational health and safety regulations.

(Reference: NFPA 472 (2013), Chapter 14, "Competencies for Hazardous Materials Technicians with a Intermodal Tank Specialty")

INTML 1 – Analyzing the Incident

INTML - 1.1 Origin: NFPA 14.2.1 *Supports OSHA HMSPEC-B,E*

Determining the Type and Extent of Damage to Intermodal Tanks

Given examples of damaged intermodal tanks, the hazardous materials technician with an intermodal tank specialty shall describe the type and extent of damage to each intermodal tank and its fittings and shall complete the following tasks:

INTML - 1.1.1 Origin: NFPA 14.2.1(1) *Supports OSHA HMSPEC-B,E*

Given the specification mark for an intermodal tank and the reference materials, describe the tank's basic construction and features.

INTML - 1.1.2 Origin: NFPA 14.2.1(2) *Supports OSHA HMSPEC-B,E*

Given examples of intermodal tanks (some jacketed and not jacketed), identify the jacketed intermodal tanks.

INTML - 1.1.3 Origin: NFPA 14.2.1(3) *Supports OSHA HMSPEC-B,E*

Given examples of various intermodal tanks, point out and explain the design and purpose of each of the following intermodal tank components, where present:

1) Corner casting
2) Data plate
3) Heater coils (steam/electric)
4) Insulation
5) Jacket
6) Refrigeration unit
7) Supporting frame

INTML - 1.1.4 Origin: NFPA 14.2.1(4) *Supports OSHA HMSPEC-B,E*

Given examples of various fittings arrangements for pressure, nonpressure, and cryogenic intermodal tanks, point out and explain the design, construction, and operation of each of the following fittings, when present:

1) Air line connection
2) Bottom outlet valve
3) Gauging device
4) Liquid or vapor valve
5) Thermometer
6) Manhole cover
7) Pressure gauge
8) Sample valve
9) Spill box
10) Thermometer well
11) Top outlet

INTML - 1.1.5 Origin: NFPA 14.2.1(5) *Supports OSHA HMSPEC-B,E*

Given examples of various safety devices for pressure, nonpressure, and cryogenic intermodal tanks, point out and explain the design, construction, and operation of each of the following safety devices, where present:

1) Emergency remote shutoff device
2) Excess flow valve
3) Fusible link/nut assemblies
4) Regulator valve
5) Rupture disc
6) Pressure relief valve

INTML - 1.1.6 Origin: NFPA 14.2.1(6) *Supports OSHA HMSPEC-B,E*

Given the following types of intermodal tank damage, identify the type of damage in each example and explain its significance:

1) Corrosion (internal/external)
2) Crack
3) Dent
4) Flame impingement

5) Metal loss (gouge/score)
6) Puncture

INTML - 1.1.7 Origin: NFPA 14.2.1(7) *Supports OSHA HMSPEC-B,E*

Given three examples of damage to the framework of intermodal tanks, describe the damage in each example and explain its significance in the analysis process.

INTML - 1.1.8 Origin: NFPA 14.2.1(8) *Supports 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:

1) Amount of product both released and remaining in the intermodal tank
2) Container stress applied to the intermodal tank
3) Nature of the emergency
4) Number of compartments
5) Pressurized or nonpressurized
6) Type and nature of tank damage
7) Type of intermodal tank
8) Type of tank metal

INTML - 1.1.9 Origin: NFPA 14.2.1(9) *Supports OSHA HMSPEC-B,E*

Given a pressurized intermodal tank containing a liquefied gas, determine the amount of liquid in the tank.

INTML - 1.1.10 Origin: NFPA 14.2.1(10) *Supports OSHA HMSPEC-B,E*

Given examples of damage to a pressurized intermodal tank, determine the extent of damage to the heat-affected zone.

INTML - 1.2 Origin: NFPA 14.2.2 *Supports OSHA HMSPEC-B,E*

Predicting the Likely Behavior of the Intermodal Tank and its Contents

Technicians with an intermodal tank specialty shall predict the likely behavior of the intermodal tank and its contents and shall complete the following tasks:

INTML - 1.2.1 Origin: NFPA 14.2.1(1) *Supports OSHA HMSPEC-B,E*

Given the following types of intermodal tanks, describe the likely breach/release mechanisms:

1) IMO Type 1/IM-101
2) IMO Type 2/IM-102
3) IMO Type 5/DOT-51
4) DOT-56
5) DOT-57
6) DOT-60

7) Cryogenic (IMO Type 7)

INTML - 1.2.2 Origin: NFPA 14.2.1(2) *Supports OSHA HMSPEC-B,E*

Describe the difference in types of construction materials used in intermodal tanks relative to assessing tank damage.

INTML 2 – Planning the Response

INTML - 2.1 Origin: NFPA 14.3.1 *Supports OSHA HMSPEC-F*

Determining Response Options

Given the analysis of an emergency involving intermodal tanks, technicians with an intermodal tank specialty shall determine the response options for each intermodal tank involved and shall complete the following tasks:

INTML - 2.1.1 Origin: NFPA 14.3.1(1) *Supports 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:

1) Flaring liquids and vapors
2) Hot tapping
3) Transferring liquids and vapors (pressure and pump)

INTML - 2.1.2 Origin: NFPA 14.3.1(2) *Supports OSHA HMSPEC-F*

Describe the purpose of, procedures for, and risks associated with controlling leaks from various fittings on intermodal tanks, including equipment needed and safety precautions.

INTML 3 – Implementing the Planned Response

INTML - 3.1 Origin: NFPA 14.4 *Supports OSHA HMSPEC-F*

Given an analysis of an emergency involving intermodal tanks and the planned response, technicians with an intermodal tank specialty shall implement or oversee the implementation of the selected response options safely and effectively and shall complete the following tasks:

INTML - 3.1.1 Origin: NFPA 14.4(1) *Supports OSHA HMSPEC-F*

Given leaks from the following fittings on intermodal tanks, control the leaks using approved methods and procedures:

1) Bottom outlet
2) Liquid/vapor valve
3) Manway cover
4) Pressure relief device
5) Tank

INTML - 3.1.2 Origin: NFPA 14.4(2) *Supports OSHA HMSPEC-F*

Given applicable equipment and resources, demonstrate the following types of emergency product removal:

1) Flaring of liquids and vapors
2) Transferring of liquids and vapors
3) Venting

INTML - 3.1.3 Origin: NFPA 14.4(3) *Supports OSHA HMSPEC-F*

Demonstrate approved procedures for the following types of emergency product removal:

1) Gas/liquid transfer (pressure/pump)
2) Flaring
3) Venting

INTML - 3.1.4 Origin: NFPA 14.4(4) *Supports OSHA HMSPEC-F*

Demonstrate grounding and bonding 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:

1) Selection of proper equipment
2) Establishment of ground field
3) Sequence of bonding and grounding connections
4) Testing of ground field and grounding and bonding connections

INTML - 3.1.5 Origin: NFPA 14.4(5) *Supports OSHA HMSPEC-F*

Demonstrate the methods for containing the following leaks on liquid intermodal tanks (e.g., IM-101 and IM-102):

1) Dome cover leak
2) Irregular-shaped hole
3) Pressure relief devices (e.g., vents, burst disc)
4) Puncture
5) Split or tear
6) Valves and piping

INTML - 3.1.6 Origin: NFPA 14.4(6) *Supports OSHA HMSPEC-F*

Describe the methods for containing the following leaks in pressure intermodal tanks:

1) Crack
2) Failure of pressure relief device (e.g., relief valve, burst disc)
3) Valves and Piping

INTML - 3.1.7 Origin: NFPA 14.4(7) *Supports OSHA HMSPEC-F*

Given the following product transfer and recovery equipment, demonstrate the safe and correct application and use of the following:

1) Portable pumps (air, electrical, gasoline/diesel)
2) Pressure transfers
3) Vacuum trucks
4) Vehicles with power-take-off driven pumps

INTML - 3.1.8 Origin: NFPA 14.4(8) *Supports OSHA HMSPEC-F*

Given a scenario involving an overturned liquid intermodal tank, demonstrate the safe procedures for product removal and transfer.

INTML - 3.1.9 Origin: NFPA 14.4(9) *Supports OSHA HMSPEC-F*

Given a scenario involving an overturned pressure intermodal tank, demonstrate the safe procedures for product removal and transfer.

INTML - 3.1.10 Origin: NFPA 14.4(10) *Supports OSHA HMSPEC-F*

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

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Hazardous Materials Technician with a Marine Tank and Non-Tank Vessel Specialty

Technicians with a marine tank and non-tank vessel specialty are those persons who provide technical support pertaining to marine tank vessels, provide oversight for product removal and movement of damaged marine tank vessels, and act as liaisons between technicians and other outside resources.

Note that NFPA 472, Chapter 15, “Competencies for Hazardous Materials Technicians with a Marine Tank and Non-Tank Vessel Specialty”, is not intended as a mandate that hazardous materials response teams must include technicians with a marine tank vessel specialty in order to perform operations at such incidents. Technicians operating within the bounds of their training as listed in NFPA 472, Chapter 7, are able to intervene at marine tank vessel 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 marine vessel tanks.

The hazardous materials technician with a marine tank and non-tank vessel specialty shall be trained to meet all competencies for the awareness, operations, and technician levels and the competencies of this chapter. They shall also receive training to meet governmental occupational health and safety regulations.

(Reference: NFPA 472 (2013 edition), Chapter 15, “Competencies for Hazardous Materials Technicians with a Marine Tank Vessel Specialty”).

MARINE 1 – Analyzing the Incident

MARINE - 1.1 Origin: NFPA 15.2.1

Determining the Type and Extent of Damage to Marine Tank Vessels

Given examples of damaged marine tank vessels, hazardous materials technicians with a marine tank and non-tank vessel specialty shall describe the type and extent of damage to each marine tank vessel and its cargo systems and shall complete the following tasks:

MARINE - 1.1.1 Origin: NFPA 15.2.1(1)

Given examples of marine tank vessels, describe a marine tank vessel’s basic construction and arrangement features, for marine tank and non-tank vessels.

MARINE - 1.1.2 Origin: NFPA 15.2.1(2)

Given examples of various marine tank vessels, point out and explain the design and purpose of each of the various types of marine tank vessel cargo / ballast compartment design, structure and components, where present.

MARINE - 1.1.3 Origin: NFPA 15.2.1(3)

Given examples of various fittings arrangements for marine tank vessels, point out and explain the design, construction, and operation of each.

MARINE - 1.1.4 Origin: NFPA 15.2.1(4)

Given a marine tank and non-tank vessel, identify and describe the normal methods of cargo transfer.

MARINE - 1.1.5 Origin: NFPA 15.2.1(5)

Given a marine non-tank vessel, describe the following systems/processes used in conjunction with cargo transfer:

1) Cargo transfer system (including liquid and vent piping arrangements).
2) Mechanical systems (cranes, booms, belts, etc.)
3) Pressure systems
4) Vacuum systems
5) Cargo securing system components (tie-downs, lashings, twist locks, etc.).

MARINE - 1.1.6 Origin: NFPA 15.2.1(6)

Given a marine tank vessel, describe the following systems/processes used in conjunction with cargo transfer:

1) Cargo transfer system (including liquid and vent piping arrangements).
2) Vapor recovery system
3) Vapor balancing
4) Pressuring cargo
5) Vacuum systems
6) Purging with an inert medium prior to transfer
7) Padding tanks
8) Inert gas system (tank vessel only)
9) Cargo monitoring systems (tank levels / alarms, tank pressures, pump controls, cargo line pressures, and cargo temperatures

MARINE - 1.1.7 Origin: NFPA 15.2.1(7)

Given the following types of cargo compartment damage on marine tank vessels, identify the type of damage in each example and explain its significance:

1) Crack, puncture, slit, or tear
2) Dent
3) Flame impingement
4) Over- or under-pressurization

5) Brittle fracture
6) Pinhole or corrosion
7) Damage to heat-affected zone (i.e., welded areas)

MARINE - 1.1.8 Origin: NFPA 15.2.1(8)

Given examples of the types of emergency situations a marine tank vessel can experience that might result in damage to the vessel or its cargo transfer system, describe the following types of marine tank vessel emergencies and explain their significance related to the vessel's seaworthiness and cargo containment:

1) Grounding
2) Stranding
3) Allision/collision
4) Foundering
5) Heavy weather damage
6) Fire
7) Explosion/BLEVE
8) Polymerization and/or chemical reaction
9) Cargo shifting or fluidization/liquefaction

MARINE - 1.1.9 Origin: NFPA 15.2.1(9)

Given a marine vessel involved in an emergency, identify the factors to be evaluated as part of the marine tank vessel damage assessment process, including the following:

1) Type of marine tank vessel
2) Type and location of damage
3) Fire control, stability and ventilation plans/documentation
4) Dangerous cargo manifest
5) Stowage plan
6) Ingress and egress and potential restrictions due to security arrangements
7) Bilge and ballast arrangements
8) Pressurized or nonpressurized systems
9) Cargo pumping arrangements (tank vessels only)
10) Number and location of cargo compartments
11) Cargo transfer and monitoring control system /location
12) Location and arrangement of void spaces in cargo area
13) Types/characteristics of void spaces in cargo area
14) Types/characteristics of cargoes in the damaged cargo system
15) Types/characteristics of other cargoes on the marine non-tank vessel (outside the damaged area)
16) Cargo compatibility
17) Stability and stresses applied to the marine non-tank vessel

18) Type and nature of cargo system damage
19) Amount of product both released and remaining in the cargo compartment

MARINE - 1.1.10 Origin: NFPA 15.2.1(10)

Given a cargo system containing a bulk liquid, determine the amount of liquid in the cargo tank.

MARINE - 1.2 Origin: NFPA 15.2.2

Predicting the Likely Behavior of the Marine Tank Vessel and Its Contents

Hazardous materials technicians with a marine tank and non-tank vessel specialty shall understand the likely behavior of both marine tank vessels and marine non-tank vessels, as well as the vessel's contents and meet the following related requirements:

MARINE - 1.2.1 Origin: NFPA 15.2.2(1)

Given the following types of marine tank vessels, provide examples of probable causes of releases:

(a) Certain bulk dangerous cargo ships (46 CFR Subchapter O, Parts 150-153)

1) Chemical tank ships
2) Sophisticated parcel chemical ships
3) Specialized chemical tank ships
4) Chemical tank barges

(b) Liquefied gas tank ships (46 CFR Subchapter O, Parts 151 or 154)

1) Fully pressurized tank ships
2) Semi-pressurized tank ships
3) Ethylene (LPG and chemical gas) ships
4) Fully refrigerated tank ships
5) Liquefied natural gas (LNG) ships
6) Liquefied gas barges

(c) Tank ships (46 CFR Subchapter D, Parts 30-39)

1) Oil tank barges
2) Oil tank ships

(d) Cargo and miscellaneous vessels (46 CFR Subchapter I, Parts 90-105)

1) Container vessels
2) Break bulk
3) Roll on/roll off (RoRo) vessels
4) Dry bulk ships or barges
5) Oil tank ships

(e) Offshore supply vessels (46 CFR Subchapter H, Parts 70-79)

(f) Passenger vessels (46 CFR Subchapter I, Parts 125-134)

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

1) Cruise ship
2) Ferries

(g) Other vessels

1) Tug boats (46 CFR Subchapter C, Parts 24-27)
2) Fishing vessels (46 CFR Subchapter C, Parts 24-28)
3) Crew boat (46 CFR Subchapter T, Parts 175-185)
4) Mobile offshore drilling unit (46 CFR Subchapter I-A, Parts 107-109)

MARINE - 1.2.2 Origin: NFPA 15.2.2(2)

Describe the significance of internal and external forces on a marine tank vessel's stress and stability in assessing marine tank vessel damage.

MARINE - 1.2.3 Origin: NFPA 15.2.2(3)

Given the following examples of damage to the cargo compartments and cargo transfer systems on marine tank vessels, describe their significance in the risk analysis process:

1) Cargo spills or releases
2) Tank leakage within the vessel
3) Overpressure/vacuum damage
4) Shifting cargo
5) Cargo /container securing systems

MARINE - 1.2.4 Origin: NFPA 15.2.2(4)

Describe the significance of the following when assessing marine tank vessel damage:

1) Lining and cladding on cargo compartments
2) Coated and uncoated cargo compartments
3) Insulation or thermal protection
4) Heating or refrigerated coils in cargo compartments

MARINE 2 – Planning the Response

MARINE - 2.1 Origin: NFPA 15.3.1

Determining the Response Options

Given the analysis of an emergency involving marine tank vessels, hazardous materials technicians with a marine tank and non-tank vessel specialty shall determine the response options for each marine tank vessel involved and shall complete the following tasks:

MARINE - 2.1.1 Origin: NFPA 15.3.1(1)

Given an incident involving a marine tank vessel, describe the methods, procedures, risks, safety precautions, and equipment that are required to implement hazardous cargo procedures for various types of incidents and marine vessels.

MARINE - 2.1.2 Origin: NFPA 15.3.1(2)

Describe the purpose of, potential risks associated with, procedures for, equipment required to implement, and safety precautions for the following product removal techniques for hazardous materials in all forms, including bulk, non-bulk, solids, liquids, and gases:

1) Vessel-to/from-shore transfer
2) Vessel-to-vessel transfer
3) Vessel-to/from-tank truck transfer
4) Vessel-to/from-rail car transfer
5) Internal transfer within the vessel
6) Other types of transfers [e.g., frac/portable tanks)

MARINE - 2.1.3 Origin: NFPA 15.3.1(3)

Describe the purpose of, procedures for, and risks associated with controlling leaks from various fittings on marine tank vessel cargo systems, including equipment needed and safety precautions.

MARINE - 2.1.4 Origin: NFPA 15.3.1(4)

Describe the hazards associated with working with vessels and marine property during emergencies.

MARINE 3 – Implementing the Planned Response

MARINE - 3.1 Origin: NFPA 15.4

Given an analysis of an emergency involving marine tank vessels and the planned response, hazardous materials technicians with a marine tank and non-tank vessel specialty shall implement or oversee the implementation of the selected response options safely and effectively and shall complete the following tasks:

MARINE - 3.1.1 Origin: NFPA 15.4(1)

Given leaks from the following fittings on marine tank vessels, describe approved methods and procedures for controlling the leaks:

1) Tank hatch/expansion trunk
2) Valve or fitting
3) Cargo compartment vent / access hatch / door
4) Pressure relief device (pressure and vacuum)
5) Manifold or pipeline
6) Transfer hoses and connections
7) Other deck penetrations

8) Bulk and non-bulk packaging

MARINE - 3.1.2 Origin: NFPA 15.4(2)

Describe approved procedures for the following types of emergency cargo removal on board marine tank vessels:

1) Gas/liquid transfer (pressure/pump)
2) Flaring
3) Venting
4) Jettisoning of cargo

MARINE - 3.1.3 Origin: NFPA 15.4(3)

Describe approved procedures for the following types of emergency cargo removal on board marine non-tank vessels:

1) Cranes and other lifting equipment
2) Unloading systems
3) Ramps and other vehicular methods
4) Gas/liquid transfer (pressure/pump)
5) Venting
6) Jettisoning of cargo

MARINE - 3.1.4 Origin: NFPA 15.4(4)

Describe the importance of bonding and grounding procedures for the transfer of flammable and combustible cargoes from a marine tank vessel or other products that can give off flammable gases or vapors when heated or contaminated.

MARINE - 3.1.5 Origin: NFPA 15.4(5)

Demonstrate the methods for containing the following leaks on marine vessels:

1) Puncture
2) Irregular-shaped hole
3) Split or tear
4) Dome / hatch cover leak
5) Valves and piping failure
6) Pressure relief devices (e.g., vents, burst / rupture disc)

MARINE - 3.1.6 Origin: NFPA 15.4(6)

Given the following product transfer and recovery equipment, describe the safe and correct application and use of the following:

1) Portable pumps (air, electrical, hydraulic, gasoline/diesel)
2) Vehicles with power-take-off-driven pumps
3) Vehicles, such as fork lifts
4) Pressure liquid transfer equipment

5) Vacuum trucks
6) Cranes
7) Ramps
8) Conveyors

MARINE - 3.1.7 Origin: NFPA 15.4(7)

Given the necessary resources, describe the flaring of a pressure flammable gas from a liquefied gas tank vessel (ship or barge as applicable).

MARINE - 3.1.8 Origin: NFPA 15.4(8)

Given a scenario involving flammable liquid spill from a marine tank vessel, describe the procedures for site safety and fire control during cleanup and removal operations.

Hazardous Materials Technician with a Flammable Liquids Bulk Storage Specialty

Technicians with a flammable liquids bulk storage specialty is a person who, in incidents involving bulk flammable liquid storage tanks and related facilities, provides support to the hazardous materials technician and other personnel, provides strategic and tactical recommendations to the on-scene incident commander, provides oversight for fire control and product removal operations, and acts as a liaison between technicians, response personnel and outside resources. For the purposes of this chapter, flammable liquid bulk storage tanks also include the related pipelines, piping, transfer pumps, additive tanks, and loading racks commonly found in a flammable liquid bulk storage tank facility.

Note that NFPA 472, Chapter 16, “Competencies for Hazardous Materials Technicians with a Flammable Liquids Bulk Storage Specialty”, is not intended as a mandate that hazardous materials response teams must include technicians with a flammable liquids bulk storage specialty in order to perform operations at such incidents. Technicians operating within the bounds of their training as listed in NFPA 472, Chapter 7, are able to intervene at flammable liquids bulk storage 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 flammable liquids bulk storage incidents.

The hazardous materials technician with a flammable liquids bulk storage specialty shall be trained to meet all competencies for the awareness, operations, and technician levels and the competencies of this chapter. They shall also receive training to meet governmental occupational health and safety regulations.

(Reference: NFPA 472 (2013 edition), Chapter 16, “Competencies for Hazardous Materials Technicians with a Flammable Liquids Bulk Storage Specialty”)

FLAM LIQ 1 – Analyzing the Incident

FLAM LIQ - 1.1 Origin: NFPA 16.2.1

Determining the Type and Extent of Damage to the Bulk Storage Tank

Given examples of incidents involving bulk flammable liquid storage tanks, describe the type of storage tank and the type and extent of damage to the tank and its associated valves, piping, fittings, and related equipment by completing the following tasks:

FLAM LIQ - 1.1.1 Origin: NFPA 16.2.1.1

Given examples of various hydrocarbon and polar solvent fuels, describe their physical and chemical properties and their impact upon the selection, application, and use of Class B fire-fighting foams for spill and fire scenarios.

FLAM LIQ - 1.1.2 Origin: NFPA 16.2.1.2

Given examples of various flammable liquid bulk storage operations, identify and describe the procedures for the normal movement and transfer of product(s) into and out of the facility and storage tanks. Examples shall be based on local or regional facilities and could include marketing terminals, pipeline operations and terminals, refineries, and bulk storage facilities.

FLAM LIQ - 1.1.3	Origin: NFPA 16.2.1.3

Given examples of the following atmospheric pressure bulk liquid storage tanks, describe each tank's design and construction features and types of products commonly found:

1) Cone roof tank
2) Open (external) floating roof tank
3) Open floating roof tank with a geodesic dome external roof
4) Covered (internal) floating roof tank

FLAM LIQ - 1.1.4	Origin: NFPA 16.2.1.4

Given examples of the following types of low pressure horizontal and vertical bulk liquid storage tanks, describe the tank's uses and design and construction features:

1) Horizontal tank
2) Dome roof tank

FLAM LIQ - 1.1.5	Origin: NFPA 16.2.1.5

Given examples of various atmospheric and low pressure bulk liquid storage tanks and related facilities, describe the design and purpose of each of the following storage tank components, where present:

1) Tank shell material of construction
2) Type of roof and material of construction
3) Primary and secondary roof seals (as applicable)
4) Incident venting and pressure relief devices
5) Tank valves
6) Tank gauging devices
7) Tank overfill device
8) Secondary containment methods (as applicable)
9) Transfer pumps (horizontal or vertical)
10) Tank piping and piping supports
11) Vapor recovery (VRU) and vapor combustion (VCU) units
12) Loading rack additive tanks
13) Fixed or semifixed fire protection system

FLAM LIQ - 1.1.6	Origin: NFPA 16.2.1.6

Given three examples of primary and secondary spill confinement measures, describe the design, construction, and incident response considerations associated with each method provided.

FLAM LIQ 2 – Predicting the Likely Behavior of the Bulk Storage Tank and Contents

FLAM LIQ - 2.1 Origin: NFPA 16.2.2

Technicians with a flammable liquids bulk storage specialty shall predict the likely behavior of the tank and its contents by completing the following tasks:

FLAM LIQ - 2.1.1 Origin: NFPA 16.2.2.1

Given examples of different types of flammable liquids bulk storage tank facilities, identify the impact of the following fire and safety features on the behavior of the products during an incident:

1) Tank spacing
2) Product spillage and control (impoundment and diking)
3) Tank venting and flaring systems
4) Transfer and product movement capabilities
5) Monitoring and detection systems
6) Fire protection systems

FLAM LIQ - 2.1.2 Origin: NFPA 16.2.2.2

Given a flammable liquid bulk storage tank involved in a fire, identify the factors to be evaluated as part of the analysis process, including the following:

1) Type of storage tank
2) Product involved
3) Amount of product within the storage tank
4) Nature of the incident (e.g., seal fire, tank overfill, full-surface fire)
5) Tank spacing and exposures
6) Fixed or semifixed fire protection system present

FLAM LIQ - 2.1.3 Origin: NFPA 16.2.2.3

Given three types of incidents involving flammable liquid storage tanks, describe the likely fire and spill behavior for each incident.

FLAM LIQ - 2.1.4 Origin: NFPA 16.2.2.4

Describe the causes, hazards, and methods of handling the following conditions as they relate to fires involving flammable liquid bulk storage tanks:

1) Frothover
2) Slopover

3) Boilover

FLAM LIQ 3 – Planning the Response

FLAM LIQ - 3.1 Origin: NFPA 16.3

Given the analysis of an incident involving flammable liquid bulk storage tanks, determine response options for the storage tank involved by completing the following tasks:

FLAM LIQ - 3.1.1 Origin: NFPA 16.3.1

Describe the factors to be considered in evaluating and selecting Class B fire—fighting foam concentrates for use on flammable liquids.

FLAM LIQ - 3.1.2 Origin: NFPA 16.3.2

Describe the factors to be considered for the portable application of Class B fire-fighting foam concentrates for the following types of incidents:

1) Flammable liquid spill (no fire)
2) Flammable liquid spill (with fire)
3) Flammable liquid storage tank fire

FLAM LIQ - 3.1.3 Origin: NFPA 16.3.3

Given examples of different types of flammable liquid bulk storage tanks, identify and describe the application, use and limitations of the types of fixed and semifixed fire protection systems that can be used, including the following:

1) Foam chambers
2) Catenary systems
3) Subsurface injection systems
4) Fixed foam monitors
5) Foam and water sprinkler systems

FLAM LIQ - 3.1.4 Origin: NFPA 16.3.4

Describe the hazards, safety procedures, and tactical guidelines for handling an accumulated (in-depth) flammable liquid-spill fire.

FLAM LIQ - 3.1.5 Origin: NFPA 16.3.5

Describe the hazards, safety procedures, and tactical guidelines for handling the product and water drainage and runoff problems that can be created at a flammable liquid bulk storage tank fire.

FLAM LIQ - 3.1.6 Origin: NFPA 16.3.6

Describe the hazards, safety procedures, and tactical guidelines for handling a flammable liquid bulk storage tank with a sunken floating roof.

FLAM LIQ - 3.1.7 Origin: NFPA 16.3.7

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Given a flammable liquid bulk storage tank fire, describe the methods and associated safety considerations for extinguishing the following types of fires by using portable application devices:

1) Pressure vent fire
2) Seal fire on an open floating roof tank
3) Seal fire on an internal floating roof tank
4) Full-surface fire on an internal floating roof tank
5) Full-surface fire on an external floating roof tank
6) Dike fire
7) Pipeline manifold fire

FLAM LIQ - 3.1.8 Origin: NFPA 16.3.8

Given the size, dimensions, and products involved for a flammable liquid spill fire, determine the following:

1) Applicable extinguishing agent
2) Approved application method (bot portable and fixed system applications)
3) Approved application rate and duration
4) Required amount of Class B foam concentrate and required amount of water
5) Volume and rate of application of water for cooling exposed tanks

FLAM LIQ - 3.1.9 Origin: NFPA 16.3.9

Given the size, dimensions, and product involved for a flammable liquid bulk storage tank fire, determine the following:

1) Applicable extinguishing agent
2) Approved application method (bot portable and fixed system applications)
3) Approved application rate and duration
4) Required amount of Class B foam concentrate and required amount of water
5) Volume and rate of application of water for cooling involved and exposed tanks

FLAM LIQ - 3.1.10 Origin: NFPA 16.3.10

Given the size, dimensions, and product involved for a fire involving a single flammable liquid bulk storage tank and its dike area, determine the following:

1) Applicable extinguishing agent
2) Approved application method (bot portable and fixed system applications)
3) Approved application rate and duration
4) Required amount of Class B foam concentrate and required amount of water
5) Volume and rate of application of water for cooling involved and exposed tanks.

FLAM LIQ - 3.1.11 Origin: NFPA 16.3.11

Given the size, dimensions, and product involved for multiple flammable liquid bulk storage tanks burning within a common dike area, determine the following:

1) Applicable extinguishing agent
2) Approved application method (bot portable and fixed system applications)
3) Approved application rate and duration
4) Required amount of Class B foam concentrate and required amount of water
5) Volume and rate of application of water for cooling involved and exposed tanks.

FLAM LIQ 4 – Implementing the Planned Response

FLAM LIQ - 4.1 Origin: NFPA 16.4

Given an analysis of an incident involving flammable liquid bulk storage tanks, implement or oversee the implementation of the selected response options safely and effectively by completing the following tasks:

FLAM LIQ - 4.1.1 Origin: NFPA 16.4.1

Given a scenario involving a flammable liquid fire, demonstrate the safe and effective methods for extinguishing the following types of fires by using portable application devices:

1) Valve and flange fires
2) Pump fire (horizontal or vertical0
3) Pressure vent fire
4) Large spill fire
5) Loading rack fire
6) Storage tank fire

FLAM LIQ - 4.1.2 Origin: NFPA 16.4.2

Given a scenario involving a three-dimensional flammable liquid fire, demonstrate the safe and effective method for controlling the fire by using portable application devices.

FLAM LIQ - 4.1.3 Origin: NFPA 16.4.3

Demonstrate grounding and bonding procedures for the transfer of flammable liquids, including the following:

1) Selection of equipment
2) Sequence of grounding and bonding connections
3) Testing of grounding and bonding connections

Hazardous Materials Technician with a Flammable Gases Bulk Storage Specialty

Hazardous materials technicians with a flammable gases bulk storage specialty is a person who, in incidents involving bulk flammable gases storage tanks and related facilities, provides support to the hazardous materials technician and other personnel, provides strategic and tactical recommendations to the on-scene incident commander, provides oversight for fire control and product removal operations, and acts as a liaison between technicians, response personnel and outside resources. For the purposes of this chapter, flammable gases bulk storage tanks also include the related pipelines, piping, transfer pumps and loading racks commonly found in a flammable gases bulk storage tank facility.

Note that NFPA 472, Chapter 17, “Competencies for Hazardous Materials Technicians with a Flammable Gases Bulk Storage Specialty”, is not intended as a mandate that hazardous materials response teams must include technicians with a flammable gases bulk storage specialty in order to perform operations at such incidents. Technicians operating within the bounds of their training as listed in NFPA 472, Chapter 7, are able to intervene at flammable gases bulk storage 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 flammable gases bulk storage incidents.

The hazardous materials technician with a flammable gases bulk storage specialty shall be trained to meet all competencies for the awareness, core operations, and technician levels and the competencies of this chapter. They shall also receive training to meet governmental occupational health and safety regulations.

(Reference: NFPA 472 (2013 edition), Chapter 17, “Competencies for Hazardous Materials Technicians with a Flammable Gases Bulk Storage Specialty”)

FLAM GAS 1 – Analyzing the Incident

FLAM GAS - 1.1 Origin: NFPA 17.2.1

Determining the Type and Extent of Damage to the Bulk Storage Tank

Given examples of incidents involving bulk flammable liquid storage tanks, describe the type of storage tank and the type and extent of damage to the tank and its associated valves, piping, fittings, and related equipment by completing the following tasks:

FLAM GAS - 1.1.1 Origin: NFPA 17.2.1.1

Given examples of various flammable gas bulk storage operations, identify and describe the procedures for the normal movement and transfer of product(s) into and out of the facility storage tanks.

FLAM GAS - 1.1.2 Origin: NFPA 17.2.1.2

Given examples of the following types of high pressure bulk gas storage tanks, describe the tank's uses and design and construction features:

1) Horizontal (bullet) tank
2) Spherical tank.

FLAM GAS - 1.1.3 Origin: NFPA 17.2.1.3

Given examples of various high pressure bulk gas storage tanks, point out and explain the design and purpose of each of the following storage tank components and fittings:

1) Liquid valve and vapor valve
2) Pressure relief valve
3) Gauging device
4) Tank piping and piping supports
5) Transfer pumps
6) Monitoring and detection systems
7) Fixed or semifixed fire protection system

FLAM GAS 2 – Predicting the Likely Behavior of the Bulk Storage Tank and Contents

FLAM GAS -2.1 Origin: NFPA 17.2.2

Technicians with a flammable liquids bulk storage specialty shall predict the likely behavior of the tank and its contents by completing the following tasks:

FLAM GAS - 2.1.1 Origin: NFPA 17.2.2.1

Given examples of different types of bulk flammable gas storage tank facilities, identify the impact of the following fire and safety features on the behavior of the products during an incident:

1) Tank spacing
2) Product spillage and control (impoundment and diking)
3) Tank venting and flaring systems
4) Transfer and product movement capabilities
5) Monitoring and detection systems
6) Fire protection systems

FLAM GAS - 2.1.2 Origin: NFPA 17.2.2.2

Given examples of different types of flammable gas bulk storage systems, identify and describe the application, use and limitations of the types of fixed and semifixed fire protection systems that can be used, including the following:

1) Water spray systems
2) Fixed water monitors
3) Fixed hydrocarbon monitoring system

FLAM GAS - 2.1.3 Origin: NFPA 17.2.2.3

Given a flammable gas bulk storage tank and its associated piping, describe the likely breach or release mechanisms and fire scenarios.

FLAM GAS 3 – Planning the Response

FLAM GAS - 3.1 Origin: NFPA 17.3

Given an analysis of an emergency involving flammable gas bulk storage tanks, determine response options for the storage tank involved by completing the following tasks:

FLAM GAS - 3.1.1 Origin: NFPA 17.3.1

Describe the hazards, safety, and tactical considerations required for the following types of flammable gas incidents:

1) Flammable vapor release (no fire)
2) Flammable vapor release (fire)
3) Liquefied flammable gas release (no fire)
4) Liquefied flammable gas release (fire)

FLAM GAS - 3.1.2 Origin: NFPA 17.3.2

Given a flammable gas storage tank with a liquid leak from the pressure relief valve, describe the hazards, safety, and tactical considerations for controlling this type of leak.

FLAM GAS - 3.1.3 Origin: NFPA 17.3.3

Given a flammable gas fire from an elevated structure (e.g., tower or column) describe the hazards, safety, and tactical considerations for controlling this type of release.

FLAM GAS - 3.1.4 Origin: NFPA 17.3.4

Describe the purpose of, potential risks associated with, procedures for, equipment required to implement, and safety precautions for the following product removal techniques:

1) Transfer of liquids and vapors
2) Flaring of liquids and vapors
3) Venting
4) Hot and cold tapping

FLAM GAS - 3.1.5 Origin: NFPA 17.3.5

Describe the effect that flaring or venting of gas or liquid has on the pressure in the tank (flammable gas or flammable liquid product).

FLAM GAS - 3.1.6 Origin: NFPA 17.3.6

Describe the hazards, safety procedures, and tactical guidelines for handling product and water drainage and runoff problems that can be created at a flammable gas bulk storage facility incident.

FLAM GAS 4 – Implementing the Planned Response

FLAM GAS - 4.1 Origin: NFPA 17.4

Given an analysis of an emergency involving flammable gas bulk storage tanks, implement or oversee the implementation of the selected response options safely and effectively by completing the following tasks:

FLAM GAS - 4.1.1 Origin: NFPA 17.4.1

Given a scenario involving a flammable gas incident, demonstrate the safe and effective methods for controlling the following types of emergencies by using portable application devices:

1) Unignited vapor release
2) Valve and/or flange vapor release (no fire)
3) Valve and/or flange fire
4) Pump fire (horizontal or vertical)

FLAM GAS - 4.1.2 Origin: NFPA 17.4.2

Given a scenario involving the simultaneous release of both flammable liquids and flammable gases, demonstrate the safe and effective method for controlling the following types of emergencies by using portable application devices:

1) Unignited vapor release
2) Flange fire
3) Pump seal fire

FLAM GAS - 4.1.3 Origin: NFPA 17.4.3

Demonstrate grounding and bonding procedures for the transfer of flammable gases, including the following:

1) Selection of proper equipment
2) Sequence of grounding and bonding connections

3) Proper testing of grounding and bonding connections

FLAM GAS - 4.1.4 Origin: NFPA 17.4.4

Given a scenario involving a flammable gas incident from a bulk storage tank or pipeline, describe the procedures for site safety and fire control during cleanup and removal operations.

Hazardous Materials Technician with a Radioactive Material Specialty

The hazardous materials technician with a radioactive materials specialty is a person who, in incidents involving radioactive materials, provides support to the hazardous materials technician on the use of radiation detection instruments, manages the control of radiation exposure, conducts hazards assessment, and acts as a liaison between hazardous materials technicians at incidents involving radioactive materials..

Note that NFPA 472, Chapter 18, “Competencies for Hazardous Materials Technicians with a Radioactive Material Specialty”, is not intended as a mandate that hazardous materials response teams must include technicians with a radioactive materials specialty in order to perform operations at such incidents. Technicians operating within the bounds of their training as listed in NFPA 472, Chapter 7, are able to intervene at radioactive materials 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 radioactive materials incidents.

The hazardous materials technician with a radioactive material specialty shall be trained to meet all competencies for the awareness, core operations, and technician levels and the competencies of this chapter. They shall also receive training to meet governmental occupational health and safety regulations.

(Reference: NFPA 472m (2013 edition), Chapter 18, “Competencies for Hazardous Materials Technicians with a Radioactive Material Specialty”)

RAD MAT 1 – Analyzing the Incident

RAD MAT - 1.1	Origin: NFPA 18.2.1

Understanding Nuclear Science and Radioactivity

Technicians with a radioactive material specialty shall have an understanding of nuclear science and radioactivity, including the units and terms used to describe radiation and radioactive materials by completing the following tasks:

RAD MAT – 1.1.1	Origin: NFPA 18.2.1 (1)

Define the following terms:

a. Ionization
b. Nucleon
c. Nuclide
d. Isotope
e. Excitation
k. Becquerel
l. Specific activity
m. Half-life
n. Exposure
o. Absorbed dose

f. Bremsstrahlung	p. Dose equivalent
g. Fission	q. Quality factor
h. Fusion	r. Roentgen
i. Criticality	s. Rad/grav
j. Curie	t. Rem/Sievert

.

RAD MAT – 1.1.2 Origin: NFPA 18.2.1 (1)

Identify the basic principles of the mass-energy equivalence concept.

RAD MAT – 1.1.3 Origin: NFPA 18.2.1 (3)

Identify how the neutron-to-proton ration is related to nuclear stability.

RAD MAT – 1.1.4 Origin: NFPA 18.2.1 (4)

Define the following terms related to nuclear stability:

1) Radioactivity
2) Radioactive decay

RAD MAT – 1.1.5 Origin: NFPA 18.2.1 (5)

Explain the characteristics of alpha, beta, gamma, and neutron radiations and the methods by which they interact with matter.

RAD MAT – 1.1.6 Origin: NFPA 18.2.1 (6)

Explain the function of a radiation dispersal device (RDD).

RAD MAT – 1.1.7 Origin: NFPA 18.2.1 (7)

Explain the function of a radiation exposure device (RED).

RAD MAT – 1.1.8 Origin: NFPA 18.2.1 (8)

Explain the function of an improvised nuclear device (IND).

RAD MAT – 1.1.9 Origin: NFPA 18.2.1 (9)

Using reference documents or computer programs, identify the following for a given nuclide:

1) Atomic number
2) Atomic mass
3) Stability
4) Half-life
5) Types and energies of radioactive emissions

RAD MAT – 1.1.10 Origin: NFPA 18.2.1 (10)

Given the Chart of Nuclides, trace the decay of a radioactive nuclide and identify the stable end product.

RAD MAT – 1.1.11 Origin: NFPA 18.2.1 (11)

Name examples of materials best suited to shield from the following types of radiation:

1) Alpha
2) Beta
3) Gamma
4) Neutron

RAD MAT – 1.1.12 Origin: NFPA 18.2.1 (12)

Explain the concept of linear energy transfer (LET).

RAD MAT - 1.2 Origin: NFPA 18.2.2

Understanding the Biological Effects of Ionizing Radiation

Technicians with a radioactive material specialty shall have an understanding of how ionizing radiation affects the human body by completing the following tasks:

RAD MAT – 1.2.1 Origin: NFPA 18.2.2 (1)

Define the law of Bergonie and Tribondeau.

RAD MAT – 1.2.2 Origin: NFPA 18.2.2 (2)

Describe factors that affect the radiosensitivity of cells.

RAD MAT – 1.2.3 Origin: NFPA 18.2.2 (3)

Given a list of types of cells, identify which are the most and which are the least radiosensitive.

RAD MAT – 1.2.4 Origin: NFPA 18.2.2 (4)

Define the following terms and give examples of each:

1) Stochastic effect
2) Nonstochastic effect

RAD MAT – 1.2.5 Origin: NFPA 18.2.2 (5)

Describe the LD 50/30 value for humans.

RAD MAT – 1.2.6 Origin: NFPA 18.2.2 (6)

Identify the possible somatic and genetic effects of an acute and chronic exposure to radiation.

RAD MAT – 1.2.7 Origin: NFPA 18.2.2 (7)

Explain the three classic syndromes and four stages of types of the acute radiation syndrome and identify the exposure levels and symptoms associated with each.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

RAD MAT – 1.2.8 Origin: NFPA 18.2.2 (8)

Describe the risks of radiation exposure to the developing embryo and fetus.

RAD MAT – 1.2.9 Origin: NFPA 18.2.2 (9)

Distinguish between the terms somatic and heritable as they apply to biological effects.

RAD MAT - 1.3 Origin: NFPA 18.2.3

Radiation Detector Theory

Technicians with a radioactive material specialty shall have an understanding of radiation detector theory in order to select the correct type of radiological survey instrument at a hazardous materials/WMD incident involving radioactive materials by completing the following tasks:

RAD MAT – 1.3.1 Origin: NFPA 18.2.3 (1)

Given a graph of the gas amplification curve, identify the regions of the curve.

RAD MAT – 1.3.2 Origin: NFPA 18.2.3 (2)

Identify the characteristics of a detector operated in each of the useful regions of the gas amplification curve.

RAD MAT – 1.3.3 Origin: NFPA 18.2.3 (3)

Describe the methods employed with gas-filled detectors to discriminate among various types of radiation and various radiation energies.

RAD MAT – 1.3.4 Origin: NFPA 18.2.3 (4)

Explain how a scintillation detector and associated components operate to detect and measure radiation.

RAD MAT – 1.3.5 Origin: NFPA 18.2.3 (5)

Explain how neutron detectors detect neurons and provide an electrical signal.

RAD MAT – 1.3.6 Origin: NFPA 18.2.3 (6)

Explain the fundamental mechanism by which isotope identification detectors operate and the advantages and disadvantages of the different types of systems available.

RAD MAT - 1.4 Origin: NFPA 18.2.4

Radiation Material Transportation

Technicians with a radioactive material specialty shall have an understanding of how radioactive material is transported and how to identify this material at a hazardous materials/WMD incident by completing the following tasks:

RAD MAT – 1.4.1 Origin: NFPA 18.2.4 (1)

List the applicable agencies that have regulations governing the transport of radioactive material.

RAD MAT – 1.4.2 Origin: NFPA 18.2.4 (2)

Identify the types of packages used in the transport of radioactive material and list examples of material shipped in each type of shipping package.

RAD MAT – 1.4.3 Origin: NFPA 18.2.4 (3)

Identify terminology and acronyms associated with shipments of radioactive material.

RAD MAT – 1.4.4 Origin: NFPA 18.2.4 (4)

Describe methods that can be used to determine the radionuclide contents of a package.

RAD MAT – 1.4.5 Origin: NFPA 18.2.4 (5)

Identify the information contained on shipping papers used for transporting radioactive material.

RAD MAT – 1.4.6 Origin: NFPA 18.2.4 (6)

Describe the radiation and contamination surveys that are performed on radioactive material packages and state the applicable limits.

RAD MAT – 1.4.7 Origin: NFPA 18.2.4 (7)

Describe the radiation and contamination surveys that are performed on exclusive-use vehicles and state the applicable limits.

RAD MAT – 1.4.8 Origin: NFPA 18.2.4 (8)

Identify the approved placement of placards on a transport vehicle.

RAD MAT 2 – Planning the Response

RAD MAT - 2.1 Origin: NFPA 18.3.1

External Exposure Control

Given the analysis of an incident involving radioactive materials, determine the response options needed to minimize external exposure to radioactive material by completing the following tasks:

RAD MAT – 2.1.1 Origin: NFPA 18.3.1 (1)

Calculate the gamma exposure rate for specific radionuclides using equations or by using a computer program.

RAD MAT – 2.1.2 Origin: NFPA 18.3.1 (2)

Using the stay time equation, calculate an individual's remaining allowable dose equivalent, or stay time.

RAD MAT – 2.1.3 Origin: NFPA 18.3.1 (3)

Identify "distance to radiation sources" techniques for minimizing personnel external exposures.

RAD MAT – 2.1.4 Origin: NFPA 18.3.1 (4)

Using the point source equation (inverse square law), calculate the exposure rate or distance for a point source of radiation.

RAD MAT – 2.1.5 Origin: NFPA 18.3.1 (5)

Define the unit of density thickness.

RAD MAT – 2.1.6 Origin: NFPA 18.3.1 (6)

Calculate shielding thickness or exposure rates for gamma and x-ray radiation using the equations or by using a computer program.

RAD MAT - 2.2 Origin: NFPA 18.3.2

Internal Exposure Control

Given the analysis of an incident involving radioactive material, determine the response options needed to minimize internal exposure to radioactive material by completing the following tasks:

RAD MAT – 2.2.1 Origin: NFPA 18.3.2 (1)

Define the terms annual limit on intake (ALI) and derived air concentration (DAC).

RAD MAT – 2.2.2 Origin: NFPA 18.3.2 (2)

Define the term *reference man*.

RAD MAT – 2.2.3 Origin: NFPA 18.3.2 (3)

Describe three factors that govern the behavior of radioactive materials in the body.

RAD MAT – 2.2.4 Origin: NFPA 18.3.2 (4)

Explain the two natural mechanisms that reduce the quantity of a radionuclide in the body.

RAD MAT – 2.2.5 Origin: NFPA 18.3.2 (5)

Explain the relationship of physical, biological, and effective half-lives.

RAD MAT – 2.2.6 Origin: NFPA 18.3.2 (6)

Given the physical and biological half-lives, calculate the effective half-life.

RAD MAT – 2.2.7 Origin: NFPA 18.3.2 (7)

Describe methods used to increase the elimination rate of radioactive materials from the body.

RAD MAT - 2.3 Origin: NFPA 18.3.3

Radiation Survey Instrumentation

Given the analysis of an incident involving radioactive material, determine the correct instrument to use for radiation and contamination monitoring by completing the following tasks:

RAD MAT – 2.3.1 Origin: NFPA 18.3.3 (1)

Describe the following features of and specifications for commonly used instruments:

1) Types of detectors or probes available
2) Operator-adjustable controls
3) Specific limitations and characteristics

RAD MAT – 2.3.2 Origin: NFPA 18.3.3 (2)

Describe the factors that affect the selection of a portable radiation survey instrument and identify appropriate instruments for external radiation surveys.

RAD MAT – 2.3.3 Origin: NFPA 18.3.3 (3)

Identify the follow features of and specifications for exposure rate instruments:

1) Types of detectors available for use
2) Detector shielding and window
3) Types of radiation detected and measured
4) Gamma energy response characteristics
5) Markings for detector effective center
6) Specific limitations and characteristics

RAD MAT – 2.3.4 Origin: NFPA 18.3.3 (4)

List the factors that affect the selection of a portable contamination monitoring instrument.

RAD MAT – 2.3.5 Origin: NFPA 18.3.3 (5)

Describe the following features of and specifications for commonly used count rate meter probes:

1) Types of detectors available for use
2) Detector shielding and window
3) Types of radiation detected and measured
4) Gamma energy response characteristics
5) Specific limitations and characteristics

RAD MAT 3 – Implementing the Planned Response

RAD MAT - 3.1 Origin: NFPA 18.4.1

Radiological Incidents

Given an analysis of an incident involving radioactive materials and the planned response, implement or oversee the response to a given radiological emergency by completing the following tasks:

RAD MAT – 3.1.1 Origin: NFPA 18.4.1 (1)

Describe the general response and responsibilities of a specialist during any radiological incident.

RAD MAT – 3.1.2 Origin: NFPA 18.4.1 (2)

Describe the specialist’s response to personnel contamination.

RAD MAT – 3.1.3 Origin: NFPA 18.4.1 (3)

Describe the specialist’s response to off-scale or lost dosimetry.

RAD MAT – 3.1.4 Origin: NFPA 18.4.1 (4)

Describe the specialist’s response to rabidly increasing or unanticipated radiation levels.

RAD MAT – 3.1.5 Origin: NFPA 18.4.1 (5)

Describe the specialist’s response to a radioactive material spill.

RAD MAT – 3.1.6 Origin: NFPA 18.4.1 (6)

Describe the specialist’s response to a fire in a radiological area or involving radioactive materials.

RAD MAT – 3.1.7 Origin: NFPA 18.4.1 (7)

Identify the available federal responder resources and explain the assistance that each group can provide.

RAD MAT - 3.2 Origin: NFPA 18.4.2

Contamination Control

Given an analysis of an incident involving radioactive material and the planned response, implement or oversee contamination control techniques to minimize the spread of radiological contamination by completing the following tasks:

RAD MAT – 3.2.1 Origin: NFPA 18.4.2 (1)

Define the terms removable and fixed surface contamination.

RAD MAT – 3.2.2 Origin: NFPA 18.4.2 (2)

State the basic principles of contamination control and list examples of implementation methods.

RAD MAT – 3.2.3 Origin: NFPA 18.4.2 (3)

State the purpose of using protective clothing in radiologically contaminated areas.

RAD MAT – 3.2.4 Origin: NFPA 18.4.2 (4)

Describe the basic factors that determine protective clothing requirements for personal protection.

RAD MAT - 3.3 Origin: NFPA 18.4.3

Personal Decontamination

Given an analysis of an incident involving radioactive material and the planned response, implement or oversee decontamination techniques for equipment and personnel by completing the following tasks:

RAD MAT – 3.3.1 Origin: NFPA 18.4.3 (1)

Describe how personnel, personal protective equipment, apparatus, and tools become contaminated with radioactive material.

RAD MAT – 3.3.2 Origin: NFPA 18.4.3 (2)

State the purpose of radioactive material decontamination.

RAD MAT – 3.3.3 Origin: NFPA 18.4.3 (3)

Describe field decontamination techniques.

RAD MAT – 3.3.4 Origin: NFPA 18.4.3 (4)

Describe the three factors that determine the actions taken in decontamination of personnel.

RAD MAT – 3.3.5 Origin: NFPA 18.4.3 (5)

Describe methods and techniques for performing personnel decontamination.

Page Intentionally Left Blank

Hazardous Materials Incident Response Curriculum Guidelines

Incident Commander

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

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 awareness level shall receive at least 24 hours of training equal to the emergency 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 incident activities, including the development of strategies and tactics and the ordering and release of resources as designated by the authority having jurisdiction. This is the equivalent to the on-scene incident commander as defined by OSHA 1910.120.

Training 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 SOPs, technical updates on state and federal response plans, and field exercise practice performing command roles in simulated emergencies.

Summary of Training Requirements

Hazardous Materials Incident Commander

Audience

All responders whose level of command responsibility may include incident commander at all phases of a hazmat incident.

Prerequisites

Awareness and Core Operations training .

Training

16-40 hours in classroom and simulator/field instruction.
Competencies:

- Knowledge of role of incident commander within the 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 haz mat 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.

Refresher

Annual refresher training recommended to include instruction, review, and/or retesting of competencies required for command of hazardous materials incidents, including:

- Understanding of current command structure SOPs
- Understanding of changes and updates to state and federal response plans
- Refresher practice on incident scene management and coordination, and practice on incident decision-making using simulated emergencies.

Federal Training Requirements

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)

HAZARDOUS MATERIALS 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.

(S) Know and be able to implement the employer's incident command system

(T) Know how to implement the employer's emergency response plan

(U) Know and understand the hazards and risks associated with employees working in chemical protective clothing

(V) Know how to implement the local emergency response plan

(W) Know of the state emergency response plan and of the Federal Regional Response Team

(X) Know and understand the importance of decontamination procedures

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

(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.

(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.

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

Required Training Objectives

OSHA I.C. - A

Given a simulated incident involving hazardous materials, demonstrate implementation of the employer's incident command system.

OSHA I.C. – A.1

Demonstrate establishing command, organizing resources and assigning subordinate units and personnel, and establishing lines of communication.- OSHA 29 CFR 1910.120(q)(3)(i).

OSHA I.C. – A.2

Demonstrate transfer of command.- Note to OSHA 29 CFR 1910.120(q)(3)(i).

OSHA I.C. – A.3

Define the roles and responsibilities of the safety officer.- OSHA 29 CFR 1910.120 (q)(3)(vii and viii).

OSHA I.C. - B

Given a simulated incident involving hazardous materials, demonstrate implementation of the employer's emergency response plan.

OSHA I.C. – B.1

Identify all hazardous substances or conditions present and describe as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies. OSHA 29 CFR 1910.120(q)(3)(ii).

OSHA I.C. – B.2

Determine and describe appropriate emergency operations, including correct use of personal protective equipment, based on the hazardous substance and/or conditions present. OSHA 29 CFR 1910.120(q)(3)(iii).

OSHA I.C - C

Given a simulated incident involving hazardous materials, identify the hazards and risks associated with employees working in chemical protective clothing.

OSHA I.C. – C.1

Identify the process to determine, through the use of air monitoring, when it is safe for subordinate personnel to discontinue use of positive pressure self-contained breathing apparatus. OSHA 29 CFR 1910.120(q)(3)(iv).

OSHA I.C. – C.2

\Identify strategies and tactics to minimize the number of emergency response personnel working in areas of potential or actual exposure to incident or site hazards, while using the buddy system in groups of two or more. OSHA 29 CFR 1910.120(q)(3)(v).

OSHA I.C. – C.3

Identify requirements for backup assistance and rescue personnel and qualified basic life support personnel, equipment, and transportation capability. OSHA 29 CFR 1910.120(q)(3)(vi).

OSHA I.C - D

Given a simulated incident involving hazardous materials, demonstrate implementation of the local emergency response plan.

OSHA I.C. - E

Identify and describe the State emergency response plan and the federal regional response team.

OSHA I.C. - F

Given a simulated incident involving hazardous materials, identify and demonstrate management of decontamination procedures.

Recommended Training Objectives

The following training objectives are recommended for hazardous materials incident commander training. The incident commander is responsible for directing and coordinating all aspects of a hazards materials incident. The primary source for the material is NFPA 472, Chapter 8 (2013 edition): Competencies for Incident Commanders. 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

HMIC - 1.1	**Origin: NFPA 8.1.2.2(1)**	***Supports OSHA I.C. - B.1,C***
This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	This indicates which OSHA requirement this objective supports.

HMIC 1 - Analyzing the Incident

HMIC - 1.1 Origin: NFPA 8.2.1 and 8.2.1.1 *Supports OSHA I.C.-B.1*

Collecting and Interpreting Hazard and Response Information

Given access to printed and technical resources, computer databases, and monitoring equipment, the incident commander shall collect and interpret hazard and response information not available from the current edition of the Emergency Response Guidebook or a Safety Data Sheet.

HMIC - 1.1.1 Origin: NFPA 8.2.1.2 *Supports OSHA TECH – B.1*

The incident commander shall be able to 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 databases
2. Monitoring equipment
3. Reference manuals
4. Technical information centers
5. Technical information specialists

HMIC - 1.2 Origin: NFPA 8.2.2 *Supports OSHA I.C.-B.1*

Estimating Potential Outcomes

Given scenarios involving hazardous materials/WMD incidents, the surrounding conditions, and the predicted behavior of the container and its contents, the incident commander shall estimate the potential outcomes within the endangered area and shall complete the following tasks:

HMIC - 1.2.1 Origin: NFPA 8.2.2(1) *Supports OSHA I.C. – B.1*

Identify the steps for estimating the outcomes within an endangered area of a hazardous materials/WMD incident.

HMIC - 1.2.2 Origin: NFPA 8.2.2(2) *Supports OSHA I.C. – B.1*

Describe the following toxicological terms and exposure values and explain their significance in the analysis process:

1. Counts per minute (cpm) and kilocounts per minute (kcpm)
2. Immediately dangerous to life and health (IDLH) value
3. Infectious dose
4. Lethal concentrations (LC50)
5. Lethal dose (LD50)
6. Parts per billion (ppb)
7. Parts per million (ppm)
8. Permissible exposure limit (PEL)
9. Radiation absorbed dose (rad)
10. Roentgen equivalent man (rem); millirem (mrem); microrem (μrem)
11. Threshold limit value time-weighted average (TLV-TWA)
12. Threshold limit value short-term exposure limit (TLV-STEL)
13. Threshold limit value ceiling (TLV-C)

HMIC - 1.2.3 Origin: NFPA 8.2.2(3) *Supports OSHA I.C. – B.1*

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

HMIC - 1.2.4 Origin: NFPA 8.2.2(4) *Supports 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.

HMIC - 1.2.5 Origin: NFPA 8.2.2(5) *Supports 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:

1. Acute and delayed toxicity (chronic)
2. Dose-response
3. Local and systemic effects
4. Routes of exposure
5. Synergistic effects

HMIC - 1.2.6 Origin: NFPA 8.2.2(6) *Supports OSHA I.C. – B.1, B.2*

Describe the health risks associated with the following:

1. Biological agents and biological toxins
2. Blood agents
3. Choking agents
4. Irritants (riot control agents)
5. Nerve agents
6. Radiological materials
7. Vesicants (blister agents)

HMIC 2 – Planning the Response

HMIC - 2.1 Origin: NFPA 8.3.1 *Supports OSHA I.C.-B.2*

Identifying Response Options

Given an analysis of a hazardous materials/WMD incident, the incident commander shall be able to describe the steps for determining response objectives (defensive, offensive, and nonintervention).

HMIC - 2.2 Origin: NFPA 8.3.2 *Supports OSHA I.C.-B.2*

Identifying the Potential Response Options

Given scenarios involving hazardous materials/WMD, the incident commander shall identify the possible response options (defensive, offensive, and non-intervention) by response objective for each problem and shall complete the following tasks:

HMIC - 2.2.1 Origin: NFPA 8.3.2 (1) *Supports OSHA I.C. – B.2*

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

HMIC - 2.2.2 Origin: NFPA 8.3.2 (2) *Supports OSHA I.C. – B.2*

Identify the purpose of each of the following techniques for hazardous materials control:

1. Absorption
2. Adsorption
3. Blanketing
4. Contamination isolation
5. Covering
6. Damming
7. Diking
8. Dilution
9. Diversion
10. Dispersion
11. Fire suppression
12. Neutralization
13. Overpacking
14. Patching
15. Plugging
16. Pressure isolation and reduction (flaring; venting; vent and burn; and isolation of valves, pumps, or energy sources)
17. Retention
18. Solidification
19. Transfer
20. Vapor control: dispersion, suppression

HMIC - 2.3 Origin: NFPA 8.3.3 *Supports OSHA I.C.-B.2*

Approving the Level of Personal Protective Equipment

Given scenarios involving hazardous materials/WMD with known and unknown hazardous materials/WMD, the incident commander shall approve the personal protective equipment for the response options specified in the incident action plan in each situation and shall complete the following tasks:

HMIC - 2.3.1 Origin: NFPA 8.3.3 (1) *Supports OSHA I.C. – B.2*

Identify the four levels of chemical protection (EPA/OSHA) and describe the equipment required for each level with the conditions under which each level is used.

HMIC - 2.3.2 Origin: NFPA 8.3.3 (2) *Supports OSHA I.C. – B.2*

Given Describe the following terms and explain their impact and significance on the selection of chemical-protective clothing:

1. Degradation
2. Penetration

Response Training Considerations | Awareness Level Personnel | Operations Level Responders: Core Competencies, Mission-Specific Competencies | Haz Mat Technician | Haz Mat Technician with Speciality | Incident Commander | Specialist Employee C,B,A | Haz Mat Officer | Haz Mat Safety Officer | BLS Basic Life Support Responder | ALS Advanced Life Support Responder | ALS Mission Specific Competencies | Hospital First Receiver | Appendix: Standards & Special Topics

HMIC - 2.3.3 Origin: NFPA 8.3.3 (3) *Supports OSHA I.C. – B.2*

Describe three safety considerations for personnel working in vapor protective, liquid splash–protective, and high temperature–protective clothing.

HMIC - 2.3.4 Origin: NFPA 8.3.3 (4) *Supports OSHA I.C. – B.2*

Identify the physiological and psychological stresses that can affect users of personal protective equipment.

HMIC - 2.4 Origin: NFPA 8.3.4 *Supports OSHA I.C.- A, A.1, B,C,D*

Developing an Incident Action Plan

Given scenarios involving hazardous materials/WMD incidents, the incident commander shall develop an incident action plan, including site safety and control plan, consistent with the emergency response plan and/or standard operating procedures and within the capability of the available personnel, personal protective equipment, and control equipment.

HMIC - 2.4.1 Origin: NFPA 8.3.4.1 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the steps for developing an incident action plan.

HMIC - 2.4.2 Origin: NFPA 8.3.4.2 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the factors to be evaluated in selecting public protective actions including evacuation and sheltering in-place.

HMIC - 2.4.3 Origin: NFPA 8.3.4.3 *Supports OSHA I.C. – A, A.1, B,C,D*

Given the emergency response plan and/or standard operating procedures, the incident commander shall identify which agency will perform the following:

1. Receive the initial notification
2. Provide secondary notification and activation of response agencies
3. Make ongoing assessments of the situation
4. Command on-scene personnel (incident management system)
5. Coordinate support and mutual aid
6. Provide law enforcement and on-scene security (crowd control)
7. Provide traffic control and rerouting
8. Provide resources for public safety protective action (evacuation or shelter in-place)
9. Provide fire suppression services
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 incident or crime scene investigation
23. Provide evidence collection and sampling

HMIC - 2.4.4 Origin: NFPA 8.3.4.4 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the process for determining the effectiveness of an action option on the potential outcomes.

HMIC - 2.4.5 Origin: NFPA 8.3.4.5 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the safe operating practices/procedures that are required to be followed at a hazardous materials/WMD incident.

HMIC - 2.4.5.1 Origin: NFPA 8.3.4.5.1 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the importance of pre incident planning relating to safety during responses to specific sites.

HMIC - 2.4.5.2 Origin: NFPA 8.3.4.5.2 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the procedures for presenting a safety briefing prior to allowing personnel to work on a hazardous materials/WMD incident.

HMIC - 2.4.5.3 Origin: NFPA 8.3.4.5.3 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify at least three safety precautions associated with search and rescue missions at hazardous materials/WMD incidents.

HMIC - 2.4.5.4 Origin: NFPA 8.3.4.5.4 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the advantages and limitations and describe an example where each of the following decontamination methods would be used:

1. Absorption
2. Adsorption
3. Chemical degradation
4. Dilution
5. Disinfection

6. Evaporation
7. Isolation and disposal
8. Neutralization
9. Solidification
10. Sterilization
11. Vacuuming
12. Washing

HMIC - 2.4.5.5 Origin: NFPA 8.3.4.5.5 *Supports OSHA I.C. – A, A.1, B,C,D*

The incident commander shall identify the atmospheric and physical safety hazards associated with hazardous materials/WMD incidents involving confined spaces.

HMIC 3 – Implementing the Planned Response

HMIC - 3.1 Origin: NFPA 8.4.1 *Supports OSHA I.C.- A, A.1, B,B.1, D*

Identifying Response Options

Given a copy of the emergency response plan and annexes related to hazardous materials/WMD, the incident commander shall identify the requirements of the plan, including the procedures for notification and utilization of non-local resources (private, state, and federal government personnel), and shall meet the following requirements:

HMIC - 3.1.1 Origin: NFPA 8.4.1 (1) *Supports OSHA I.C. – A, A.1, B,B.1, D*

Identify the role of the incident commander during a hazardous materials/WMD incident.

HMIC - 3.1.2 Origin: NFPA 8.4.1 (2) *Supports OSHA I.C. – A, A.1, B,B.1, D*

Describe the concept of unified command, and its application and use at a hazardous materials/WMD incident.

HMIC - 3.1.3 Origin: NFPA 8.4.1 (3) *Supports OSHA I.C. – A, A.1, B,B.1, D*

Identify the duties and responsibilities of the following hazardous materials branch/group functions within the incident management system:

1. Decontamination
2. Entry (back-up)
3. Hazardous materials branch director/group supervisor
4. Hazardous materials safety
5. Information/research

HMIC - 3.1.4 Origin: NFPA 8.4.1 (4) *Supports OSHA I.C. – A, A.1, B,B.1, D*

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.

HMIC - 3.1.5	Origin: NFPA 8.4.1 (5)	*Supports OSHA I.C. – A, A.1, B,B.1, D*

Given the emergency response planning documents, identify the elements of each of the documents.

HMIC - 3.1.6	Origin: NFPA 8.4.1 (6)	*Supports OSHA I.C. – A, A.1, B,B.1, D*

Identify the elements of the incident management system necessary to coordinate response activities at hazardous materials/WMD incidents.

HMIC - 3.1.7	Origin: NFPA 8.4.1 (7)	*Supports OSHA I.C. – A, A.1, B,B.1, D*

Identify the primary 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.

HMIC - 3.1.8	Origin: NFPA 8.4.1 (8)	*Supports OSHA I.C. – A, A.1, B,B.1, D*

Identify the governmental agencies and resources that may offer assistance during a hazardous materials/WMD incident and identify their role and the type of assistance or resources available.

HMIC - 3.2	Origin: NFPA 8.4.2	*Supports OSHA I.C.- A, A.1, B,B.1, D*

Directing Resources (Private and Governmental)

Given a scenario involving a hazardous materials/WMD 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.

HMIC - 3.3	Origin: NFPA 8.4.3	*Supports OSHA I.C.- A*

Identifying Response Options

Given a scenario involving a hazardous materials/WMD incident, the incident commander shall identify information to be provided to the media and local, state, and federal officials, and complete the following tasks:

HMIC - 3.3.1	Origin: NFPA 8.4.3 (1)	*Supports OSHA I.C. – A*

Identify the local policy for providing information to the media.

HMIC - 3.3.2	Origin: NFPA 8.4.3 (2)	*Supports OSHA I.C. – A*

Identify the responsibilities of the public information officer at a hazardous materials/WMD incident.

HMIC - 3.3.3 Origin: NFPA 8.4.3 (3) *Supports OSHA I.C. – A*

Describe the concept of a Joint Information Center (JIC), and its application and use at a hazardous materials/WMD incident.

HMIC 4 – Evaluating Progress

HMIC - 4.1 Origin: NFPA 8.5.1 *Supports OSHA I.C.- A, B, D, F*

Identifying Response Options

Given scenarios involving hazardous materials/WMD incidents, the incident commander shall evaluate the progress of the incident action plan to determine whether the efforts are accomplishing the response objectives and shall complete the following tasks:

HMIC - 4.1.1 Origin: NFPA 8.5.1 (1) *Supports OSHA I.C. – A, B, D, F*

Identify the procedures for evaluating whether the action options are effective in accomplishing the objectives.

HMIC - 4.1.2 Origin: NFPA 8.5.1 (2) *Supports OSHA I.C. – A, B, D, F*

Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.

HMIC - 4.1.3 Origin: NFPA 8.5.1 (3) *Supports OSHA I.C. – A, B, D, F*

Determine the effectiveness of the following:

1. Control, containment, or confinement operations
2. Decontamination process
3. Established control zones
4. Personnel being used
5. Personal protective equipment

HMIC - 4.1.4 Origin: NFPA 8.5.1 (4) *Supports OSHA I.C. – A, B, D, F*

Make modifications to the incident action plan as necessary.

HMIC - 4.2 Origin: NFPA 8.5.2 *Supports OSHA I.C.- A, B, D, F*

Transferring Command

Given a scenario involving a hazardous materials/WMD incident, the emergency response plan, and the 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.

HMIC 5 – Terminating the Incident

HMIC - 5.1 Origin: NFPA 8.6.1 *Supports OSHA I.C.- A*

Terminating Response Operations

Given a scenario involving a hazardous materials/WMD incident in which the incident action plan objectives have been achieved, the incident commander shall be able to identify the steps to be taken to terminate the incident consistent with the emergency response plan and standard operating procedures.

HMIC - 5.2 Origin: NFPA 8.6.2 *Supports OSHA I.C.- A, B, D*

Conducting a Debriefing

Given scenarios involving a hazardous materials/WMD incident, the incident commander shall conduct a debriefing of the incident and shall complete the following tasks:

HMIC - 5.2.1 Origin: NFPA 8.6.2 (1) *Supports OSHA I.C. – A, B, D*

Describe three components of an effective debriefing.

HMIC - 5.2.2 Origin: NFPA 8.6.2 (2) *Supports OSHA I.C. – A, B, D*

Describe the key topics in an effective debriefing.

HMIC - 5.2.3 Origin: NFPA 8.6.2 (3) *Supports OSHA I.C. – A, B, D*

Describe when a debriefing should take place.

HMIC - 5.2.4 Origin: NFPA 8.6.2 (4) *Supports OSHA I.C. – A, B, D*

Describe who should be involved in a debriefing.

HMIC - 5.2.5 Origin: NFPA 8.6.2 (5) *Supports OSHA I.C. – A, B, D*

Identify the procedures for conducting incident debriefings at a hazardous materials/WMD incident.

HMIC - 5.3 Origin: NFPA 8.6.3 *Supports OSHA I.C.- A, B, D*

Conducting a Critique

Given details of a scenario involving multi-agency hazardous materials/WMD incident, the incident commander shall conduct a critique of the incident, and shall complete the following tasks

HMIC - 5.3.1 Origin: NFPA 8.6.3 (1) *Supports OSHA I.C. – A, B, D*

Describe three components of an effective critique.

HMIC - 5.3.2 Origin: NFPA 8.6.3 (2) *Supports OSHA I.C. – A, B, D*

Describe who should be involved in a critique.

HMIC - 5.3.3 Origin: NFPA 8.6.3 (3) *Supports OSHA I.C. – A, B, D*

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

HMIC - 5.3.4 Origin: NFPA 8.6.3 (4) *Supports OSHA I.C. – A, B, D*

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

HMIC - 5.3.5 Origin: NFPA 8.6.3 (5) *Supports OSHA I.C. – A, B, D*

Implement the procedure for conducting a critique of the incident.

HMIC - 5.4 Origin: NFPA 8.6.4 *Supports OSHA I.C.- A, B, D*

Reporting and Documenting the Hazardous Materials/WMD Incident

Given a scenario involving a hazardous materials/WMD incident, the incident commander shall demonstrate the ability to report and document the incident consistent with the local, state, and federal requirements, and shall complete the following tasks:

HMIC - 5.4.1 Origin: NFPA 8.6.4 (1) *Supports OSHA I.C. – A, B, D*

Identify the reporting requirements of the federal, state, and local agencies.

HMIC - 5.4.2 Origin: NFPA 8.6.4 (2) *Supports OSHA I.C. – A, B, D*

Identify the importance of documentation for a hazardous materials/WMD incident, including training records, exposure records, incident reports, and critique reports.

HMIC - 5.4.3 Origin: NFPA 8.6.4 (3) *Supports OSHA I.C. – A, B, D*

Identify the steps in keeping an activity log and exposure records for hazardous materials/WMD incidents.

HMIC - 5.4.4 Origin: NFPA 8.6.4 (4) *Supports OSHA I.C. – A, B, D*

Identify the requirements for compiling hazardous materials/WMD incident reports found in the emergency response plan and/or standard operating procedures.

HMIC - 5.4.5 Origin: NFPA 8.6.4 (5) *Supports OSHA I.C. – A, B, D*

Identify the requirements for filing documents and maintaining records found in the emergency response plan and/or standard operating procedures.

HMIC - 5.4.6 Origin: NFPA 8.6.4 (6) *Supports OSHA I.C. – A, B, D*

Identify the procedures required for legal documentation and chain of custody/continuity described in the standard operating procedure or the emergency response plan.

Hazardous Materials Incident Response Curriculum Guidelines

Specialist Employee C,B,A

Introduction

Specialist employees shall be trained to the 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. The term “Specialist” may also be used in accordance with the NIMS ICS.

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 specialist 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 (2013 edition), as Specialist Employee C, Specialist Employee B, and Specialist Employee A.

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. Specialist Employees C may be asked to gather, record, and analyze information. They may serve as consultants and technical specialists to the incident commander or the hazardous materials response team (HMRT), 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.

Specialist Employees B meet the competencies of Specialist Employees C and in addition are qualified to provide technical assistance including working in the warm and hot zones of an incident area and are qualified to provide technical advice on personal protective equipment, decontamination methods, and response evaluation.

Specialist Employee A meet the competencies of Specialist Employee C and all competencies at the hazardous materials technician level relative to the hazardous materials and containers used in the organization’s area of specialization. The individual is able to analyze an incident involving their organization’s area of specialization, plan a response to that incident, implement the planned response within the capabilities and resources available, and evaluate the progress of the planned response.

Training Audience

Persons training under this provision shall include those titled specialist employees under Title 29 of the Code of Federal Regulations and those titled Specialist Employee C (i.e., awareness level), Specialist Employee B (i.e., operations level), and Specialist Employee A (i.e., hazardous materials technician level) using NFPA 472 (2013 edition) 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 response situations and scenarios. 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 A and B 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 Training Requirements

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 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 post-incident analysis.

Recommended Training Objectives

Recommended objectives for each of the specialist employee areas begin at the following pages:

Page 100 **Specialist Employee C**
Page 110 **Specialist Employee B**
Page 116 **Specialist Employee A**

To assist in assessing course compliance with OSHA 1910.120(q)(5), the relationships between these objectives and the OSHA requirements are noted. References to OSHA are abbreviated as noted.

Objective Identification Legend

SPEC (C) - 1.1 **Origin: NFPA 9.2.1.2.2(1)** ***Supports OSHA SpEMP-1***

This is the identification of the objective that is used in these guidelines.

This indicates the origin of the objective (usually NFPA 472 or 473).

This indicates which OSHA requirement this objective supports.

Specialist Employee C

Specialist employee C is that person who responds to emergencies involving hazardous materials/WMD and/or containers within the organization's area of specialization. Consistent with the emergency response plan and/or standard operating procedures, the specialist employee C can be called upon to gather and record information, provide technical advice, and/or arrange for technical assistance.

Specialist employee C does not enter the hot or warm zone at an emergency.

SPEC(C) 1 – Analyzing the Incident

SPEC(C) - 1.1 Origin: NFPA 9.2.2.1 *Supports OSHA SpEMP-1*

Providing Information on the Hazards and Harmful Effects of Specific Hazardous Materials/WMD

Given a specific chemical(s) used in the organization's area of specialization and the corresponding SDS or other applicable resource, the specialist employee C shall advise the incident commander of the chemical's hazards and harmful effects and shall complete the following tasks:

SPEC(C) - 1.1.1 Origin: NFPA 9.2.2.1(1) *Supports OSHA SpEMP-1*

Identify the following hazard information from the MSDS or other resource:

1. Physical and chemical properties
2. Physical hazards of the chemical (including fire and explosion hazards)
3. Health hazards of the chemical
4. Signs and symptoms of exposure
5. Routes of entry
6. Permissible exposure limits
7. Reactivity hazards
8. Environmental concerns

SPEC(C) - 1.1.2 Origin: NFPA 9.2.2.1(2) *Supports OSHA SpEMP-1*

Identify how to contact CHEMTREC/CANUTEC/SETIQ, and local, state, and federal authorities.

SPEC(C) - 1.1.3 Origin: NFPA 9.2.2.1(3) *Supports OSHA SpEMP-1*

Identify the resources available from CHEMTREC/CANUTEC/SETIQ, and local, state, and federal authorities.

SPEC(C) - 1.1.4 Origin: NFPA 9.2.2.1(4) *Supports OSHA SpEMP-1*

Given the emergency response plan and/or standard operating procedures, identify additional resources of hazard information, including a method of contact.

SPEC(C) - 1.2 Origin: NFPA 9.2.2.2 *Supports OSHA SpEMP-1*

Providing Information on Characteristics of Specific Containers

Given examples containers for hazardous materials/WMD in the organization's area of specialization, the specialist employee C shall advise the incident commander of the characteristics of the containers and shall complete the following tasks:

SPEC(C) - 1.2.1 Origin: NFPA 9.2.2.2(1) *Supports OSHA SpEMP-1*

Identify each container by name.

SPEC(C) - 1.2.2 Origin: NFPA 9.2.2.2(2) *Supports OSHA SpEMP-1*

Identify the markings that differentiate one container from another.

SPEC(C) - 1.2.3 Origin: NFPA 9.2.2.2(3) *Supports OSHA SpEMP-1*

Given the emergency response plan and/or standard operating procedures, identify the resources available that can provide information about the characteristics of the container.

SPEC(C) - 1.2.4 Origin: NFPA 9.2.2.2(4) *Supports OSHA SpEMP-1*

Identify indicators of possible criminal or terrorist activity, including the following:

1. Intentional release of hazardous materials
2. Unexplained bomb/munitions-like material

SPEC(C) 2 – Planning the Response

SPEC(C) - 2.1 Origin: NFPA 9.2.3.1 *Supports OSHA SpEMP-1*

Providing Information on Potential Response Options for Specific Hazardous Materials/WMD

Given a specific chemical used in their organization's area of specialization and corresponding SDS or other resource, the specialist employee C shall advise the incident commander of the response information for that chemical and by being able to complete the following tasks:

SPEC(C) - 2.1.1 Origin: NFPA 9.2.3.1(1) *Supports OSHA SpEMP-1*

Obtain the following response information:

1. Precautions for safe handling, including hygiene practices, protective measures, and procedures for cleanup of spills/leaks
2. Applicable emergency response control measures, including personal protective equipment
3. Emergency and first aid procedures

SPEC(C) - 2.1.2 Origin: NFPA 9.2.3.1(2) *Supports OSHA SpEMP-1*

Relay any suspicions of criminal or terrorist activity to the incident commander.

SPEC(C) - 2.1.3 Origin: NFPA 9.2.3.1(3) *Supports OSHA SpEMP-1*

Identify additional resources for obtaining response information.

SPEC(C) - 2.2 Origin: NFPA 9.2.3.2 *Supports OSHA SpEMP-1*

Providing Information on Potential Response Options for Specific Containers

Given a specific facility or transportation container used in the organization’s area of specialization, the specialist employee C shall advise the incident commander of the response information for that chemical by being able to complete the following tasks:

SPEC(C) - 2.2.1 Origin: NFPA 9.2.3.2(1) *Supports OSHA SpEMP-1*

Identify safe operating procedures for that container, including acceptable pressures, temperatures, and materials of construction; and potential adverse outcomes resulting from these conditions.

SPEC(C) - 2.2.2 Origin: NFPA 9.2.3.2(2) *Supports OSHA SpEMP-1*

Describe safety devices on the container, including emergency shutoff valves, pressure relief devices, and vacuum breakers.

SPEC(C) - 2.2.3 Origin: NFPA 9.2.3.2(3) *Supports OSHA SpEMP-1*

Identify early signs of container and/or safety device failure.

SPEC(C) - 2.2.4 Origin: NFPA 9.2.3.2(4) *Supports OSHA SpEMP-1*

Suggest emergency response procedures.

Specialist Employee B

Specialist employee B is that person who, in the course of regular job duties, works with or is trained in the hazards of specific chemicals or containers within the individual's area of specialization. Because of the employee's education, training, or work experience, the specialist employee B can be called upon to respond to incidents involving these chemicals or containers.

The specialist employee B can be used to gather and record information, provide technical advice, and provide technical assistance (including work within the warm and hot zone) at the incident consistent with the emergency response plan and/or standard operating procedures.

SPEC(B) 1 – Analyzing the Incident

SPEC(B) - 1.1	Origin: NFPA 9.3.2.1	*Supports OSHA SpEMP-1*

Providing and Interpreting Information on the Hazards of Specific Hazardous Materials/WMD

Given a specific chemical within the individual's area of specialization and a corresponding MSDS or other resource, the specialist employee B shall advise the incident commander of the chemical's hazards and harmful effects of specific hazardous materials/WMD and the potential consequences based on the incident and shall meet the following requirements:

SPEC(B) - 1.1.1	Origin: NFPA 9.3.2.1(1)	*Supports OSHA SpEMP-1*

Given a specific chemical, identify and interpret the following hazard information:

1. Physical and chemical properties
2. Physical hazards of the chemical (including fire and explosion hazards)
3. Health hazards of the chemical
4. Signs and symptoms of exposure
5. Routes of entry
6. Permissible exposure limits
7. Reactivity hazards
8. Environmental concerns

SPEC(B) - 1.1.2	Origin: NFPA 9.3.2.1(2)	*Supports OSHA SpEMP-1*

Given examples of specific hazardous materials/WMD and the necessary resources, predict the potential behavior of the hazardous materials/WMD based on the damage found, including the consequences of that behavior.

SPEC(B) - 1.1.3 Origin: NFPA 9.3.2.1(3) *Supports OSHA SpEMP-1*

Identify the general types of hazard information available from the other resources identified in their organization's emergency response plan and/or standard operating procedures.

SPEC(B) - 1.2 Origin: NFPA 9.3.2.2 *Supports OSHA SpEMP-1*

Providing Information on the Characteristics of Specific Containers

Given a container for specific hazardous materials/WMD, the specialist employee B shall advise the incident commander of the characteristics and potential behavior of that container and shall meet the following requirements:

SPEC(B) - 1.2.1 Origin: NFPA 9.3.2.2(1) *Supports OSHA SpEMP-1*

Given examples of containers for specific hazardous materials/WMD, identify the purpose and operation of the closures found on those containers.

SPEC(B) - 1.2.2 Origin: NFPA 9.3.2.2(2) *Supports OSHA SpEMP-1*

Given a chemical container, list the types of damage that could occur.

SPEC(B) - 1.2.3 Origin: NFPA 9.3.2.2(3) *Supports OSHA SpEMP-1*

Given examples of containers for specific hazardous materials/WMD and the necessary resources, predict the potential behavior of the containers and the consequences, based on the damage found.

SPEC(B) - 1.2.4 Origin: NFPA 9.3.2.2(4) *Supports OSHA SpEMP-1*

Given the emergency response plan and/or standard operating procedures, identify resources (including a method of contact) for knowledge in the design, construction, and damage assessment of containers for hazardous materials/WMD.

SPEC(B) - 1.3 Origin: NFPA 9.3.2.3 and 9.3.2.3.1 *Supports OSHA SpEMP-1*

Providing Information on Concentrations of Hazardous Materials/WMD

Given a chemical and the applicable monitoring equipment provided by the organization for that chemical or the available predictive capabilities (e.g., dispersion modeling, exposure modeling), the specialist employee B shall advise the incident commander of the concentrations of the released chemical and the implications of that information to the incident.

SPEC(B) - 1.3.1 Origin: NFPA 9.3.2.3.2(1) *Supports OSHA SpEMP-1*

Identify the applicable monitoring equipment.

SPEC(B) - 1.3.2. Origin: NFPA 9.3.2.3.2(2) *Supports OSHA SpEMP-1*

Use the monitoring equipment provided by the organization to determine the actual concentrations of a specific chemical.

SPEC(B) - 1.3.3. Origin: NFPA 9.3.2.3.2(3) *Supports OSHA SpEMP-1*

Given information on the concentrations of a chemical, interpret the significance of that concentration information to the incident relative to the hazards and harmful effects of the chemical.

SPEC(B) - 1.3.4 Origin: NFPA 9.3.2.3.2(4) *Supports OSHA SpEMP-1*

Demonstrate field calibration and testing procedures, as necessary, for the monitoring equipment provided by the organization.

SPEC(B) - 1.3.5 Origin: NFPA 9.3.2.3.2(5) *Supports OSHA SpEMP-1*

Given the emergency response plan and/or standard operating procedures, identify the resources (including a method of contact) capable of providing monitoring equipment, dispersion modeling, or monitoring services.

SPEC(B) 2 – Planning the Response

SPEC(B) - 2.1 Origin: NFPA 9.3.3.1 *Supports OSHA SpEMP-2*

Providing and Interpreting Information on the Hazards of Specific Hazardous Materials/WMD

Given a specific chemical within the individual’s area of specialization and a corresponding MSDS or other resource, the specialist employee B shall advise the incident commander of the chemical’s hazards and harmful effects of specific hazardous materials/WMD and the potential consequences based on the incident and shall meet the following requirements:

SPEC(B) - 2.1.1 Origin: NFPA 9.3.3.1 (1)(a) *Supports OSHA SpEMP-2*

Given a specific chemical and an corresponding MSDS, identify and interpret the precautions for safe handling, including hygiene practices, protective measures, and procedures for cleanup of spills or leaks.

SPEC(B) - 2.1.2 Origin: NFPA 9.3.3.1 (1)(b) *Supports OSHA SpEMP-2*

Applicable control measures, including personal protective equipment.

SPEC(B) - 2.1.3 Origin: NFPA 9.3.3.1 (1)(c) *Supports OSHA SpEMP-2*

Emergency and first-aid procedures information.

SPEC(B) - 2.1.4 Origin: NFPA 9.3.3.1 (2) *Supports OSHA SpEMP-2*

Given the emergency response plan and/or standard operating procedures, identify additional resources for interpreting the hazards and applicable response information for a hazardous material/WMD.

SPEC(B) - 2.1.5 Origin: NFPA 9.3.3.1 (3) *Supports OSHA SpEMP-2*

Describe the advantages and limitations of the potential response options for a specific chemical.

SPEC(B) - 2.1.6 Origin: NFPA 9.3.3.1 (4) *Supports OSHA SpEMP-2*

Given the emergency response plan and/or standard operating procedures, identify resources (including a method of contact) capable of the following:

1. Repairing containers for hazardous materials
2. Removing the contents of containers for hazardous materials
3. Cleanup and disposal of hazardous materials/WMD or containers for hazardous materials/WMD

SPEC(B) - 2.2 Origin: NFPA 9.3.3.2 *Supports OSHA SpEMP-3*

Providing Information on Personal Protective Equipment Requirements

Given a specific chemical within the individual's area of specialization and a corresponding MSDS or other resource, the specialist employee B shall advise the incident commander of the chemical's hazards and harmful effects of specific hazardous materials/WMD and the potential consequences based on the incident and shall meet the following requirements:

SPEC(B) - 2.2.1 Origin: NFPA 9.3.3.2 (1) *Supports OSHA SpEMP-3*

Given a specific chemical and a corresponding MSDS, identify personal protective equipment, including the materials of construction that will be compatible with that chemical.

SPEC(B) - 2.2.2 Origin: NFPA 9.3.3.2 (2) *Supports OSHA SpEMP-3*

Given the emergency response plan and/or standard operating procedures, identify other resources (including a method of contact) capable of identifying the personal protective equipment that is compatible with a specific chemical.

SPEC(B) - 2.2.3 Origin: NFPA 9.3.3.2 (3) *Supports 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.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

SPEC(B) - 2.3 Origin: NFPA 9.3.3.3 *Supports OSHA SpEMP-3*

Providing Information on Decontamination Methods

Given a specific chemical within the employee's individual area of specialization and the available resources, the specialist employee B shall identify the technical decontamination process for various response options and shall complete the following tasks:

SPEC(B) - 2.3.1 Origin: NFPA 9.3.3.3 (1) *Supports OSHA SpEMP-3*

Given a specific chemical and a corresponding MSDS and/or other chemical-specific resource, identify the potential methods for removing or neutralizing that chemical.

SPEC(B) - 2.3.2 Origin: NFPA 9.3.3.3 (2) *Supports OSHA SpEMP-3*

Given a specific chemical and a corresponding MSDS or other chemical-specific resource, identify the circumstances under which disposal of contaminated equipment would be necessary.

SPEC(B) - 2.3.3 Origin: NFPA 9.3.3.3 (3) *Supports OSHA SpEMP-3*

Given the emergency response plan and/or standard operating procedures, identify resources (including a method of contact) capable of identifying potential decontamination methods.

SPEC(B) - 2.4 Origin: NFPA 9.3.3.4 *Supports OSHA SpEMP-2*

Providing Information on Handling and Disposal Regulations

Given a specific chemical within the employee's individual area of specialization and the available resources, the specialist employee B shall advise the incident commander of the federal or provincial regulations that relate to the handling, transportation, and disposal of that chemical and shall complete the following tasks:

SPEC(B) - 2.4.1 Origin: NFPA 9.3.3.4 (1) *Supports OSHA SpEMP-2*

Given a specific chemical and a corresponding MSDS or other resource, identify federal or provincial regulations that apply to the handling, transportation, and disposal of that chemical.

SPEC(B) - 2.4.2 Origin: NFPA 9.3.3.4 (2) *Supports OSHA SpEMP-2*

Given a specific chemical and a corresponding MSDS or other resource, identify the agencies (including a method of contact) responsible for compliance with the federal or provincial regulations that apply to the handling, transportation, and disposal of a specific chemical.

SPEC(B) - 2.4.3 Origin: NFPA 9.3.3.4 (3) *Supports OSHA SpEMP-2*

Given the emergency response plan and/or standard operating procedures, identify resources for information pertaining to federal or provincial regulations relative to the handling and disposal of a specific chemical.

SPEC(B) - 2.5 Origin: NFPA 9.3.3.5 *Supports OSHA SpEMP-2*

Developing an Incident Action Plan

Given a scenario involving hazardous materials/WMD or containers used in the employee's individual area of specialization, the specialist employee B shall (in conjunction with the incident commander) develop an incident action plan, consistent with the emergency response plan and/or standard operating procedures, and within the capabilities of the available resources, for handling hazardous materials/WMD containers in that incident and shall complete the following tasks:

SPEC(B) - 2.5.1 Origin: NFPA 9.3.3.5 (1) *Supports OSHA SpEMP-2*

Given the emergency response plan and/or standard operating procedures, identify the process for development of an incident action plan, including roles and responsibilities under the Incident Command System site safety and control plan.

SPEC(B) - 2.5.2 Origin: NFPA 9.3.3.5 (2) *Supports OSHA SpEMP-2*

Include a site safety and control plan in the incident action plan.

SPEC(B) 3 – Implementing the Planned Response

SPEC(B) - 3.1 Origin: NFPA 9.3.4.1 *Supports OSHA SpEMP-3*

Performing Response Options Specified in the Incident Action Plan

Given an assignment by the incident commander in the employee's individual area of specialization, the specialist employee B shall perform the assigned actions consistent with the emergency response plan and/or standard operating procedures and shall complete the following tasks:

SPEC(B) - 3.1.1 Origin: NFPA 9.3.4.1 (1) *Supports OSHA SpEMP-3*

Perform assigned tasks consistent with the emergency response plan and/or standard operating procedures and the available personnel, tools, and equipment (including personal protective equipment), including the following:

1. Confinement activities
2. Containment activities
3. Product removal activities

SPEC(B) - 3.1.2 Origin: NFPA 9.3.4.1 (2) *Supports OSHA SpEMP-3*

Identify factors that can affect an individual's ability to perform the assigned tasks.

Response Training Considerations | Awareness Level Personnel | Operations Level Responders: Core Competencies, Mission-Specific Competencies | Haz Mat Technician | Haz Mat Technician with Speciality | Incident Commander | Specialist Employee C,B,A | Haz Mat Officer | Haz Mat Safety Officer | BLS Basic Life Support Responder | ALS Advanced Life Support Responder | ALS Mission Specific Competencies | Hospital First Receiver | Appendix: Standards & Special Topics

SPEC(B) - 3.2 Origin: NFPA 9.3.4.2 *Supports OSHA SpEMP-3*

Using Personal Protective Equipment

Given an assignment within the employee's individual area of specialization that is consistent with the emergency response plan and/or standard operating procedures, the specialist employee B shall be able to complete the following tasks:

SPEC(B) - 3.2.1 Origin: NFPA 9.3.4.2 (1) *Supports OSHA SpEMP-3*

Don, work in, and doff the correct respiratory protection and protective clothing for the assigned tasks.

SPEC(B) - 3.2.2 Origin: NFPA 9.3.4.2 (2) *Supports OSHA SpEMP-3*

Identify the safety considerations for personnel wearing personal protective equipment, including the following:

1. Buddy system
2. Backup personnel
3. Symptoms of heat and cold stress
4. Limitations of personnel working in personal protective equipment
5. Indications of material degradation of chemical-protective clothing
6. Physical and psychological stresses on the wearer
7. Emergency procedures and hand signals

SPEC(B) - 3.2.3 Origin: NFPA 9.3.4.2 (3) *Supports OSHA SpEMP-3*

Identify the procedures for cleaning, sanitizing, and inspecting personal protective equipment provided by the organization.

SPEC(B) 4 – Evaluating Progress

SPEC(B) - 4.1 Origin: NFPA 9.3.5.1 *Supports OSHA SpEMP-3*

Providing an Evaluation on the Effectiveness of Selected Response Options

Given an incident involving specific hazardous materials/WMD or containers for hazardous materials/WMD within the employee's individual area of specialization, the specialist employee B shall advise the incident commander of the effectiveness of the selected response options and shall complete the following tasks:

SPEC(B) - 4.1.1 Origin: NFPA 9.3.5.1 (1) *Supports OSHA SpEMP-3*

Identify the criteria for evaluating whether or not the selected response options are effective in accomplishing the objectives.

SPEC(B) - 4.1.2 Origin: NFPA 9.3.5.1 (2) *Supports OSHA SpEMP-3*

Identify the circumstances when it would be prudent to withdraw from a chemical incident.

SPEC(B) - 4.2 Origin: NFPA 9.3.5.2 *Supports OSHA SpEMP-1,2*

Reporting and Documenting the Incident

Given a scenario involving hazardous materials/WMD or containers for hazardous materials/WMD used in the employee's individual area of specialization, the specialist employee B shall complete the reporting and subsequent documentation requirements consistent with the emergency response plan and/or standard operating procedures and shall complete the following tasks:

SPEC(B) - 4.2.1 Origin: NFPA 9.3.5.2 (1) *Supports OSHA SpEMP-1,2*

Identify the importance of documentation (including training records, exposure records, incident reports, and critique reports) for an incident involving hazardous materials/WMD.

SPEC(B) - 4.2.2 Origin: NFPA 9.3.5.2 (2) *Supports OSHA SpEMP-1,2*

Identify the importance of documentation (including training records, exposure records, incident reports, and critique reports) for an incident involving hazardous materials/WMD.

SPEC(B) - 4.2.3 Origin: NFPA 9.3.5.2 (3) *Supports OSHA SpEMP-1,2*

Identify the steps used in keeping an activity log and exposure records.

SPEC(B) - 4.2.4 Origin: NFPA 9.3.5.2 (4) *Supports OSHA SpEMP-1,2*

Identify the requirements for compiling incident reports.

SPEC(B) - 4.2.5 Origin: NFPA 9.3.5.2 (5) *Supports OSHA SpEMP-1,2*

Identify the requirements for compiling hot zone entry and exit logs.

SPEC(B) - 4.2.6 Origin: NFPA 9.3.5.2 (6) *Supports OSHA SpEMP-1,2*

Identify the requirements for compiling personal protective equipment logs.

SPEC(B) - 4.2.7 Origin: NFPA 9.3.5.2 (7) *Supports OSHA SpEMP-1,2*

Identify the requirements for filing documents and maintaining records.

SPEC(B) - 4.2.8 Origin: NFPA 9.3.5.2 (8) *Supports OSHA SpEMP-1,2*

Identify resources (including a method of contact) knowledgeable on the federal/provincial reporting requirements for hazardous materials/WMD incidents.

Specialist Employee A

Specialist employee A is a person who is specifically trained to handle incidents involving chemicals or containers for chemicals used in the organization's area of specialization. Consistent with the emergency response plan and/or standard operating procedures, the specialist employee A is able to analyze an incident involving chemicals within his or her organization's area of specialization.

The specialist employee A can then 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.

The Specialist Employee A meet the competencies of Specialist Employee C and all competencies at the hazardous materials technician level relative to the hazardous materials and containers used in the organization's area of specialization.

SPEC(A) 1 – Analyzing the Incident

SPEC(A) - 1.1 Origin: NFPA 9.4.1.2.2 (1) *Supports OSHA HMSPEC-B,E,I*

Analyze an incident involving hazardous materials/WMD and containers for hazardous materials/WMD used in the organization's area of specialization to determine the magnitude of the incident by completing the following tasks:

SPEC(A) - 1.1.1 Origin: NFPA 9.4.1.2.2(1) a *Supports OSHA HMSPEC-B,E,I*

Survey an incident involving hazardous materials/WMD and containers for hazardous materials/WMD including the following:

1. Identify the containers involved.
2. Identify or classify unknown materials.
3. Verify the identity of the hazardous materials/WMD.

SPEC(A) - 1.1.2 Origin: NFPA 9.4.1.2.2(1) b *Supports OSHA HMSPEC-B,E,I*

Collect and interpret hazard and response information from printed resources, technical resources, computer databases, and monitoring equipment for hazardous materials/WMD.

SPEC(A) - 1.1.3 Origin: NFPA 9.4.1.2.2(1) c *Supports OSHA HMSPEC-B,E,I*

Determine the extent of damage to containers of hazardous materials/WMD.

SPEC(A) - 1.1.4 Origin: NFPA 9.4.1.2.2(1) d *Supports OSHA HMSPEC-B,E,I*

Predict the likely behavior of the hazardous materials/WMD and containers for hazardous materials/WMD.

SPEC(A) - 1.1.5 Origin: NFPA 9.4.1.2.2(1) e *Supports OSHA HMSPEC-B,E,I*

Estimate the potential outcomes of an incident involving hazardous materials/WMD and containers for hazardous materials/WMD.

Planning the Response

SPEC(A) - 1.2 Origin: NFPA 9.4.1.2.2 (2) *Supports OSHA HMSPEC-A,F,H*

Plan a response (within the capabilities of available resources) to an incident involving hazardous materials/WMD and containers for hazardous materials/WMD used in the organization's area of specialization by completing the following tasks:

SPEC(A) - 1.2.1 Origin: NFPA 9.4.1.2.2(2) a *Supports OSHA HMSPEC-A,F,H*

Identify the response objectives for an incident involving hazardous materials/WMD and containers for hazardous materials/WMD.

SPEC(A) - 1.2.2 Origin: NFPA 9.4.1.2.2(2) b *Supports OSHA HMSPEC-D*

Identify the potential response options for each response objective for an incident involving hazardous materials/WMD and containers for hazardous materials/WMD.

SPEC(A) - 1.2.3 Origin: NFPA 9.4.1.2.2(2) c *Supports OSHA HMSPEC-D*

Select the personal protective equipment required for a given response option for an incident involving hazardous materials/WMD and containers for hazardous materials/WMD.

SPEC(A) - 1.2.4 Origin: NFPA 9.4.1.2.2(2) d *Supports OSHA HMSPEC-G*

Select the technical decontamination process for an incident involving hazardous materials/WMD and containers for hazardous materials/WMD.

SPEC(A) - 1.2.5 Origin: NFPA 9.4.1.2.2(2) e *Supports OSHA HMSPEC-A,F,G*

Develop an incident action plan (within the capabilities of the available resources), including site safety and control plan, for handling an incident involving hazardous materials/WMD and containers for hazardous materials/WMD consistent with the emergency response plan and/or standard operating procedures.

Implementing the Planned Response

SPEC(A) - 1.3 Origin: NFPA 9.4.1.2.2 (3) *Supports OSHA HMSPEC- F*

Operating under the Incident Command System, implement the planned response (as developed with the incident commander) to an incident involving hazardous materials/WMD and containers for hazardous materials/WMD used in the organization's area of specialization consistent with the emergency response plan and/or standard operating procedures by completing the following tasks:

SPEC(A) - 1.3.1 Origin: NFPA 9.4.1.2.2(3) a *Supports OSHA HMSPEC- F*

Don, work in, and doff correct personal protective equipment for use with hazardous materials/WMD.

SPEC(A) - 1.3.2 Origin: NFPA 9.4.1.2.2(3) b *Supports OSHA HMSPEC- F*

Perform containment, control, and product transfer functions, as agreed upon with the incident commander, for hazardous materials/WMD and containers for hazardous materials/WMD.

Evaluating the Planned Response

SPEC(A) - 1.4 Origin: NFPA 9.4.1.2.2 (4) *Supports OSHA HMSPEC- H*

Evaluate the results of implementing the planned response to an incident involving HM/WMD and containers for HM/WMD in the organization's area of specialization.

Hazardous Materials Incident Response Curriculum Guidelines

Hazardous Materials Officer

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Introduction

The hazardous materials 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 DOT, EPA, OSHA, and other appropriate state, local, or provincial occupational health and safety regulatory requirements.

Definition

The hazardous materials officer (NIMS: Hazardous Materials Branch Director/Group Supervisor) is that person who is responsible for directing and coordinating all operations involving hazardous materials/ weapons of mass destruction (WMD) as assigned by the incident commander (NFPA 472-10.1.1.1).

This function is akin to that of hazardous materials response team (HMRT) leader and encompasses both the general command functions at the branch director / group supervisor 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 officer is not directly specified in OSHA 1910.120 or EPA 311, the officer function is a natural derivative of the incident command system requirements and incident commander delegation options that are themselves specified as required under the OSHA and EPA regulations for hazardous materials incident response.

Training Audience

The training audience for hazardous materials 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 officer level.

Methodology Recommendations

Hazardous materials 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 the application and use of risk-based response processes, 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 risk-based 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 director / group supervisor. 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 director / group supervisor 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 of Training Requirements

Hazardous Materials Officer

Audience

Small in number. Members of hazmat teams at the technician level who have branch command and leadership potential.

Prerequisites

Awareness, Core Operations, and Technician Level Training.

Training

No specific length of training is recommended. Length of training should be sufficient to achieve competency.

Competencies:

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

Refresher

Annual refresher training recommended to include retesting of response skills, technical and SOP information updates, and refreshing of incident scene decision-making and branch team leadership through field exercises and simulation training.

Federal Training Requirements

These objectives define competencies for a response function that is not directly specified by OSHA. However, the officer function is a natural derivative of the use of the incident command system and of the performance of the incident commander, including branch or group level delegation, both of which are required by OSHA. Because the function of hazardous materials 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

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

requirements that 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.

Recommended Training Objectives

The following training objectives are recommended for hazardous materials technician training. The primary source for this material is NFPA 472 (2013 edition), Chapter 7: 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.

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

HMO - 1.1	**Origin: NFPA 10.2**	
This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	No OSHA requirements are specifically supported by this objective

HMO 1 - Analyzing the Incident

HMO - 1.1 Origin: NFPA 10.2

Given scenarios involving hazardous materials/WMD incidents including the surrounding conditions and the predicted behavior of the container and its contents, the hazardous materials officer shall estimate the potential outcomes within the endangered area.

HMO 2 – Planning the Response

HMO - 2.1 Origin: NFPA 10.3.1

Identifying the Response Objective

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials officer shall identify the response objective (defensive, offensive, and nonintervention) for each incident.

HMO - 2.2 Origin: NFPA 10.3.2

Identifying the Response Options

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials officer shall identify the potential response options (defensive, offensive, and nonintervention) for each incident.

HMO - 2.3 Origin: NFPA 10.3.3

Selecting the Level of Personal Protective Equipment

Given scenarios involving hazardous materials/WMD incidents with known and unknown hazardous materials/WMD, the hazardous materials officer shall select the personal protective equipment for the response options specified in the incident action plan in each situation.

HMO - 2.4 Origin: NFPA 10.3.4

Developing a Plan of Action

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials officer shall develop a plan of action consistent with the emergency response plan and/or standard operating procedures that is within the capability of the available personnel, personal protective equipment, and control equipment, and shall complete the following tasks:

HMO - 2.4.1 Origin: NFPA 10.3.4(1)

Identify the order of the steps for developing the plan of action.

HMO - 2.4.2 Origin: NFPA 10.3.4(2)

Identify the factors to be evaluated in selecting public protective actions, including evacuation and shelter in-place.

HMO - 2.4.3 Origin: NFPA 10.3.4(3)

Given the local emergency response plan and/or the standard operating procedures, identify procedures to accomplish the following tasks:

1. Make ongoing assessments of the situation.
2. Command on-scene personnel assigned to the hazardous materials branch/group.
3. Coordinate hazardous materials/WMD support and mutual aid.
4. Coordinate public protective actions (evacuation or shelter-in place).
5. Coordinate with fire suppression services as they relate to hazardous materials/WMD incidents.
6. Coordinate control, containment, or confinement operations.
7. Coordinate with the medical branch to ensure emergency medical assistance (ambulance) and medical treatment (hospital).

8. Coordinate on-scene decontamination.
9. Coordinate activities with those of the environmental remediation (cleanup) services.
10. Coordinate evidence preservation and sampling in a contaminated environment.

HMO - 2.4.4 Origin: NFPA 10.3.4(4)

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

HMO - 2.4.5 Origin: NFPA 10.3.4(5)

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

HMO 3 – Implementing the Planned Response

HMO - 3.1 Origin: NFPA 10.4.1

Implementing the Functions within the Incident Management System

Given a copy of the emergency response plan, the hazardous materials officer shall identify the requirements of the plan, including the required procedures for notification and utilization of non-local resources (private, state, and federal government personnel), and shall complete the following tasks:

HMO - 3.1.1 Origin: NFPA 10.4.1(1)

Identify the process and procedures for obtaining cleanup and remediation services in the emergency response plan and/or standard operating procedures.

HMO - 3.1.2 Origin: NFPA 10.4.1(2)

Identify the steps for implementing the emergency response plans as required under SARA Title III Section 303 of the federal regulations or other emergency response planning legislation.

HMO - 3.1.3 Origin: NFPA 10.4.1(3)

Given the local emergency planning documents, identify the elements of each of the documents.

HMO - 3.1.4 Origin: NFPA 10.4.1(4)

Identify the elements of the incident management system necessary to coordinate response activities at hazardous materials/WMD incidents.

HMO - 3.1.5 Origin: NFPA 10.4.1(5)

Identify the primary local, state, regional, and federal government agencies and identify the scope of their regulatory authority (including the regulations) pertaining to the production, transportation, storage, and use of hazardous materials/WMD and the disposal of hazardous wastes.

HMO - 3.1.6 Origin: NFPA 10.4.1(6)

Identify the governmental agencies and resources offering assistance to the hazardous materials branch/group during a hazardous materials/ WMD incident and identify their role and type of assistance or resources available.

HMO - 3.1.7 Origin: NFPA 10.4.1(7)

Identify the governmental agencies and resources offering assistance during a hazardous materials incident involving criminal or terrorist activities, and identify their role and the type of assistance or resources available.

HMO - 3.2 Origin: NFPA 10.4.2

Directing Resources (Private and Governmental)

Given a scenario involving a hazardous materials/WMD incident and the necessary resources to implement the planned response, the hazardous materials officer shall demonstrate the ability to direct the hazardous materials branch/group resources in a safe and efficient manner consistent with the capabilities of those resources.

HMO - 3.3 Origin: NFPA 10.4.3

Providing a Focal Point for Information Transfer to Media and Elected Officials

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials officer shall 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 and shall complete the following tasks:

HMO - 3.3.1 Origin: NFPA 10.4.3(1)

Identify the local policy for providing information to the media.

HMO - 3.3.2 Origin: NFPA 10.4.3(2)

Identify the responsibilities of the public information officer at a hazardous materials/WMD incident.

HMO 4 – Evaluating Progress

HMO - 4.1 Origin: NFPA 10.5

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials officer shall evaluate the progress of the incident action plan to determine whether the efforts are accomplishing the response objectives and shall complete the following tasks:

HMO - 4.1.1 Origin: NFPA 10.5.1(1)

Identify the procedures for evaluating whether the response options are effective in accomplishing the objectives.

HMO - 4.1.2 Origin: NFPA 10.5.1(2)

Identify the steps for comparing actual behavior of the material and the container to that predicted in the analysis process.

HMO - 4.1.3 Origin: NFPA 10.5.1(3)

Determine the effectiveness of the following:

1. Personnel being used
2. Control zones
3. Personal protective equipment
4. Control, containment, or confinement operations
5. Decontamination

HMO - 4.1.4 Origin: NFPA 10.5.1(4)

Make appropriate modifications to the incident action plan.

HMO 5 – Terminating the Incident

HMO - 5.1 Origin: NFPA 10.6.1

Terminating the Emergency Phase of the Incident

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials officer shall demonstrate the ability to terminate the emergency phase of the incident consistent with the emergency response plan and/or standard operating procedures and shall complete the following tasks:

HMO - 5.1.1 Origin: NFPA 10.6.1(1)

Identify the steps required in terminating the emergency phase of a hazardous materials/WMD incident.

HMO - 5.1.2 Origin: NFPA 10.6.1(2)

Identify the procedures for conducting incident debriefings at a hazardous materials/WMD incident.

HMO - 5.2 Origin: NFPA 10.6.2

Conducting a Debriefing

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials officer shall demonstrate the ability to conduct a debriefing of the incident for all units assigned to the hazardous materials branch/group and shall complete the following tasks:

HMO - 5.2.1 Origin: NFPA 10.6.2(1)

Describe three components of an effective debriefing.

HMO - 5.2.2 Origin: NFPA 10.6.2(2)

Describe the key topics in an effective debriefing.

HMO - 5.2.3 Origin: NFPA 10.6.2(3)

Describe when a debriefing should take place.

HMO - 5.2.4 Origin: NFPA 10.6.2(4)

Describe who should be involved in a debriefing.

HMO - 5.2.5 Origin: NFPA 10.6.2(5)

Identify the procedures for conducting incident debriefings at a hazardous materials/WMD incident.

HMO - 5.3 Origin: NFPA 10.6.3

Conducting a Critique

Given the details of a scenario involving a hazardous materials/WMD incident, the hazardous materials officer shall demonstrate the ability to conduct a critique of the incident for all units assigned to the hazardous materials branch/group and shall complete the following tasks:

HMO - 5.3.1 Origin: NFPA 10.6.3(1)

Describe three components of an effective critique.

HMO - 5.3.2 Origin: NFPA 10.6.3(2)

Describe who should be involved in a critique.

HMO - 5.3.3 Origin: NFPA 10.6.3(3)

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

HMO - 5.3.4 Origin: NFPA 10.6.3(4)

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

HMO - 5.3.5 Origin: NFPA 10.6.3(5)

Identify the procedure for conducting a critique of the incident.

HMO - 5.3.6 Origin: NFPA 10.6.3(6)

Identify the requirements for conducting a post-incident analysis as defined in the emergency response plan; the standard operating procedures; or local, state, and federal regulations.

HMO - 5.4 Origin: NFPA 10.6.4

Reporting and Documenting the Incident

Given an example of a hazardous materials/WMD incident, the hazardous materials officer shall demonstrate the ability to report and document the incident consistent with the local, state, and federal requirements and shall complete the following tasks:

HMO - 5.4.1 Origin: NFPA 10.6.4(1)

Identify the reporting requirements of federal, state, and local agencies.

HMO - 5.4.2 Origin: NFPA 10.6.4(2)

Identify the importance of documentation for a hazardous materials incident/WMD, including training records, exposure records, incident reports, and critique reports.

HMO - 5.4.3 Origin: NFPA 10.6.4(3)

Identify the steps in keeping an activity log and exposure records for hazardous materials/WMD incidents.

HMO - 5.4.4 Origin: NFPA 10.6.4(4)

Identify the requirements found in the emergency response plan and/or standard operating procedures for compiling hazardous materials/WMD incident reports.

HMO - 5.4.5 Origin: NFPA 10.6.4(5)

Identify the requirements for filing documents and maintaining records as defined in the emergency response plan and/or standard operating procedures.

HMO - 5.4.6 Origin: NFPA 10.6.4(6)

Identify the procedures required for legal documentation and chain of custody/continuity described in the standard operating procedures or the emergency response plan.

Page Intentionally Left Blank

Hazardous Materials Incident Response Curriculum Guidelines

Hazardous Materials Safety Officer

Introduction

There are two training categories combined in this section. The first is the safety officer at hazardous materials incidents (i.e., Incident Safety Officer), as defined by OSHA, and the second is the hazardous materials safety officer (i.e., Assist Safety Officer – Hazardous Materials), as defined by NFPA 472. 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 safety officer, as defined by NFPA 472, 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 Department of Transportation (DOT), Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and other appropriate state, local, or provincial occupational health and safety regulatory requirements.

Definition

The incident safety officer at hazardous materials incidents (OSHA) and the hazardous materials 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. While the Incident Safety Officer is responsible for the incident at-large and has the authority to alter, suspend, or terminate activities that involve dangerous conditions. The assistant Safety Officer – Hazardous Materials is responsible for operations within the hazardous materials branch / group, and will normally advise the incident commander of actions that need to take place in order to correct the hazards. The hazardous materials safety officer (NFPA 472) will be called upon to provide technical advice or assistance regarding safety issues to the hazardous materials officer and incident safety officer at a hazardous materials incident.

Training Audience

The training audience for both the safety officer at hazardous materials incidents (OSHA) and the hazardous materials 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 hazards, assess 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 safety officer level.

Methodology Recommendations

The safety officer at hazardous materials incidents (OSHA) and the hazardous materials safety officer (NFPA 472) 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 risk-based 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.

Summary of Training Requirements

Hazardous Materials Safety Officer

Audience

Small in number. Safety officer (OSHA) responders at the incident command level with potential for assignment as incident safety officer. Responders at the technician level with potential for assignment as haz mat safety officer.

Prerequisites

Awareness, Core Operations, Technician, and Incident Commander Level Training.

Training

No specific length of training is recommended. Length of training should be sufficient to achieve competency.

Methodology should include classroom, lab and field exercises with an emphasis on real time simulations requiring development of safe response plans and identifying safety problems during implementation of the response plan.

Competencies:

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

Refresher

Annual refresher training recommended to include retesting of response skills, technical and SOP information updates, and refreshing of incident scene decision-making and identification of safety issues through field exercises and simulation training.

Federal Training Requirements

There are no federally specified training requirements for hazardous materials 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 (i.e., Assistant Safety officers) at the incident scene, advising to several levels of command.

> *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.

OSHA 29 CFR 1910.120 (q) (3)(vii-viii)

OSHA S.O - 1

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 S.O - 2

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 S.O. - 3

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.

Recommended Training Objectives

The following training objectives are recommended for hazardous materials safety officer training. The primary source for this material is NFPA 472 (2013 edition), *Chapter 11: Competencies for the Hazardous Materials Safety Officers*. 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*.

The hazardous materials 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 DOT, EPA, OSHA, and other appropriate state, local, or provincial occupational health and safety regulatory requirements.

Objective Identification Legend

S.Off. - 1.1	**Origin: NFPA 11.2.1**	***Supports OSHA S.O. - A***
This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	This indicates which OSHA requirement this objective supports.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

S.Off. 1 - Analyzing the Incident

S.Off. - 1.1	Origin: NFPA 11.2.1	*Supports OSHA S.O. - A*

Determining the Magnitude of the Problem in Terms of Safety

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials safety officer shall observe a scene, review and evaluate hazard and response information as it pertains to the safety of all persons within the hazardous materials branch/group.

S.Off. - 1.1.1	Origin: NFPA 11.2.1.1	*Supports OSHA S.O. - A*

The hazardous materials safety officer shall explain the basic toxicological principles relative to assessment and treatment of personnel exposed to hazardous materials/WMD, including the following:

1. Acute and chronic toxicity
2. Dose-response
3. Routes of exposure to toxic materials
4. Synergistic effects

S.Off. - 1.1.2	Origin: NFPA 11.2.1.2	*Supports OSHA S.O. - A*

The hazardous materials safety officer shall identify at least three conditions where the hazards from flammability would require chemical protective clothing with thermal protection.

S.Off. - 1.1.3	Origin: NFPA 11.2.1.3	*Supports OSHA S.O. - A*

The hazardous materials safety officer shall identify at least three conditions where personnel would not be allowed to enter the hot zone.

S.Off. - 1.1.4	Origin: NFPA 11.2.1.4	*Supports OSHA S.O. - A*

Given the names of five hazardous materials/WMD and at least three reference sources, the hazardous materials safety officer identify the physical and chemical properties and their potential impact on the safety of personnel at an incident involving each of the materials/agents.

S.Off. - 1.1.5	Origin: NFPA 11.2.1.5	*Supports OSHA S.O. - A*

Given the names of five hazardous materials and at least three reference sources, identify the health concerns and their potential impact on the safety and health of personnel at an incident involving each of the materials.

S.Off. - 1.1.6	Origin: NFPA 11.2.1.6	*Supports OSHA S.O. - A*

Given the names of five hazardous materials and a description of their containers, hazardous materials safety officer shall identify five hazards or physical conditions that would impact the safety of personnel at an incident involving each of the materials.

S.Off. 2 – Planning the Response

S.Off. - 2.1	Origin: NFPA 11.3.1	*Supports OSHA S.O. - A*

Identifying the Safety Precautions for Potential Action Options

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials safety officer shall assist the hazardous materials officer in developing a site safety and control plan to respond within the capabilities of available response personnel, personal protective equipment, and control equipment.

S.Off. - 2.1.1	Origin: NFPA 11.3.1(1)	*Supports OSHA S.O. - A*

Identify specific safety precautions to observe while mitigating each of the hazards or conditions identified.

S.Off. - 2.1.2	Origin: NFPA 11.3.1 (2)	*Supports OSHA S.O. - A*

Identify safety precautions associated with search and rescue missions at hazardous materials/WMD incidents.

S.Off. - 2.2	Origin: NFPA 11.3.2.1	*Supports OSHA S.O. – A,C*

Identifying the Safety Precautions for Potential Action Options

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials safety officer shall provide the incident safety officer, hazardous materials officer, and incident commander with observation-based recommendations regarding considerations for the safety of on-site personnel.

S.Off. - 2.2.1	Origin: NFPA 11.3.2.2	*Supports OSHA S.O. – A,C*

The hazardous materials safety officer shall develop recommendations for the incident commander regarding safety considerations of the hazards and risks for each of the hazardous materials/WMD and containers identified.

S.Off. - 2.3	Origin: NFPA 11.3.3	*Supports OSHA S.O. – A*

Assisting in the Development of Site Safety and Control Plan for Inclusion in the Incident Action Plan

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials safety officer shall assist the incident safety officer and hazardous materials officer in the development of the site safety and control plan for inclusion in the incident action plan.

S.Off. - 2.3.1 Origin: NFPA 11.3.3(a) *Supports OSHA S.O. – A*

Identify the importance and list five benefits of pre-emergency planning relating to specific sites.

S.Off. - 2.3.2 Origin: NFPA 11.3.3(b) *Supports OSHA S.O. – A*

Identify and name five hazards and precautions to be observed when approaching a hazardous materials/WMD incident.

S.Off. - 2.3.3 Origin: NFPA 11.3.3(c) *Supports OSHA S.O. – A*

List the elements of safety considerations.

S.Off. - 2.3.4 Origin: NFPA 11.3.3(d) *Supports OSHA S.O. – A*

Given a pre-incident plan involving one of the hazardous materials/WMD and containers, develop safety considerations for the incident.

S.Off. - 2.4 Origin: NFPA 11.3.4 *Supports OSHA S.O. – A*

Providing Recommendations Regarding Safety and Reviewing the Plan of Action

Given a proposed plan of action for an incident involving one of the hazardous materials/WMD and containers, identify to the incident safety officer, hazardous materials officer, and incident commander the safety precautions for the incident action plan.

S.Off. - 2.4.1 Origin: NFPA 11.3.4(a) *Supports OSHA S.O. – A*

Ensure that the safety considerations in the proposed incident action plan are consistent with the emergency response plan and/or the organization’s standard operating procedures.

S.Off. - 2.4.2 Origin: NFPA 11.3.4(b) *Supports OSHA S.O. – A*

Make recommendations to the incident commander on the safety considerations in the proposed incident action plan.

S.Off. - 2.5 Origin: NFPA 11.3.5 *Supports OSHA S.O. – A*

Reviewing Selection of Personal Protective Equipment

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials safety officer shall demonstrate the ability to review the selection of personal protective equipment required for a given action option.

S.Off. - 2.5.1 Origin: NFPA 11.3.5(a) *Supports OSHA S.O. – A*

Identify five safety considerations for personnel working in personal protective equipment.

S.Off. - 2.5.2 Origin: NFPA 11.3.5(b) *Supports OSHA S.O. – A*

Given the names of five different hazardous materials/WMD and a chemical compatibility chart for chemical-protective clothing, identify the chemical-protective clothing that would provide protection from the identified hazards to the wearer for each of the five substances.

S.Off. - 2.5.3 Origin: NFPA 11.3.5(c) *Supports OSHA S.O. – A*

Given the names of five different hazardous materials, identify personal protective equipment options for specified response options.

S.Off. - 2.5.4 Origin: NFPA 11.3.5(d) *Supports OSHA S.O. – A*

Identify the recommended for donning, doffing, and using all personal protective equipment provided by the authority having jurisdiction for use in hazardous materials/WMD response activities.

S.Off. - 2.6 Origin: NFPA 11.3.6 *Supports OSHA S.O. – A*

Reviewing the Proposed Decontamination Plan

Given site-specific decontamination procedures by the hazardous materials officer or incident commander for a scenario involving a simulated hazardous materials/WMD incident, review the plan to identify safety considerations prior to implementation of the incident action plan.

S.Off. - 2.7 Origin: NFPA 11.3.7 *Supports OSHA S.O. – A*

Ensuring Provision of Proper Emergency Medical Services

Given a scenario involving a hazardous materials/WMD incident, the hazardous materials safety officer shall review the Emergency Medical Services procedures to ensure that response personnel are provided medical care.

S.Off. - 2.7.1 Origin: NFPA 11.3.7(a) *Supports OSHA S.O. – A*

Identify the elements required in an Emergency Medical Services Plan.

S.Off. - 2.7.2 Origin: NFPA 11.3.7(b) *Supports OSHA S.O. – A*

Identify the importance of an on-site medical monitoring program.

S.Off. - 2.7.3 Origin: NFPA 11.3.7(c) *Supports OSHA S.O. – A*

Identify the resources for the transportation and care of the injured personnel exposed to hazardous materials/WMD.

S.Off. 3 – Implementing the Planned Response

S.Off. - 3.1 Origin: NFPA 11.4.1 *Supports OSHA S.O. – A,B,C*

Identifying the Safety Precautions for Potential Action Options

Given a scenario involving hazardous materials/WMD incidents, the hazardous materials safety officer shall perform the duties of the position in a manner consistent with the emergency response plan and/or standard operating procedures.

S.Off. - 3.1.1 Origin: NFPA 11.4.1(a) *Supports OSHA S.O. – A,B,C*

Identify the duties of the hazardous materials safety officer as defined in the emergency response plan and/or standard operating procedures.

S.Off. - 3.1.2 Origin: NFPA 11.4.1(b) *Supports OSHA S.O. – A,B,C*

Demonstrate proper performance of the duties of the hazardous materials safety officer as defined in the emergency response plan and/or standard operating procedures.

S.Off. - 3.2 Origin: NFPA 11.4.2 *Supports OSHA S.O. – A,B*

Identifying the Safety Precautions for Potential Action Options

Given scenarios involving a hazardous materials/WMD incident, the hazardous materials safety officer shall ensure that personnel perform their tasks in a safe manner by identifying the safety considerations for the control functions identified in the site safety and control plan.

S.Off. - 3.2.1 Origin: NFPA 11.4.1(1) *Supports OSHA S.O. – A,B*

Identify the safe operating practices that are required to be followed at a hazardous materials/WMD incident as stated in the emergency response plan and/or standard operating procedures.

S.Off. - 3.2.2 Origin: NFPA 11.4.1(2) *Supports OSHA S.O. – A,B*

Identify how the following factors influence heat and cold stress for hazardous materials response personnel:

1. Activity levels
2. Duration of entry
3. Environmental factors
4. Hydration
5. Level of personal protective equipment
6. Physical fitness

S.Off. - 3.2.3	Origin: NFPA 11.4.1(3)	*Supports OSHA S.O. – A,B*

Identify the methods that will minimize the potential harm from heat and cold stress.

S.Off. - 3.2.4	Origin: NFPA 11.4.1(4)	*Supports OSHA S.O. – A,B*

Identify the safety considerations that will minimize the psychological and physical stresses on personnel working in personal protective equipment.

S.Off. - 3.2.5	Origin: NFPA 11.4.1(5)	*Supports OSHA S.O. – A,B*

Describe five conditions where it would be prudent to withdraw from a hazardous materials/WMD incident.

S.Off. - 3.3	Origin: NFPA 11.4.3(1)	*Supports OSHA S.O. –B,C*

Conducting Safety Briefings

Given a scenario involving a hazardous materials/WMD incident and site safety and control plan, the hazardous materials safety officer shall conduct safety briefings for personnel performing the functions identified in the incident action plan.

S.Off. - 3.3.1	Origin: NFPA 11.4.3(2)	*Supports OSHA S.O. –B,C*

The hazardous materials safety officer shall be able to demonstrate the procedure for conducting a safety briefing to personnel for an incident involving one of the hazardous materials/WMD and its container identified, as specified by the emergency response plan and/or standard operating procedures.

S.Off. - 3.4	Origin: NFPA 11.4.4	*Supports OSHA S.O. –B,C*

Implementing and Enforcing Safety Considerations

Given a scenario involving a hazardous materials/WMD incident and site safety and control plan, the hazardous materials safety officer shall assist the incident commander, the incident safety officer, and the hazardous materials officer in implementing and enforcing the safety considerations.

S.Off. - 3.4.1	Origin: NFPA 11.4.4(1)	*Supports OSHA S.O. –B,C*

Identify whether the boundaries of the established control zones are clearly marked, consistent with the safety considerations, and are being maintained.

S.Off. - 3.4.2	Origin: NFPA 11.4.4(2)	*Supports OSHA S.O. –B,C*

Identify whether the on-site medical monitoring that are required by the authority having jurisdiction is being performed.

S.Off. - 3.4.3 Origin: NFPA 11.4.4(3) *Supports OSHA S.O. –B,C*

Given an entry team, a backup team, and a decontamination team wearing personal protective clothing and equipment, identify that each team is properly protected and prepared to safely perform its assigned tasks.

S.Off. - 3.4.3.1 Origin: NFPA 11.4.4(3)(a) *Supports OSHA S.O. –B,C*

Verify whether the selection of clothing and equipment is consistent with the site safety and control plan.

S.Off. - 3.4.3.2 Origin: NFPA 11.4.4(3)(b) *Supports OSHA S.O. –B,C*

Verify whether each team has examined the clothing for barrier integrity and the equipment to ensure correct working order.

S.Off. - 3.4.3.3 Origin: NFPA 11.4.4(3)(c) *Supports OSHA S.O. –B,C*

Verify whether protective clothing and equipment have been donned in accordance with the organization's standard operating procedures and the manufacturer's recommendations.

S.Off. - 3.4.4 Origin: NFPA 11.4.4(4) *Supports OSHA S.O. –B,C*

Verify whether each person entering the hot zone has a specific task assignment, understands the assignment, is properly trained to perform the assigned task(s), and is working with a designated partner at all times during the assignment.

S.Off. - 3.4.5 Origin: NFPA 11.4.4(5) *Supports OSHA S.O. –B,C*

Verify whether a backup team is prepared at all times for immediate entry into the hot zone during entry team operations.

S.Off. - 3.4.6 Origin: NFPA 11.4.4(6) *Supports OSHA S.O. –B,C*

Verify whether the decontamination process specified in the safety considerations is in place before any entry into the hot zone.

S.Off. - 3.4.7 Origin: NFPA 11.4.4(7) *Supports OSHA S.O. –B,C*

Verify 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/WMD exposure.

S.Off. - 3.4.8 Origin: NFPA 11.4.4(8) *Supports OSHA S.O. –B,C*

Demonstrate the proper procedure for recording the names of the individuals exiting the hot zone, as specified in the local emergency response plan and the organization's standard operating procedures.

S.Off. - 3.4.9	Origin: NFPA 11.4.4(9)	*Supports OSHA S.O. –B,C*

Identify three safety considerations that can minimize secondary contamination.

S.Off. - 3.5	Origin: NFPA 11.4.5	*Supports OSHA S.O. –B,C*

Maintaining Communications

Given a scenario involving a hazardous materials/WMD incident and the site safety and control plan, the hazardous materials safety officer shall maintain routine and emergency communications within the incident command structure at all times during the incident.

S.Off. - 3.5.1	Origin: NFPA 11.4.5(1)	*Supports OSHA S.O. –B,C*

Identify three types of communications systems used at hazardous materials/WMD incident sites.

S.Off. - 3.5.2	Origin: NFPA 11.4.5(2)	*Supports OSHA S.O. –B,C*

Verify 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.

S.Off. - 3.6	Origin: NFPA 11.4.6.1	*Supports OSHA S.O. –B,C*

Monitoring Status Reports

Given a simulated hazardous materials/WMD incident and site safety and control plan, the hazardous materials safety officer monitor routine and emergency communications within the incident command structure at all times during the incident.

S.Off. - 3.6.1	Origin: NFPA 11.4.6.2	*Supports OSHA S.O. –B,C*

The hazardous materials safety officer shall insure that entry team members regularly communicate the status of their work assignment to the hazardous materials officer.

S.Off. - 3.7	Origin: NFPA 11.4.7	*Supports OSHA S.O. –B,C*

Implementing Exposure Monitoring

Given a scenario involving a hazardous materials/WMD incident and the site safety and control plan, the hazardous materials safety officer shall assist the incident commander, the incident safety officer, and the hazardous materials officer in implementing exposure monitoring.

S.Off. - 3.8	Origin: NFPA 11.4.8	*Supports OSHA S.O. –B,C*

Verifying Exposure Monitoring

The hazardous materials safety officer shall identify that exposure monitoring (personnel and environment), as specified in the emergency response plan and/or standard operating procedures and site safety and control plan considerations, is performed.

S.Off. 4 – Evaluating Progress

S.Off. - 4.1	Origin: NFPA 11.5.1	*Supports OSHA S.O. –B*

Identifying Deviations from Safety Considerations or Other Dangerous Situations

Given scenarios involving hazardous materials/WMD incidents, and given deviations from the site safety and control plan for activities in both the hot and warm zones and dangerous conditions, the hazardous materials safety officer shall take such corrective actions as are necessary to ensure the safety and health of persons in the hot and warm zones.

S.Off. - 4.1.1	Origin: NFPA 11.5.1(1)	*Supports OSHA S.O. –B*

Identify those actions that deviate from the site safety and control plan or otherwise violate accepted safe operating practices, organizational policies, or applicable occupational safety and health laws, regulations, codes, standards, or guidelines.

S.Off. - 4.1.2	Origin: NFPA 11.5.1(2)	*Supports 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.Off. - 4.1.3	Origin: NFPA 11.5.1(3)	*Supports OSHA S.O. –B*

Identify the signs and symptoms of psychological and physical stresses on personnel wearing personal protective equipment.

S.Off. - 4.2	Origin: NFPA 11.5.2	*Supports OSHA S.O. –B*

Taking Corrective Actions

Given scenarios involving hazardous materials/WMD incidents, and given deviations from the site safety and control plan for activities in both the hot and warm zones and dangerous conditions, the hazardous materials safety officer shall take such corrective actions as are necessary to ensure the safety and health of persons in the hot and warm zones.

S.Off. - 4.2.1 Origin: NFPA 11.5.2(1) *Supports OSHA S.O. –B*

Send emergency communications to, and receive emergency communications from, the incident safety officer, entry team personnel, the hazardous materials officer, and others as appropriate regarding safe working practices and conditions.

S.Off. - 4.2.1.1 Origin: NFPA 11.5.2(1)(a) *Supports OSHA S.O. –B*

Given a hazardous situation or condition that has developed or been identified following initial hot zone entry, demonstrate the application of the emergency alerting procedures specified in the site safety and control plan to communicate the hazard and emergency response information to the affected personnel.

S.Off. - 4.2.1.2 Origin: NFPA 11.5.2(1)(b) *Supports OSHA S.O. –B*

Given a demonstrated emergency alert via hand signal by a member of the entry team operating within the hot zone, identify the meaning of that signal as specified in the site safety and control plan.

S.Off. - 4.2.2 Origin: NFPA 11.5.2(2) *Supports OSHA S.O. –B*

Identify the procedures to alter, suspend, or terminate any activity that can be judged to be unsafe, as specified in the emergency response plan and/or standard operating procedures.

S.Off. - 4.2.3 Origin: NFPA 11.5.2(3) *Supports OSHA S.O. –B*

Demonstrate the procedure for notifying the appropriate individual of the unsafe action and for directing alternative safe actions, in accordance with the safety considerations and the organization’s standard operating procedures.

S.Off. - 4.2.4 Origin: NFPA 11.5.2(4) *Supports OSHA S.O. –B*

Demonstrate the procedure for suspending or terminating an action that could result in an imminent hazard condition, in accordance with the site safety and control plan and the standard operating procedures.

S.Off. 5 – Terminating the Incident

S.Off. - 5.1 Origin: NFPA 11.6.1 *Supports OSHA S.O. –C*

Providing Reports and Documentation

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials safety officer shall complete and submit the reports, documentation, and follow-up required of the hazardous materials safety officer.

S.Off. - 5.1.1 Origin: NFPA 11.6.1(1) *Supports OSHA S.O. –C*

Identify the safety reports and supporting documentation required by the local emergency response plan and/or standard operating procedures.

S.Off. - 5.1.2 Origin: NFPA 11.6.1(2) *Supports OSHA S.O. –C*

Demonstrate completion of the safety reports required by the emergency response plan and/or standard operating procedures.

S.Off. - 5.1.3 Origin: NFPA 11.6.1(3) *Supports OSHA S.O. –C*

Describe the importance of personnel exposure records.

S.Off. - 5.2 Origin: NFPA 11.6.2 *Supports OSHA S.O. –C*

Debriefing of Hazardous Materials Branch/Group Personnel

Given scenarios involving hazardous materials/WMD incidents, the hazardous materials safety officer shall debrief hazardous materials branch/group personnel regarding site-specific occupational safety and health issues.

S.Off. - 5.2.1 Origin: NFPA 11.6.2(1) *Supports OSHA S.O. –C*

The hazardous materials safety officer shall be able to identify five health and safety topics to be addressed in an incident debriefing.

S.Off. - 5.1.2 Origin: NFPA 11.6.2(2) *Supports OSHA S.O. –C*

The hazardous materials safety officer shall be able to demonstrate the proper procedure for debriefing hazardous materials branch/group personnel regarding site-specific occupational safety and health areas of concern, as specified in the site safety and control plan, emergency response plan, and the organization's standard operating procedures.

S.Off. - 5.3 Origin: NFPA 11.6.3 *Supports OSHA S.O. –B,C*

Assisting in the Incident Critique

Given scenarios involving hazardous materials/WMD incidents and the site safety and control plan, the hazardous materials safety officer shall provide safety and health-related critical observations of the activities that were performed in the hot and warm zones during the incident.

S.Off. - 5.4 Origin: NFPA 11.6.4 (1)-(6) *Supports OSHA S.O. –B,C*

Information to be Presented

Given the site safety and control plan and hazardous materials safety officer's report for a scenario involving a hazardous materials/WMD incident, the hazardous materials safety officer shall demonstrate the procedure for verbally presenting the following information in accordance with the emergency response plan and/or standard operating procedures:

1) Safety and health-related critical observations of the activities that were performed in the hot and warm zones during the incident.
2) Recorded violations of the site safety and control plan 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.
6) 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.
7) Deficiencies or weaknesses in the site safety and control plan, local emergency response plan, and organizational standard operating procedures that were noted during or following the incident.

Page Intentionally Left Blank

Hazardous Materials Incident Response Curriculum Guidelines

Emergency Medical Service/ Hazardous Materials/WMD Basic Life Support (BLS) Responder

Introduction

Emergency medical service (EMS) personnel at the EMS/HM Basic Life Support (BLS) responder level, in addition to their BLS or ALS certification, shall be trained to meet the requirements of the emergency responder at the awareness level, as defined in OSHA 1910.120(q)(6)(i) and/or as defined in NFPA 472, *Chapter 4: Competencies for Awareness Level Personnel*, and all the competencies recommended in this section. In addition, EMS/HM BLS 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 competency 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

EMS/HM BLS 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 BLS responders shall provide pre-hospital care only to those individuals who no longer pose a significant risk of secondary contamination, such as decontaminated patients in the cold zone.

Training Audience

EMS/HM BLS 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 Standard on Emergency Services Incident Management System and Command Safety, 2014 Edition
- U.S. Fire Administration Emergency Incident Rehabilitation Guide, 2008 Edition

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/HM BLS personnel responding should have been trained to the emergency medical technician A level or equivalent.

Methodology Recommendations

EMS/HM BLS responder training should include a combination of traditional classroom lecture with small-group activities, field exercises involving working with the incident command structure in simulated emergencies, and hands-on psychomotor skill training. Content instruction should focus on contamination hazards, treatment procedures, and incident scene roles and responsibilities. Trainee activities should focus on assessment and analysis of hazards and determination of appropriate procedures. Skill training should focus on implementing procedures. Written and practical examinations are highly recommended to measure achievement in initial training and refresher programs and to support the employer's responsibility that all EMS personnel are trained to competency before being called on to perform at emergencies. Table-top and field exercises should focus on acting out incident scene roles and on implementing procedures in a field environment. Refresher training should be conducted on a yearly basis and focus on technical updates to changes in response protocols, SOPs, 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, 16th Edition
- OSHA 29 CFR 1910.120
- Hazardous Chemical Data (U.S. Government)
- National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards (U.S. Government)
- Emergency Action Guides (Association of American Railroads)
- NFPA 471, 472, and 473
- Handbook of Toxic and Hazardous Chemicals and Carcinogens
- Toxic Gases: First Aid and Medical Treatment
- Haz/Mat Injuries (Bradford/Stutz)

Summary of Training Requirements

EMS/HazMat/WMD BLS Responder

Audience

Large training audience. All paramedics and emergency medical personnel who respond to emergencies, including all transportation accidents, that may involve hazardous materials.

Prerequisites

Awareness Training, and BLS or ALS certification.

Training

- Length of training should be sufficient to achieve competency. Methodology should include classroom, physical skills lab and simulation/field instruction, with an emphasis on decision making and treatment.
- Competencies:
  - Assessing incident scene hazards and risks of patient secondary contamination.
  - Incident scene response planning, including determining personal protective equipment needs and defining roles and responsibilities of the EMS BLS responder.
  - Ability to perform EMS/HM BLS 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.

Refresher

Annual refresher training recommended to include technical updates, changes in response protocols and incident command system SOPs, and renewal and retesting of incident scene decision making and patient decontamination and treatment skills.

Recommended Training Objectives

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/Weapons of Mass Destruction Incidents*, Chapter 4: *Competencies for Hazardous Materials/WMD Basic Life Support (BLS) 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

BLS - 1.1 **Origin: NFPA 4.2.1**

This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	No OSHA requirements are specifically supported by this objective

BLS 1 - Analyzing the Incident

BLS - 1.1 Origin: NFPA 4.2.1

Surveying Hazardous Materials/WMD Incidents

Given scenarios of hazardous materials/WMD incidents, the BLS level responder shall assess the nature and severity of the incident as it relates to anticipated or actual EMS responsibilities at the scene.

BLS - 1.1.1 Origin: NFPA 4.2.1.1

Given examples of the following types of containers, the BLS level responder shall identify the potential mechanisms of injury/harm and possible treatment modalities:

1) Pressure
2) Nonpressure
3) Cryogenic
4) Radioactive

BLS - 1.1.2 Origin: NFPA 4.2.1.2

Given examples of the nine U.S. Department of Transportation (DOT) hazard classes, the BLS level responder shall identify possible treatment modalities associated with each hazard class.

BLS - 1.1.3 Origin: NFPA 4.2.1.3

Given examples of various hazardous materials/WMD incidents at fixed facilities, the BLS level responder shall identify the following available health-related resource personnel:

1) Environmental health and safety representatives
2) Radiation safety officers
3) Occupational physicians and nurses
4) Site emergency response teams
5) Product or container specialists

BLS - 1.1.4 Origin: NFPA 4.2.1.4

Given various scenarios of hazardous materials/WMD incidents, the BLS level responder, working within an incident command system, shall evaluate the off-site consequences of the release based on the physical and chemical nature of the released substance and the prevailing environmental factors, to determine the need to evacuate or to shelter in place affected persons.

BLS - 1.1.5 Origin: NFPA 4.2.1.5

Given the following biological agents, the BLS level responder shall define the signs and symptoms of exposure and the likely means of dissemination:

1) Variola virus (smallpox)
2) Botulinum toxin
3) E. coli O157:H7
4) Ricin toxin
5) B. anthracis (anthrax)
6) Venezuelan equine encephalitis virus
7) Rickettsia
8) Yersinia pestis (plague)
9) Tularemia
10) Viral hemorrhagic fever
11) Other CDC Category A, B, or C-listed organism

BLS - 1.1.6 Origin: NFPA 4.2.1.6

Given examples of various types of hazardous materials/WMD incidents involving toxic industrial chemicals (TICs) and toxic industrial materials (TIMs) e.g., corrosives, reproductive hazards, carcinogens, nerve agents, flammable and/or explosive hazards, blister agents, blood agents, choking agents, and irritants), the BLS level responder shall determine the general health risks to patients exposed to those substances in the case of any release with the following:

1) A visible cloud
2) Liquid pooling
3) Solid dispersion

BLS - 1.2 Origin: NFPA 4.2.1.7

Determining If a Hazardous Materials/WMD Incident is an Illicit Laboratory Operation

Given examples of hazardous materials/WMD incidents involving illicit laboratory operations, BLS level responders assigned to respond to illicit laboratory incidents shall identify the potential drugs/WMD being manufactured.

BLS - 1.2.1 Origin: NFPA 4.2.1.7(1)

Given examples of illicit drug manufacturing methods, describe the operational considerations, hazards, and products involved in the illicit process.

BLS - 1.2.2 Origin: NFPA 4.2.1.7(2)

Given examples of illicit chemical WMD methods, describe the operational considerations, hazards and products involved in the illicit process.

BLS - 1.2.3 Origin: NFPA 4.2.1.7(3)

Given examples of illicit biological WMD methods, describe the operational considerations, hazards, and products involved in the illicit process.

BLS - 1.2.4 Origin: NFPA 4.2.1.7(4)

Given examples of illicit laboratory operations, describe the potential booby traps that have been encountered by response personnel.

BLS - 1.2.5 Origin: NFPA 4.2.1.7(5)

Given examples of illicit laboratory operations, describe the agencies that have investigative authority and operational responsibility to support the response.

BLS - 1.3 Origin: NFPA 4.2.1.8

Determining Potential Patient Outcomes of Exposure to Radiation

Given examples of a hazardous materials/WMD incident involving radioactive materials, including radiological dispersion devices, the BLS level responder shall determine the probable health risks potential patient outcomes.

BLS - 1.3.1 Origin: NFPA 4.2.1.8(1)

Determine the most likely exposure pathways for a given radiation exposure, including inhalation, ingestion, and direct skin exposure.

BLS - 1.3.2 Origin: NFPA 4.2.1.8(2)

Identify the difference between radiation exposure and radioactive contamination and the health concerns associated with each.

BLS - 1.3.3 Origin: NFPA 4.2.1.8(3)

Given three examples of pesticide labels and labeling, the BLS level responder shall use the following information to determine the associated health risks:

1) Hazard statement
2) Precautionary statement
3) Signal word
4) Pesticide name

BLS - 1.4 Origin: NFPA 4.2.2

Collecting and Interpreting Hazard and Response Information

The BLS level responder shall obtain information from the following sources to determine the nature of the medical problem and potential health effects:

1) Hazardous materials databases
2) Clinical monitoring
3) Reference materials
4) Technical information centers (e.g., CHEMTREC, CANUTEC, and SETIQ) and local state and federal authorities.
5) Technical information specialists
6) Regional poison control centers

BLS - 1.5	Origin: NFPA 4.2.3

Establishing and Enforcing Scene Control Procedures

Given two scenarios involving hazardous materials/WMD incidents, the BLS level responder shall identify how to establish and enforce scene control, including control zones and emergency decontamination, and communications between responders and to the public.

BLS - 1.5.1	Origin: NFPA 4.2.3(1)

Identify the procedures for establishing scene control through control zones.

BLS - 1.5.2	Origin: NFPA 4.2.3(2)

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

BLS - 1.5.3	Origin: NFPA 4.2.3(3)

Identify the basic techniques for the following protective actions at hazardous materials/WMD incidents:

1) Evacuation
2) Sheltering-in-place protection

BLS - 1.5.4	Origin: NFPA 4.2.3(4)

Demonstrate the ability to perform emergency decontamination.

BLS - 1.5.5	Origin: NFPA 4.2.3(5)

Identify the items to be considered in a safety briefing prior to allowing personnel to work at the following:

1) Hazardous materials incidents
2) Hazardous materials/WMD incidents involving criminal activities

Response Training Considerations
Awareness Level Personnel
Operations Level Responders: Core Competencies; Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

BLS - 1.5.6 Origin: NFPA 4.2.3(6)

Identify the procedures for ensuring coordinated communication between responders and to the public.

BLS 2 – Planning the Response

BLS - 2.1 Origin: NFPA 4.3.1.1(1)-(3)

Identifying High Risk Areas for Potential Exposures

The BLS level responder, given an events calendar and pre-incident plans, which can include the local emergency planning committee plan, as well as the agency's emergency response plan and standard operating procedures (SOPs), shall identify the venues for mass gatherings, industrial facilities, potential targets for terrorism, and any other location where an accidental or intentional release of a harmful substance can pose an unreasonable health risk to any person in the local geographical area as determined by the AHJ and shall identify the following:

1) Locations where hazardous materials/WMD are used, stored, or transported
2) Areas and locations that present a potential for a high loss of life or rate of injury in the event of an accidental or intentional release of hazardous materials/WMD
3) External factors that may complicate a hazardous materials/WMD incident

BLS - 2.2 Origin: NFPA 4.3.2.1(1)-(10)

Identifying High Risk Areas for Potential Exposures

The BLS level responder shall identify the following methods and vehicles available to transport hazardous materials patients and shall determine the location and potential routes of travel to the medically appropriate local and regional hospitals, based on the patients' needs:

1) Adult trauma centers
2) Pediatric trauma centers
3) Adult burn centers
4) Pediatric burn centers
5) Hyperbaric chambers
6) Established field hospitals
7) Dialysis centers
8) Supportive care facilities
9) Forward deployable assets
10) Other specialty hospitals or medical centers

BLS - 2.2.1 Origin: NFPA 4.3.2.2

Given a list of receiving hospitals in the region, the BLS level responder shall describe the location, availability, and capability of hospital-based decontamination facilities.

BLS - 2.2.2 Origin: NFPA 4.3.2.3

The BLS level responder shall describe the BLS protocols and SOPs at hazardous materials WMD incidents as developed by the AHJ and the prescribed role of medical control and poison control centers, as follows:

1) During mass casualty incidents
2) Where exposures have occurred
3) In the event of disrupted radio communications

BLS - 2.2.3 Origin: NFPA 4.3.2.4

The BLS level responder shall identify the formal and informal mutual aid resource (hospital- and non-hospital-based) for the field management of multi-casualty incidents, as follows:

1) Mass-casualty trailers with medical supplies
2) Mass-decedent capabilities
3) Regional decontamination units
4) Replenishment of medical supplies during long-term incidents
5) Rehabilitation units for the EMS responders
6) Replacement transport units for vehicles lost to mechanical trouble, collision, theft, and contamination

BLS - 2.2.4 Origin: NFPA 4.3.2.5

The BLS level responder shall identify the special hazards associated with inbound and outbound air transportation of patients exposed to hazardous materials/WMD.

BLS - 2.3 Origin: NFPA 4.3.3.1(1)-(2)

Identifying High Risk Areas for Potential Exposures

Given an incident communications plan, the BLS level responder shall identify the following:

1) Medical components of the communications plan
2) Ability to communicate with other responders, transport units, and receiving facilities

Response Training Considerations
Awareness Level Personnel
Operations Level Responders Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Specialty
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

BLS - 2.3.1 Origin: NFPA 4.3.3.2

Given examples of various patient exposure scenarios, the BLS level responder shall describe the following information to be transmitted to the medical or poison control center or the receiving hospital prior to arrival:

1) The name of the substance(s) involved
2) Physical and chemical properties of the substance(s) involved
3) Number of victims being transported
4) Age and sex of transported patient
5) Patient condition and chief complaint
6) Medial history
7) Circumstances and history of the exposure, such as duration of exposure and primary route of exposure
8) Vital signs, initial and current
9) Symptoms described by the patient, initial and current
10) Presence of associated injuries, such as burns and trauma
11) Decontamination status
12) Treatment rendered or in progress
13) Patient response to treatment(s)
14) Estimated time of arrival

BLS - 2.4 Origin: NFPA 4.3.4.1

Identifying High Risk Areas for Potential Exposures

Given scenarios involving hazardous materials/WMD, the BLS level responder shall identify his or her role during hazardous materials/WMD incidents as specified in the emergency response plan and SOPs developed by the AHJ.

BLS - 2.4.1 Origin: NFPA 4.3.4.1 (1)

Describe the purpose, benefits, and elements of the incident command system as it relates to the BLS level responder.

BLS - 2.4.2 Origin: NFPA 4.3.4.1 (2)

Describe the typical incident command structure, for the emergency medical component of a hazardous materials/WMD incident as specified in the emergency response plan and SOPs, as developed by the AHJ.

BLS - 2.4.3 Origin: NFPA 4.3.4.1 (1)

Demonstrate the ability of the BLS level responder to function within the incident command system.

BLS - 2.4.4 Origin: NFPA 4.3.4.1 (4)

Demonstrate the ability to implement an incident command system for a hazardous materials/WMD incident where an ICS does not currently exist.

BLS - 2.4.5 Origin: NFPA 4.3.4.1 (5)

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

BLS - 2.5 Origin: NFPA 4.3.4.2

Role of the Hazardous Materials/WMD BLS Responder

The hazardous materials/WMD BLS responder shall describe his or her role within the hazardous materials response plan developed by the AHJ or identified in the local emergency response plan, as follows:

1) Determine the toxic effect of hazardous materials/WMD
2) Estimate the number of patients.
3) Recognize and assess the presence and severity of symptoms.
4) Take and record vital signs.
5) Determine resource maximization and assessment.
6) Assess the impact on the health care system.
7) Perform appropriate patient monitoring.
8) Communicate pertinent information

BLS 3 – Implementing the Planned Response

BLS - 3.1 Origin: NFPA 4.4.1

Determining the Nature of the Incident / Providing Medical Care

The BLS level responder shall demonstrate the ability to identify the mechanisms of injury or harm and the clinical implications and provide emergency medical care to those patients exposed to hazardous materials/WMD agent by completing the following tasks:

BLS - 3.1.1 Origin: NFPA 4.4.1 (1)

Determine the physical state of the released substance, in addition to the environmental influences surrounding the release, as follows:

1) Solid
2) Liquid
3) Gas
4) Vapor
5) Dust
6) Mist

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

7) Aerosol

BLS - 3.1.2 Origin: NFPA 4.4.1 (2)

Identify potential routes of exposure and correlate those routes of exposure to the physical state of the released substance, to determine the origin of the illness or injury, as follows:

1) Inhalation
2) Absorption
3) Ingestion
4) Injection

BLS - 3.1.3 Origin: NFPA 4.4.1 (3)

Describe the potential routes of entry into the body, the common signs and symptoms of exposure, and the BLS treatment options approved by the HAJ for exposure (s) to the following classification of substances:

1) Corrosives
2) Pesticides
3) Chemical asphyxiants
4) Simple asphyxiants
5) Organic solvents
6) Nerve agents
7) Vesicants and blister agents
8) Blood agents
9) Choking agents
10) Irritants
11) Biological agents and toxins
12) Incapacitating agents
13) Radiological materials
14) Nitrogen compounds
15) Opiate compounds
16) Flourine compounds
17) Phenolic compounds

BLS - 3.1.4 Origin: NFPA 4.4.1 (4)

Describe the basic toxicological principles relative to assessment and treatment of persons exposed to hazardous materials, including the following:

1) Acute and delayed effects
2) Local and systemic effects
3) Dose-response relationship

BLS - 3.1.5 Origin: NFPA 4.4.1 (5)

Given examples of various hazardous materials/WMD, define the basic toxicological terms as applied to patient care:

1) Threshold limit value-time-weighted average (TLV-TWA)
2) Permissible exposure limit (PEL)
3) Threshold limit value – short-term exposure limit (TLV-STEL)
4) Immediately dangerous to life and health (IDLH)
5) Threshold limit value – ceiling (TLV-C)
6) Parts per million/ parts per billion/ parts per trillion (ppm/ ppb/ ppt)

BLS - 3.2 Origin: NFPA 4.4.1(6)

Evaluating Progress and Effectiveness of Medical Care Providers

Given examples of hazardous materials/WMD incidents with exposed patients, evaluate the progress and effectiveness of the medical care provided at a hazardous materials/WMD incident to ensure that the overall incident response objectives, along with patient care goals.

BLS – 3.2.1 Origin: NFPA 4.4.1 (6)(a)

Locate and track all exposed patients at a hazardous materials/WMD incident, from triage and treatment to transport to a medically appropriate facility.

BLS - 3.2.2 Origin: NFPA 4.4.1 (6)(b)

Review the incident objectives at periodic intervals to ensure that patient care is being carried out within the overall incident action plan.

BLS - 3.2.3 Origin: NFPA 4.4.1 (6)(c)

Ensure that the required incident command system forms are completed, along with the patient care forms, during the course of the incident.

BLS - 3.2.4 Origin: NFPA 4.4.1 (6)(d)

Evaluate the need for trained and qualified EMS personnel, medical equipment, transport units, and other supplies based on the scope and duration of the incident.

BLS - 3.3 Origin: NFPA 4.4.2(1)

Determine if Decontamination Was Performed

Given the emergency response plan and SOPs developed by the AHJ, the BLS level responder shall determine if patient decontamination activities were performed prior to accepting responsibility and transferring care of exposed patients.

BLS - 3.4 Origin: NFPA 4.4.2(2)

Determine the Need and Location for Patient Decontamination

Given the emergency response plan and SOPs developed by the AHJ, the BLS level responder shall determine the need and location for patient decontamination, including mass casualty decontamination, in the event none has been performed prior to arrival of EMS personnel.

BLS – 3.4.1 Origin: NFPA 4.4.2 (2)(a)

Given the emergency response plan and SOPs developed by the AHJ, identify sources of information for determining the appropriate decontamination procedure and identify how to access those resources in a hazardous materials/WMD incident.

BLS – 3.4.2 Origin: NFPA 4.4.2 (2)(b)

Given the emergency response plan and SOPs developed by the AHJ, identify (within the plan) the supplies and equipment required to set up and implement emergency decontamination operations and mass decontamination operations for ambulatory and non-ambulatory patients.

BLS – 3.4.3 Origin: NFPA 4.4.2 (2)(c)

Identify procedures, equipment, and safety precautions for the treatment and handling of emergency service animals brought to the decontamination corridor at hazardous materials/WMD incidents.

BLS – 3.4.4 Origin: NFPA 4.4.2 (2)(d)

Identify procedures, equipment, and safety precautions for communicating with critical, urgent, and potentially exposed patients and identify population prioritization as it relates to decontamination purposes.

BLS – 3.4.5 Origin: NFPA 4.4.2 (2)(e)

Identify procedures, equipment, and safety precautions for preventing cross contamination.

BLS - 3.5 Origin: NFPA 4.4.3.1

Determine the Ongoing Need for Medical Supplies

Given examples of single-patient and multi-casualty hazardous materials/WMD incidents, the BLS level responder shall determine the following:

1) If the available medical equipment will meet or exceed patient care needs throughout the duration of the incident.
2) If the available transport units will meet or exceed patient care needs throughout the duration of the incident.

BLS - 3.6 Origin: NFPA 4.4.4

Preserving Evidence

Given examples of hazardous materials/WMD incidents where criminal acts are suspected, the BLS level responder shall make every attempt to preserve evidence during the course of delivering patient care.

BLS – 3.6.1 Origin: NFPA 4.4.4 (1)

Determine if the incident is potentially criminal in nature and cooperate with the law enforcement agency having investigative jurisdiction.

BLS – 3.6.2 Origin: NFPA 4.4.4 (2)

Identify the unique aspects of criminal hazardous materials/WMD incidents, including crime scene preservation and evidence preservation, to avoid the destruction of potential evidence on medical patients during the decontamination process.

BLS – 3.6.3 Origin: NFPA 4.4.4 (3)

Identify within the emergency response plan and SOPs developed by the AHJ procedures, equipment, and safety precautions for securing evidence during decontamination operations at hazardous materials/WMD incidents.

BLS – 3.6.4 Origin: NFPA 4.4.4 (4)

Ensure that any information regarding suspects, sequence of events during a potentially criminal act, and observations made based on patient presentation or during patient assessment are documented and communicated to the law enforcement agency having investigative jurisdiction.

BLS - 3.7 Origin: NFPA 4.4.5

Medical Support at Hazardous Materials/WMD Incidents

Given examples of hazardous materials/WMD incident, the BLS level responder shall describe the procedures of the AHJ for performing medical monitoring and support of hazardous materials incident response personnel.

BLS – 3.7.1 Origin: NFPA 4.4.5 (1)(a)

Given examples of various hazardous materials/WMD incidents requiring the use chemical protective ensembles, the BLS level responder shall demonstrate the ability to set up and operate a medical monitoring station.

BLS – 3.7.2 Origin: NFPA 4.4.5 (1)(b)

Given examples of various hazardous materials/WMD incidents requiring the use chemical protective ensembles, the BLS level responder shall demonstrate the

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

ability to recognize the signs and symptoms of heat stress, cold stress, heat exhaustion, and heat stroke.

BLS – 3.7.3 Origin: NFPA 4.4.5 (1)(c)

Given examples of various hazardous materials/WMD incidents requiring the use chemical protective ensembles, the BLS level responder shall determine the BLS needs for responders exhibiting the effects of heat stress, cold stress, and heat exhaustion.

BLS – 3.7.4 Origin: NFPA 4.4.5 (1)(d)

Given examples of various hazardous materials/WMD incidents requiring the use chemical protective ensembles, the BLS level responder shall describe the medical significance of heat stroke and the importance of rapid transport to an appropriate medical receiving facility.

BLS – 3.7.5 Origin: NFPA 4.4.5 (1)(e)

Given a simulated hazardous materials incident, demonstrate the appropriate documentation of medical monitoring activities.

BLS – 3.7.6 Origin: NFPA 4.4.5 (2)

The BLS level responder responsible for pre-entry medical monitoring shall obtain hazard and toxicity information on the hazardous materials/WMD from the designated hazardous materials technical reference resource or other sources of information at the scene.

BLS – 3.7.7 Origin: NFPA 4.4.5 (3)

The following information shall be conveyed to the entry team, incident safety officer, hazardous materials officer, other EMS personnel at the scene, and any other responders responsible for the health and well-being of those personnel operating at the scene:

1) Chemical name
2) Hazard class
3) Multiple hazards and toxicity information
4) Applicable decontamination methods and procedures
5) Potential for cross contamination
6) Procedure for transfer of patients from the constraints of the incident to the EMS
7) Prehospital management of medical emergencies and exposures

BLS – 3.7.8 Origin: NFPA 4.4.5 (4)

The BLS level responder shall evaluate the pre-entry health status of responders to hazardous materials/WMD incidents prior to their donning personal protective equipment (PPE) by performing the following tasks (consideration shall be given to excluding responders if they do not meet criteria specified by the AHJ prior to working in chemical protective clothing):

1) A full set of vital signs
2) Body weight measurements to address hydration considerations
3) General health observations
4) Core body temperature: hypothermia/hyperthermia
5) Blood pressure: hypotension/hypertension
6) Pulse rate: bradycardia/tachycardia as defined
7) Respiratory rate: bradypnea/tachypnea

BLS – 3.7.9 Origin: NFPA 4.4.5 (5)

The BLS level responder shall determine how the following factors influence heat stress on hazardous materials/WMD response personnel:

1) Baseline level of hydration
2) Underlying physical fitness
3) Environmental factors
4) Activity levels during the entry
5) Level of PPE worn
6) Duration of entry
7) Cold stress

BLS – 3.7.10 Origin: NFPA 4.4.5 (6)

The BLS level responder shall medically evaluate all team members after decontamination and PPE removal, using the following criteria:

1) Pulse rate determined within the first minute
2) Pulse rate determined 3 minutes after initial evaluation
3) Temperature
4) Body weight
5) Blood pressure
6) Respiratory rate

BLS – 3.7.11 Origin: NFPA 4.4.5 (7)

The BLS level responder shall recommend that any hazardous materials team member be prohibited from redonning chemical protective clothing if any of the following criteria is exhibited:

1) Signs or symptoms of heat stress or heat exhaustion

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

2) Pulse rate: tachycardia/bradycardia
3) Core body temperature: hyperthermia/hypothermia
4) Recovery heart rate with a trend toward normal rate and rhythm
5) Blood pressure: hypertension/hypotension
6) Weight loss of >5 percent
7) Any team member exhibiting the signs or symptoms of extreme heat exhaustion or heat stroke shall be transported to the medical facility

BLS – 3.7.12	Origin: NFPA 4.4.5 (8)

The BLS level responder responsible for medical monitoring and support shall immediately notify the persons designated by the incident action plan that a team member required significant medical treatment or transport. Transportation shall be arranged through the designee identified in the emergency response plan.

BLS - 3.8	Origin: NFPA 4.5

Reporting and Documenting the Incident

Given a scenario involving a hazardous materials/WMD incident, the responder assigned to use PPE shall complete the reporting and documentation requirements consistent with the emergency response plan or SOPs and identify the reports and supporting documentation required by the emergency response plan or SOPs.

BLS - 3.9	Origin: NFPA 4.6

Compiling Incident Reports

The BLS responder shall describe his or her role in compiling incident reports that meet federal, state, local, and organizational requirements.

BLS – 3.9.1	Origin: NFPA 4.6 (1)

List the information to be gathered regarding the exposure of all patient(s) and describe the reporting procedures, including the following:

1) Detailed information on the substances released
2) Pertinent information on each patient treated and transported
3) Routes, extent, and duration of exposures
4) Actions taken to limit exposure
5) Decontamination activities

BLS – 3.9.2	Origin: NFPA 4.6 (2)

At the conclusion of the hazardous materials/WMD incident, identify the methods used by the AHJ to evaluate transport units that might have been contaminated and the process and locations available to decontaminate those units.

Page Intentionally Left Blank

Hazardous Materials Incident Response Curriculum Guidelines

Emergency Medical Service/ Hazardous Materials/WMD Advanced Life Support (ALS) Responder

Introduction

Emergency Medical Service/Hazardous Materials/WMD Advanced Life Support (EMS/HM ALS) Responders shall be certified at the EMT-B level or higher, shall meet all the competencies for EMS/HM BLS 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 ALS Responder. In addition, EMS/HM ALS 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 ALS 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 ALS 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 ALS 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.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Training Audience

EMS/HM ALS 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 Emergency Services Incident Management System and Command Safety, 2014 Edition
- U.S. Fire Administration Emergency Incident Rehabilitation Guide, 2008 Edition

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 materials-related criminal or terrorist incident occurs, all EMS basic life-support-provider personnel responding should have been trained to the emergency medical technician B level or equivalent.

Methodology Recommendations

EMS/HM ALS 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 ALS Responder personnel be trained to competency before being called on to perform EMS/HM ALS 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 SOPs, and renewal of individual skills in decontamination, patient treatment, and use of personal protective equipment.

Summary of Training Requirements

EMS/HazMat/WMD ALS Responder

Audience

Moderate size training audience. Paramedics and emergency medical personnel who may be called upon to conduct decontamination and patient care in the warm and hot zone of a hazmat incident or hazmat-related criminal or terrorist incident scene.

Prerequisites

Awareness Training, EMS/HM BLS Responder training, EMT-B certification

Training

- Length of training should be sufficient to achieve competency. Methodology should include classroom, physical skills lab and simulation/field instruction, with an emphasis on decision making and treatment.
- Competencies:
  - Assessing incident scene hazards and risks of patient secondary contamination.
  - Incident scene response planning, including determining personal protective equipment needs and defining roles and responsibilities of the EMS ALS responder.
  - Ability to perform EMS/HM ALS patient decontamination and treatment in the warm zone at an incident scene.
  - Ability to perform post-incident EMS reporting, documentation and follow-up.

Refresher

Annual refresher training recommended to include technical updates, changes in response protocols and incident command system SOPs, and renewal and retesting of incident scene decision making and warm zone decontamination and treatment skills.

Recommended Training Objectives

The following training objectives are recommended for the Emergency Medical Service/Hazardous Materials ALS Responder. The primary source for this material is NFPA 473: *Standard for Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents*, Chapter 5: *Competencies for Hazardous Materials/WMD Advanced Life Support (ALS) Responder*.

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.

Objective Identification Legend

ALS - 1.1 **Origin: NFPA 5.2.1**

This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	No OSHA requirements are specifically supported by this objective

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

ALS 1 - Analyzing the Incident

ALS - 1.1 Origin: NFPA 473 5.2.1

Surveying Hazardous Materials/WMD Incidents

Given scenarios of hazardous materials/WMD incidents, the ALS level responder shall assess the nature and severity of the incident as it relates to anticipated or actual EMS responsibilities at the scene.

ALS - 1.1.1 Origin: NFPA 473 5.2.1.1

Given examples of the following marked transport vehicles (and their corresponding shipping papers or identification systems) that can be involved in hazardous materials/WMD incidents, the ALS level responder shall evaluate the general health risks based on the physical and chemical properties of the anticipated contents:

1) Highway transport vehicles, including cargo tanks
2) Intermodal equipment, including tank containers
3) Rail transport vehicles, including tank cars

ALS - 1.1.2 Origin: NFPA 473 5.2.1.2 (1)

Given examples of various hazardous materials/WMD incidents at fixed facilities, the ALS level responder shall demonstrate the ability to identify a variety of containers and their markings, including bulk and nonbulk packages and containers, drums, underground and aboveground storage tanks, specialized storage tanks, or any other specialized containers found in the AHJ’s geographic area, and evaluate the general health risks based on the physical and chemical properties of the anticipated contents.

ALS - 1.1.3 Origin: NFPA 473 5.2.1.2 (2)

Given examples of various hazardous materials/WMD incidents at fixed facilities, the ALS level responder shall demonstrate the ability to identify the following job functions of health-related resource personnel available at fixed facility hazardous materials/WMD incidents:

1) Environmental health and safety representatives
2) Radiation safety officers
3) Occupational physicians and nurses
4) Site emergency response teams
5) Specialized experts

ALS - 1.1.4 Origin: NFPA 473 5.2.1.3

The ALS level responder shall identify two ways to obtain a safety data sheet (SDS) at a hazardous materials/WMD incident and shall demonstrate the ability to identify the following health-related information:

1) Proper chemical name or synonyms
2) Physical and chemical properties
3) Health hazards of the material
4) Signs and symptoms of exposure
5) Routes of entry
6) Permissible exposure limits
7) Emergency medical procedures or recommendations
8) Responsible party contact

ALS - 1.1.5 Origin: NFPA 473 5.2.1.4

Given scenarios at various fixed facilities, transportation incidents, pipeline release scenarios, maritime incidents, or any other unexpected hazardous materials/WMD incident, the ALS level responder, working within an incident command system must evaluate the off-site consequences of the release, based on the physical and chemical nature of the released substance, and the prevailing environmental factors to determine the need to evacuate or shelter in place affected persons.

ALS - 1.1.6 Origin: NFPA 473 5.2.1.5

Given examples of the following biological threat agents, the ALS level responder shall define the various types of biological threat agents, including the signs and symptoms of exposure, mechanism of toxicity, incubation periods, possible disease patterns, and likely means of dissemination:

1) Variola virus (smallpox)
2) Botulinum toxin
3) E. coli O157:H7
4) Ricin toxin
5) B. anthracis (anthrax)
6) Venezuelan equine encephalitis virus
7) Rickettsia
8) Yersinia pestis (plague)
9) Tularemia
10) Viral hemorrhagic fever
11) Other CDC Category A–listed organism or threat

ALS - 1.1.7 Origin: NFPA 473 5.2.1.6

Given examples of various types of hazardous materials/WMD incidents involving toxic industrial chemicals (TICs), toxic industrial materials (TIMs), blister agents,

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

blood agents, nerve agents, choking agents and irritants, the ALS level responder shall determine the general health risks to patients exposed to those substances and identify those patients who may be candidates for antidotes.

ALS - 1.1.8 Origin: NFPA 473 5.2.1.7

Given examples of hazardous materials/WMD found at illicit laboratories, the ALS level responder shall identify general health hazards associated with the chemical substances that are expected to be encountered.

ALS - 1.1.9 Origin: NFPA 473 5.2.1.8

Given examples of a hazardous materials/WMD incident involving radioactive materials, including radiological dispersion devices, the ALS level responder shall determine the probable health risks and potential patient outcomes.

ALS - 1.1.9.1 Origin: NFPA 473 5.2.1.8 (1)

Determine the types of radiation (alpha, beta, gamma, and neutron) and potential health effects of each.

ALS - 1.1.9.2 Origin: NFPA 473 5.2.1.8 (2)

Determine the most likely exposure pathways for a given radiation exposure, including inhalation, ingestion, and direct skin exposure.

ALS - 1.1.9.3 Origin: NFPA 473 5.2.1.8 (3)

Describe how the potential for cross contamination differs for electromagnetic waves compared to radioactive solids, liquids, or vapors.

ALS - 1.1.9.4 Origin: NFPA 473 5.2.1.8 (4)

Identify priorities for decontamination in scenarios involving radioactive materials.

ALS - 1.1.9.5 Origin: NFPA 473 5.2.1.8 (5)

Describe the manner in which acute medical illness or traumatic injury can influence decisions about decontamination and patient transport.

ALS - 1.1.10 Origin: NFPA 473 5.2.1.9

Given examples of typical labels found on pesticide containers, the ALS level responder shall define the following terms:

1) Pesticide name
2) Pesticide classification (e.g., insecticide, rodenticide, organophosphate, carbamate, organochlorine.
3) Environmental Protection Agency (EPA) registration number

4) Manufacturer name
5) Ingredients broken down by percentage
6) Cautionary statement (e.g., Danger, Warning, Caution, Keep from Waterways)
7) Strength and concentration
8) Treatment information

ALS - 1.2 Origin: NFPA 473 5.2.2 (1)-(11)

Surveying Hazardous Materials/WMD Incidents

Collecting and Interpreting Hazard and Response Information. The ALS level responder shall demonstrate the ability to utilize various reference sources at a hazardous materials/WMD incident, including the following:

1) SDS
2) CHEMTREC/CANUTEC/SETIQ
3) Regional poison control centers
4) DOT Emergency Response Guidebook
5) NFPA 704, Standard System for the Identification of the Hazards of Materials for Emergency Response identification system.
6) Hazardous Materials Information System (HMIS)
7) Local, state, federal, and provincial authorities
8) Shipper/manufacturer contacts
9) Agency for Toxic Substances and Disease Registry (ATSDR) medical management guidelines
10) Medical toxicologists
11) Electronic databases

ALS - 1.3 Origin: NFPA 473 5.2.2.1

Identifying Secondary Devices

Given scenarios involving hazardous materials/WMD, the ALS level responders shall describe the importance of evaluating the scene for secondary devices prior to rendering patient care.

ALS - 1.3.1 Origin: NFPA 473 5.2.2.1 (1)

Evaluate the scene for likely areas where secondary devices can be placed.

ALS - 1.3.2 Origin: NFPA 473 5.2.2.1 (2)

Visually scan operating areas for a secondary device before providing patient care.

ALS - 1.3.3 Origin: NFPA 473 5.2.2.1 (3)

Avoid touching or moving anything that can conceal an explosive device.

ALS - 1.3.4 Origin: NFPA 473 5.2.2.1 (4)

Designate and enforce scene control zones.

ALS - 1.3.5 Origin: NFPA 473 5.2.2.1 (5)

Evacuate victims, other responders, and nonessential personnel as quickly and safely as possible.

ALS 2 – Planning the Response

ALS - 2.1 Origin: NFPA 473 5.3.1.1

Identifying High-Risk Areas for Potential Exposures

The ALS level responder, given an events calendar and pre-incident plans, which can include the local emergency planning committee plan as well as the agency's emergency response plan and SOPs, shall identify the venues for mass gatherings, industrial facilities, potential targets for terrorism, or any other locations where an accidental or intentional release of a harmful substance can pose an unreasonable health risk to any person within the local geographical area as determined by the AHJ.

ALS - 2.1.1 Origin: NFPA 473 5.3.1.1(1)

Identify locations where hazardous materials/WMD are used, stored, or transported.

ALS - 2.1.2 Origin: NFPA 473 5.3.1.1(2)

Identify areas and locations presenting a potential for a high loss of life or rate of injury in the event of an accidental/intentional release of a hazardous materials/WMD substance.

ALS - 2.1.3 Origin: NFPA 473 5.3.1.1(3)

Evaluate the geographic and environmental factors that can complicate a hazardous materials/WMD incident, including prevailing winds, water supply, vehicle and pedestrian traffic flow, ventilation systems, and other natural or man-made influences, including air and rail corridors.

ALS - 2.2 Origin: NFPA 473 5.3.2.1

Determining the Capabilities of the Local Hospital Network

The ALS level responder shall identify the methods and vehicles available to transport hazardous materials patients and shall determine the location and potential routes of travel to the following appropriate local and regional hospitals, based on patient need:

1) Adult trauma centers
2) Pediatric trauma centers
3) Adult burn centers

4) Pediatric burn centers
5) Hyperbaric chambers
6) Established field hospitals
7) Other specialty hospitals or medical centers

ALS - 2.2.1 Origin: NFPA 473 5.3.2.2

Given a list of local receiving hospitals in the AHJ's geographic area, the ALS level responder shall describe the location and availability of hospital-based decontamination facilities.

ALS - 2.2.2 Origin: NFPA 473 5.3.2.3

The ALS level responder shall describe the ALS protocols and SOPs developed by the AHJ and the prescribed role of medical control and poison control centers during mass casualty incidents, at hazardous materials/WMD incidents where exposures have occurred, and in the event of disrupted radio communications.

ALS - 2.2.3 Origin: NFPA 473 5.3.2.4

The ALS level responder shall identify the following mutual aid resources (hospital and non-hospital based) identified by the AHJ for the field management of multi-casualty incidents.

1) Mass-casualty trailers with medical supplies
2) Mass-decedent capability
3) Regional decontamination units
4) Replenishment of medical supplies during long-term incidents
5) Locations and availability of mass-casualty antidotes for selected exposures, including but not limited to the following:
6) Nerve agents and organophosphate pesticides
7) Biological agents and other toxins
8) Blood agents
9) Opiate exposures
10) Selected radiological exposures
11) Rehabilitation units for the EMS responders
12) Replacement transport units for those vehicles lost to mechanical trouble, collision, theft, and contamination

ALS - 2.2.4 Origin: NFPA 473 5.3.2.5

The ALS level responder shall identify the special hazards associated with inbound and outbound air transportation of patients exposed to hazardous materials/WMD.

ALS - 2.2.5 Origin: NFPA 473 5.3.2.6

The ALS level responder shall describe the available medical information resources concerning hazardous materials toxicology and response.

ALS - 2.3 Origin: NFPA 473 5.3.3.1

Identifying Incident Communications

The ALS level responder shall identify the components of the communication plan within the AHJ geographic area and determine that the EMS providers have the ability to communicate with other responders on the scene, with transport units, and with local hospitals.

ALS - 2.3.1 Origin: NFPA 473 5.3.3.2 (1)-(13)

Given examples of various patient exposure scenarios, the ALS level responder shall describe the following information to be transmitted to the medical control or poison control center or the receiving hospital prior to arrival:

1) The exact name of the substance(s) involved
2) The physical and chemical properties of the substance(s) involved
3) Number of victims being transported
4) Age and sex of transported patients
5) Patient condition and chief complaint
6) Medical history
7) Circumstances and history of the exposure, such as duration of exposure and primary route of exposure
8) Vital signs, initial and current
9) Symptoms described by the patient, initial and current
10) Presence of associated injuries, such as burns and trauma
11) Decontamination status
12) Treatment rendered or in progress, including the effectiveness of antidotes administered
13) Estimated time of arrival

ALS - 2.4 Origin: NFPA 473 5.3.4

Identifying the role of the ALS Level Responder

Given scenarios involving hazardous materials/WMD, the ALS level responder shall identify his or her role during hazardous materials/WMD incidents as specified in the emergency response plan and SOPs developed by the AHJ.

ALS - 2.4.1 Origin: NFPA 473 5.3.4.1 (1)

Describe the purpose, benefits, and elements of the incident command system as it relates to the ALS level responder.

ALS - 2.4.2 Origin: NFPA 473 5.3.4.1 (2)

Describe the typical incident command structure for the emergency medical component of a hazardous materials/WMD incident as specified in the emergency response plan and SOPs developed by the AHJ.

ALS - 2.4.3 Origin: NFPA 473 5.3.4.1 (3)

Demonstrate the ability of the ALS level responder to function within the incident command system.

ALS - 2.4.4 Origin: NFPA 473 5.3.4.1 (4)

Demonstrate the ability to implement an incident command system for a hazardous materials/WMD incident where an ICS does not currently exist.

ALS - 2.4.5 Origin: NFPA 473 5.3.4.1 (5)

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

ALS - 2.4.6 Origin: NFPA 473 5.3.4.2

Describe the hazardous materials/WMD ALS responder's role in the hazardous materials/WMD response plan developed by the AHJ or identified in the local emergency response plan as follows:

ALS - 2.4.6.1 Origin: NFPA 473 5.3.4.2 (1)

Determine the toxic effect of hazardous materials/WMD.

ALS - 2.4.6.2 Origin: NFPA 473 5.3.4.2 (2)

Estimate the number of patients.

ALS - 2.4.6.3 Origin: NFPA 473 5.3.4.2 (3)

Recognize and assess the presence and severity of symptoms.

ALS - 2.4.6.4 Origin: NFPA 473 5.3.4.2 (4)

Assess the impact on the health care system.

ALS - 2.4.6.5 Origin: NFPA 473 5.3.4.2 (5)

Perform appropriate patient monitoring as follows:

1) Pulse oximetry
2) Cardiac monitor
3) End tidal CO2

ALS - 2.4.6.6 Origin: NFPA 473 5.3.4.2 (6)

Communicate pertinent information.

ALS - 2.4.6.7 Origin: NFPA 473 5.3.4.2 (7)

Estimate pharmacological need.

ALS - 2.4.6.8 Origin: NFPA 473 5.3.4.2 (8)

Address threat potential for clinical latency.

ALS - 2.4.6.9 Origin: NFPA 473 5.3.4.2 (9)

Estimate dosage – exposure.

ALS - 2.4.6.10 Origin: NFPA 473 5.3.4.2 (10)

Estimate dosage – treatment.

ALS - 2.4.6.11 Origin: NFPA 473 5.3.4.2 (11)

Train in appropriate monitoring.

ALS - 2.5 Origin: NFPA 473 5.3.5

Supplemental Medical Resources

Given scenarios of various hazardous materials/WMD mass casualty incidents, the ALS level responder shall identify the supplemental medical resources available to the AHJ, including the following:

ALS - 2.5.1 Origin: NFPA 473 5.3.5 (1)

Describe the strategic national stockpile (SNS) program, including the following components:

1) Intent and goals of the SNS program
2) Procedures and requirements for deploying the SNS to a local jurisdiction
3) Typical supplies contained in 12-hour push package
4) Role of the technical advisory response unit (TARU)

ALS - 2.5.2 Origin: NFPA 473 5.3.5 (2)

Describe the metropolitan medical response system(MMRS) including the following components:

1) Scope, intent, and goals of the MMRS
2) Capabilities and resources of the MMRS
3) Eight capability focus areas of the MMRS

ALS 3 – Implementing the Planned Response

ALS - 3.1 Origin: NFPA 473 5.4.1

Determining the Nature of the Incident and Providing Medical Care

The ALS level responder shall demonstrate the ability to provide emergency medical care to those patients exposed to hazardous materials/WMD by completing the following tasks:

ALS - 3.1.1 Origin: NFPA 473 5.4.1(1)

The ALS level responder shall determine the physical state of the released substance and the environmental influences surrounding the release, as follows:

1) Solid
2) Liquid
3) Gas, vapor, dust, mist, aerosol

ALS - 3.1.2 Origin: NFPA 473 5.4.1(2)

The ALS level responder shall identify potential routes of exposure, and correlate those routes of exposure to the physical state of the released substance, to determine the origin of the illness or injury, as follows:

1) Inhalation
2) Absorption
3) Ingestion
4) Injection

ALS - 3.1.3 Origin: NFPA 473 5.4.1(3)

The ALS level responder shall describe the potential routes of entry into the body, the common signs and symptoms of exposure, and the ALS treatment options approved by the AHJ (e.g., advanced airway management, drug therapy), including antidote administration where appropriate for exposure(s) to the following classification of substances:

1) Corrosives
2) Pesticides
3) Chemical asphyxiants
4) Simple asphyxiants
5) Organic solvents
6) Nerve agents
7) Vesicants
8) Blood agents
9) Choking agents
10) Irritants (riot control agents)
11) Biological agents and toxins

12) Incapacitating agents
13) Radiological materials
14) Nitrogen compounds
15) Opiate compounds
16) Fluorine compounds
17) Phenolic compounds

ALS - 3.1.4 Origin: NFPA 473 5.4.1(4)

The ALS level responder shall describe the basic toxicological principles relative to assessment and treatment of persons exposed to hazardous materials, including the following:

1) Acute and delayed toxicological effects
2) Local and systemic effects
3) Dose-response relationship

ALS - 3.1.5 Origin: NFPA 473 5.4.1(5)

Given examples of various hazardous substances, the ALS level responder shall define the basic toxicological terms as they relate to the treatment of an exposed patient, as follows:

1) Threshold limit value – time weighted average (TLVTWA)
2) Lethal doses and concentrations, as follows:
    a. LDlo
    b. LD50
    c. LDhi
    d. LClo
    e. LC50
    f. LChi
3) Parts per million/parts per billion/parts per trillion (ppm/ppb/ppt)
4) Immediately dangerous to life and health (IDLH)
5) Permissible exposure limit (PEL)
6) Threshold limit value – short-term exposure limit (TLV-STEL)
7) Threshold limit value – ceiling (TLV-C)
8) Solubility
9) Poison – a substance that causes injury, illness, or death
10) Toxic – harmful nature related to amount and concentration

ALS - 3.2 Origin: NFPA 473 5.4.1 (6)

Evaluating the Progress and Effectiveness of Medical Care

Given examples of hazardous materials/WMD incidents with exposed patients, the ALS level responder shall evaluate the progress and effectiveness of the medical care provided at a hazardous materials/WMD incident, to ensure that the overall incident response objectives, along with patient care goals, are being met.

ALS - 3.2.1 Origin: NFPA 473 5.4.1(6) a

Locate and track all exposed patients at a hazardous materials/WMD incident, from triage and treatment to transport to the appropriate hospital.

ALS - 3.2.2 Origin: NFPA 473 5.4.1(6) b

Review the incident objectives at periodic intervals to ensure that patient care is being carried out within the overall incident response plan.

ALS - 3.2.3 Origin: NFPA 473 5.4.1(6) c

Ensure that the incident command system forms are completed, along with the patient care forms required by the AHJ, during the course of the incident.

ALS - 3.2.4 Origin: NFPA 473 5.4.1(6) d

Evaluate the need for trained and qualified EMS personnel, medical equipment, transport units, and other supplies, including antidotes based on the scope and duration of the incident.

ALS - 3.3 Origin: NFPA 473 5.4.2

Decontaminating Exposed Patients

Given the emergency response plan and SOPs developed by the AHJ and given examples of hazardous materials/WMD incidents with exposed patients, the ALS level responder shall do as follows:

ALS - 3.3.1 Origin: NFPA 473 5.4.2(1)

Given the emergency response plan and SOPs developed by the AHJ, identify and evaluate the patient decontamination activities performed prior to accepting responsibility for and transferring care of exposed patients.

ALS - 3.3.2 Origin: NFPA 473 5.4.2(2)

Determine the need and location for patient decontamination, including mass-casualty decontamination, in the event none has been performed prior to arrival of EMS personnel.

ALS - 3.3.2.1 Origin: NFPA 473 5.4.2(2) a

Given the emergency response plan and SOPs developed by the AHJ, identify and evaluate the patient decontamination activities performed prior to accepting responsibility for and transferring care of exposed patients; identify sources of information for determining the appropriate decontamination procedure and how to access those resources in a hazardous materials/WMD incident.

ALS - 3.3.2.2 Origin: NFPA 473 5.4.2(2) b

Given the emergency response plan and SOPs developed by the AHJ, identify and evaluate the patient decontamination activities performed prior to accepting responsibility for and transferring care of exposed patients.

ALS - 3.3.2.3 Origin: NFPA 473 5.4.2(2) c

Given the emergency response plan and SOPs provided by the AHJ, identify the supplies and equipment required to set up and implement technical or mass-casualty decontamination operations for ambulatory and non-ambulatory patients.

ALS - 3.3.2.4 Origin: NFPA 473 5.4.2(2) d

Given the emergency response plan and SOPs developed by the AHJ, identify the procedures, equipment, and safety precautions for securing evidence during decontamination operations at hazardous materials/WMD incidents.

ALS - 3.3.2.5 Origin: NFPA 473 5.4.2(2) e

Identify procedures, equipment, and safety precautions for handling tools, equipment, weapons, and law enforcement and K-9 search dogs brought to the decontamination corridor at hazardous materials/WMD incidents.

ALS - 3.3.2.6 Origin: NFPA 473 5.4.2(2) f

Identify procedures, equipment, and safety precautions for communicating with critically, urgently, and potentially exposed patients, and population prioritization and management techniques.

ALS - 3.3.2.7 Origin: NFPA 473 5.4.2(2) g

Determine the threat of cross contamination to all responders and patients by completing the following tasks:

1) Identify hazardous materials/WMD with a high risk of cross contamination.
2) Identify hazardous materials/WMD agents with a low risk of cross contamination.
3) Describe how the physical state of the hazardous materials/WMD provides clues to its potential for secondary contamination, when the exact identity of the hazardous materials/WMD is not known.

ALS - 3.4 Origin: NFPA 473 5.4.3

Evaluating the Need for Medical Supplies

Given examples of single-patient and multi-casualty hazardous materials/WMD incidents, the ALS level responder shall determine if the available medical equipment, transport units, and other supplies, including antidotes, will meet or exceed expected patient care needs throughout the duration of the incident.

ALS - 3.5 Origin: NFPA 473 5.4.4

Evidence Preservation

Given examples of hazardous materials/WMD incidents where criminal acts are suspected, the ALS level responder shall make every attempt to preserve evidence during the course of delivering patient care.

ALS - 3.5.1 Origin: NFPA 473 5.4.4(1)

Determine if the incident is potentially criminal in nature and cooperate with the law enforcement agency having investigative jurisdiction.

ALS - 3.5.2 Origin: NFPA 473 5.4.4(2)

Identify the unique aspects of criminal hazardous materials/WMD incidents, including crime scene preservation, evidence preservation, and destruction of potential evidence found on medical patients, and/or the destruction of evidence during the decontamination process.

ALS - 3.5.3 Origin: NFPA 473 5.4.4(3)

Ensure that any information regarding suspects, sequence of events during a potential criminal act, or observations made based on patient presentation or during patient assessment are documented and communicated and passed on to the law enforcement agency having investigative jurisdiction.

ALS - 3.6 Origin: NFPA 473 5.4.5

Medical Support at Hazardous Materials/WMD Incidents

Given the emergency response plan and SOPs developed by the AHJ and examples of various hazardous materials/WMD incidents, the ALS level responder shall describe the procedures for performing medical support of hazardous materials/WMD incident response personnel.

ALS - 3.6.1 Origin: NFPA 473 5.4.5(1)

The ALS level responder responsible for pre-entry medical monitoring shall obtain hazard and toxicity information on the released substance from the designated hazardous materials technical reference resource or other reliable sources of information at the scene. The following information shall be conveyed to the entry team, incident safety officer, hazardous materials officer, other EMS personnel at the scene, and any other responders responsible for the health and well-being of those personnel operating at the scene:

1) Chemical name
2) Hazard class
3) Hazard and toxicity information
4) Applicable decontamination methods and procedures
5) Potential for secondary contamination
6) Procedure for transfer of patients from the constraints of the incident to the emergency medical system
7) Prehospital management of medical emergencies and exposures, including antidote administration

ALS - 3.6.2 Origin: NFPA 473 5.4.5(2)

The ALS level responder shall evaluate the pre-entry health status of hazardous materials/WMD responders prior to donning PPE by performing the following tasks:

1) Record a full set of vital signs
2) Record body weight measurements
3) Record general health observations

ALS - 3.6.3 Origin: NFPA 473 5.4.5(3)

The ALS level responder shall determine the medical fitness of those personnel charged with donning chemical protective clothing, using the criteria set forth in the emergency action plan (EAP) and the SOP developed by the AHJ. Consideration shall be given to excluding responders if they do not meet the following criteria prior to working in chemical protective clothing:

1) Core body temperature: hypothermia/hyperthermia
2) Blood pressure: hypotension/hypertension
3) Heart rate: bradycardia/tachycardia
4) Respiratory rate: bradypnea/tachypnea

ALS - 3.6.4 Origin: NFPA 473 5.4.5(4)

The ALS level responder shall determine how the following factors influence heat stress on hazardous materials/WMD response personnel:

1) Baseline level of hydration
2) Underlying physical fitness
3) Environmental factors
4) Activity levels during the entry
5) Level of PPE worn
6) Duration of entry
7) Cold stress

ALS - 3.6.5 Origin: NFPA 473 5.4.5(5)

Given examples of various hazardous materials/WMD incidents requiring the use of chemical protective ensembles, the ALS level responder shall complete the following tasks:

1) Demonstrate the ability to set up and operate a medical monitoring station.
2) Demonstrate the ability to recognize the signs and symptoms of heat stress, heat exhaustion, and heat stroke.
3) Determine the ALS needs for responders exhibiting the effects of heat stress, cold stress, and heat exhaustion.
4) Describe the medical significance of heat stroke and the importance of rapid transport to an appropriate medical receiving facility.

ALS - 3.6.6 Origin: NFPA 473 5.4.5(6)

Given a simulated hazardous materials/WMD incident, the ALS level responder shall demonstrate documentation of medical monitoring activities.

ALS - 3.6.7 Origin: NFPA 473 5.4.5(7)

The ALS level responder shall evaluate all team members after decontamination and PPE removal, using the following criteria:

1) Pulse rate — done within the first minute
2) Pulse rate — 3 minutes after initial evaluation
3) Temperature
4) Body weight
5) Blood pressure
6) Respiratory rate

ALS - 3.6.8 Origin: NFPA 473 5.4.5(8)

The ALS level responder shall recommend that any hazardous materials team member exhibiting any of the following signs be prohibited from redonning chemical protective clothing:

1) Heat stress or heat exhaustion
2) Pulse rate: tachycardia/bradycardia
3) Core body temperature: hyperthermia/hypothermia
4) Recovery heart rate with a trend toward normal rate and rhythm
5) Blood pressure: hypertension/hypotension
6) Weight loss of >5 percent
7) Signs or symptoms of extreme heat exhaustion or heat stroke, which requires transport by ALS ambulance to the appropriate hospital

ALS - 3.6.9 Origin: NFPA 473 5.4.5(9)

The ALS level responder shall notify immediately the appropriate persons designated by the emergency response plan if a team member requires significant medical treatment or transport (arranged through the appropriate designee identified by the emergency response plan).

ALS 4 – Terminating the Incident

ALS - 4.1 Origin: NFPA 473 5.5

Reporting and Documenting the Incident

Upon termination of the hazardous materials/WMD incident, the ALS level responder shall complete the reporting, documentation, and EMS termination activities as required by the local emergency response plan or the organization's SOPs.

ALS - 4.1.1 Origin: NFPA 473 5.5 (1)

Identify the reports and supporting documentation required by the emergency response plan or SOPs.

ALS - 4.1.2 Origin: NFPA 473 5.5 (2)

Demonstrate completion of the reports required by the emergency response plan or SOPs.

ALS - 4.1.3 Origin: NFPA 473 5.5 (3)

Describe the importance of personnel exposure records.

ALS - 4.1.4 Origin: NFPA 473 5.5 (4)

Describe the importance of debriefing records.

ALS - 4.1.5 Origin: NFPA 473 5.5 (5)

Describe the importance of critique records.

ALS - 4.1.6 Origin: NFPA 473 5.5 (6)

Identify the steps in keeping an activity log and exposure records.

ALS - 4.1.7 Origin: NFPA 473 5.5 (7)

Identify the steps to be taken in compiling incident reports that meet federal, state, local, and organizational requirements.

ALS - 4.1.8 Origin: NFPA 473 5.5 (8)

Identify the requirements for compiling personal protective equipment logs.

ALS - 4.1.9 Origin: NFPA 473 5.5 (9)

Identify the requirements for filing documents and maintaining records, as follows:

ALS - 4.1.9.1 Origin: NFPA 473 5.5 (9)a

List the information to be gathered regarding the exposure of all patient(s) and describe the reporting procedures, including the following:

1) Detailed information on the substances released
2) Pertinent information on each patient treated or transported
3) Routes, extent, and duration of exposures
4) Actions taken to limit exposure
5) Decontamination activities

ALS - 4.1.9.2 Origin: NFPA 473 5.5 (9)b

Identify the methods used by the AHJ to evaluate transport units for potential contamination and the process and locations available to decontaminate those units.

Hazardous Materials Incident Response Curriculum Guidelines

Emergency Medical Service/ Hazardous Materials/WMD Advanced Life Support (ALS)

Mission Specific Competencies

Introduction

This chapter addresses competencies for the following advanced life support (ALS) level responders who are assigned mission-specific responsibilities at hazardous materials/WMD incidents by the authority having jurisdiction (AHJ) beyond the competencies of the hazardous materials/WMD ALS responder:

1) ALS responder assigned to a hazardous materials team
2) ALS responder assigned to provide clinical interventions at a hazardous materials/WMD incident
3) ALS responders assigned to treatment of smoke inhalation victims.

The goal of the competencies in this chapter is to provide the ALS responder assigned mission-specific responsibilities at hazardous materials/WMD incidents by the AHJ with the knowledge and skills to perform the assigned mission-specific responsibilities safely and effectively. This guidance and the 473 standard on which it is based are not intended to suggest any mandate that response organizations perform mission specific responsibilities, but rather that responders shall be able to perform those responsibilities when assigned.

Training Audience

EMS/HM ALS 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.

Recommended Training Objectives

The following training objectives are recommended for Advanced Life Support (ALS) Responders Assigned Mission-Specific Responsibilities. The primary source for this material is NFPA 473: *Standard for Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents*, Chapter 6: *Competencies for Advanced Life Support (ALS) Responders Assigned Mission-Specific Responsibilities.* 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.

Objective Identification Legend

ALS - 1.1 **Origin: NFPA 5.2.1**

This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective (usually NFPA 472 or 473).	No OSHA requirements are specifically supported by this objective

Mission Specific Competency

ALS Responder Assigned to a Hazardous Materials Team

ALS/HMT 1 Planning the Response

ALS/HMT - 1.1 Origin: NFPA 473 6.2.3.1

Given the standard operating procedures of the AHJ, the ALS responder assigned to a hazardous materials team shall create medical information for each hazardous materials team member in compliance with the AHJ and OSHA requirements for confidentiality.

ALS/HMT - 1.2 Origin: NFPA 473 6.2.3.2

Given existing guidance from the AHJ, explain the importance of becoming an advocate for team member physical fitness and encouraging proper exercise and nutrition for team members.

ALS/HMT - 1.3 Origin: NFPA 473 6.2.3.3

Given existing guidance from the AHJ, establish and implement an awareness program to encourage proper hydration and medical surveillance actions by hazardous materials team members prior to hazardous materials response operations.

ALS/HMT - 1.4 Origin: NFPA 473 6.2.3.4

Given the emergency response plan and existing guidance from the AHJ, establish and maintain a liaison with local and regional medical direction and medical control entities that may be involved with hazardous materials team medical care.

ALS/HMT - 1.5 Origin: NFPA 473 6.2.3.5

Given the emergency response plan and existing guidance from the AHJ, advise local and regional medical direction and medical control entities on the potential hazardous exposures and physical stressors on hazardous materials team members at a hazardous materials/WMD incident.

ALS/HMT - 1.6 Origin: NFPA 473 6.2.3.6

Given the emergency response plan and existing guidance from the AHJ, develop a list of the following healthcare facilities likely to receive injured or ill hazardous materials team members and the points of contact within those facilities:

1) Trauma centers
2) Emergency departments

3) Burn centers
4) Cardiovascular centers
5) Smoke centers
6) Hyperbaric centers

ALS/HMT - 1.7 Origin: NFPA 473 6.2.3.7

Given a list of healthcare facilities, describe how to establish and maintain the following:

1) Capability and patient flow efficiency of decontamination facilities
2) Standard inventory of antidotal pharmaceuticals

ALS/HMT - 1.8 Origin: NFPA 473 6.2.3.8

Given a listing of regional healthcare facilities with decontamination capabilities, demonstrate how to provide guidance for the healthcare facility in preparation for hazardous materials team member care.

ALS/HMT - 1.9 Origin: NFPA 473 6.2.3.9

Given a list of regional EMS responders, establish and maintain a matrix of responder capabilities to include:

1) Patient decontamination capabilities
2) Contaminated patient transportation capabilities
3) Staff hazardous materials training levels
4) Access to advanced hazardous materials medical interventions
5) Personal protective equipment inventories

ALS/HMT - 1.10 Origin: NFPA 473 6.2.3.10

Given the emergency response plan and existing guidance from the AHJ, obtain and maintain medical equipment dedicated to supporting hazardous materials team operations.

ALS/HMT - 1.11 Origin: NFPA 473 6.2.3.11

Given the emergency response plan and existing guidance from the AHJ, obtain and maintain patient rescue devices intended for affecting rescue of injured or ill hazardous materials team members from the hot zone.

ALS/HMT - 1.12 Origin: NFPA 473 6.2.3.12

Given the emergency response plan and existing guidance from the AHJ, provide training on hot zone rescue techniques to the hazardous materials team members.

ALS/HMT 2 Implementing the Planned Response

ALS/HMT - 2.1 Origin: NFPA 473 6.2.4.1

Given the emergency response plan and existing guidance from the AHJ, verify that site medical surveillance is established in accordance with AHJ policies and that all team members complete medical surveillance prior to entry.

ALS/HMT - 2.2 Origin: NFPA 473 6.2.4.2

Given the emergency response plan and existing guidance from the AHJ, ensure that the ICS 206 Medical Form or equivalent medical site survey form is completed and included as part of the incident action plan.

ALS/HMT - 2.3 Origin: NFPA 473 6.2.4.3

Given the emergency response plan and existing guidance from the AHJ, describe how to function as the hazardous materials team medical group supervisor during an exercise.

ALS/HMT - 2.4 Origin: NFPA 473 6.2.4.4

Given the emergency response plan and existing guidance from the AHJ, describe how to coordinate support to the hazardous materials team from EMS ambulances and medical personnel assigned to support hazardous materials operations as defined in OSHA 29 CFR 1910.120(q).

ALS/HMT - 2.5 Origin: NFPA 473 6.2.4.5

Given the emergency response plan and existing guidance from the AHJ, demonstrate how to establish emergency decontamination for injured or ill hazardous materials team members, including removal from all personal protective equipment (PPE) provided by the AHJ.

ALS/HMT - 2.6 Origin: NFPA 473 6.2.4.6

Given the emergency response plan and existing guidance from the AHJ, describe how to coordinate with the decontamination group supervisor to ensure the following:

1) Effectiveness of technical decontamination operations
2) Recognition of team member medical concerns

ALS/HMT - 2.7 Origin: NFPA 473 6.2.4.7

Given the emergency response plan and existing guidance from the AHJ, describe how to coordinate the following:

1) Preparation of a team rescue equipment cache near the technical decontamination line
2) Preparation of a backup team to affect a rescue in coordination with the hazardous materials safety officer

ALS/HMT - 2.8 Origin: NFPA 473 6.2.4.8

Given the emergency response plan and existing guidance from the AHJ, describe how to coordinate the rescue, medical treatment, and transportation of injured or ill hazardous materials team members in conjunction with the hazardous materials officer, hazardous materials safety officer, and EMS personnel assigned to the incident.

ALS/HMT - 2.9 Origin: NFPA 473 6.2.4.9

Given the emergency response plan and existing guidance from the AHJ, describe the following:

1) How to establish a hazardous materials rehabilitation group in accordance with NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises.*
2) Procedures to ensure team member compliance with rehabilitation efforts.

ALS/HMT - 2.10 Origin: NFPA 473 6.2.4.10

Given the emergency response plan and existing guidance from the AHJ, describe the following procedures:

1) Acting as a patient advocate for team members requiring transport to a healthcare facility for treatment.
2) Assisting healthcare responders as necessary with information regarding the patient's injury and/or illness.

ALS/HMT - 2.11 Origin: NFPA 473 6.2.4.11

Given the emergency response plan and existing guidance from the AHJ, describe:

1) Safety concerns when utilizing air medical transportation during hazardous materials incidents.
2) Methods to prevent air medical crew and aircraft from secondary contamination during incidents.

ALS/HMT 3 Terminating the Incident

ALS/HMT - 3.1 Origin: NFPA 473 6.2.6.1

Given the emergency response plan and existing guidance from the AHJ, describe the importance of completing all team medical documentation required by the AHJ following incident responses.

ALS/HMT - 3.2 Origin: NFPA 473 6.2.6.2

Given the emergency response plan and existing guidance from the AHJ, describe the process for coordinating morbidity, and mortality review sessions for all medical personnel involved in patient care on hazardous materials team members during incidents.

Mission Specific Competency

ALS Responder Assigned to Provide Clinical Intervention at a Hazardous Materials/WMD Incident

ALS/CI 1 Planning the Response

ALS/CI - 1.1 Origin: NFPA 473 6.3.3.1

Given the emergency response plan and existing guidance from the AHJ medical director, the ALS responder assigned to provide clinical interventions at a hazardous materials incident shall receive advanced training on pharmaceutical and clinical interventions.

ALS/CI - 1.2 Origin: NFPA 473 6.3.32

Given the emergency response plan and existing guidance from the AHJ medical director, the ALS responder assigned to provide clinical interventions at a hazardous materials incident shall identify potential sources of hazardous material exposure within the response are of the AHJ that may require clinical intervention skills and/or equipment.

ALS/CI 2 Implementing the Planned Response

ALS/CI - 2.1 Origin: NFPA 473 6.3.3.1

Given the emergency response plan and existing guidance from the AHJ medical director, the ALS responder assigned to provide clinical interventions at a hazardous materials incident shall identify the toxidromes for the following:

1) Organophosphates
2) Carbamates
3) Military nerve agents
4) Cyanides
5) Chlorine and acid gases
6) Anhydrous ammonia
7) Hydrogen fluoride
8) Phenolic compounds
9) Military vesicant agents
10) Nitrogen containing compounds
11) Opiates
12) Bacteria

13) Viruses
14) Biological toxins
15) Riot control agents
16) Phosgene
17) Ionizing radiation

ALS/CI - 2.2 Origin: NFPA 473 6.3.3.2

Given the emergency response plan and existing guidance from the AHJ medical director, the ALS responder assigned to provide clinical interventions at a hazardous materials incident shall describe the clinical application and actions of the following pharmaceuticals based upon approval for clinical use by the AHJ:

1) Atropine sulfate
2) Pralidoxime (2PAM)
3) Diazepam
4) Calcium gluconate
5) Amyl nitrite
6) Sodium nitrite
7) Sodium thiosulphate
8) Hydroxocobalamin
9) Methylene blue
10) Sodium bicarbonate
11) Naloxone
12) Dimercaprol
13) Polyethylene glycol
14) Zinc EDTA
15) Calcium EDTA
16) Prussian blue
17) Water

ALS/CI - 2.3 Origin: NFPA 473 6.3.3.3

Given the emergency response plan and existing guidance from the AHJ medical director, the ALS responder assigned to provide clinical interventions at a hazardous materials incident shall demonstrate the ability to properly perform the following clinical skills using the equipment approved and provided for use by the AHJ:

1) Nebulizer treatment
2) Morgan lens insertion
3) Monitor hemoglobin oxygenation levels
4) Monitor carboxyhemoglobin levels
5) Monitor methemoglobin levels
6) Administer square centimeter grid subcutaneous injections

Mission Specific Competency

ALS Responder Assigned to Treatment of Smoke Inhalation Victims

ALS/SMK 1 Analyzing the Incident

ALS/SMK - 1.1 Origin: NFPA 473 6.4.2.1

Identifying the General Hazards of Fire Smoke.

Given examples of various types of fire scenes involving residential or commercial structure fires, vehicle fires, aircraft fires, and other hazardous materials/WMD incidents, the ALS responder shall describe the commonly found components of fire smoke, including carbon monoxide and hydrogen cyanide, and describe the general health hazards associated with these substances including the following:

1) Mechanism of toxicity
2) Acute and delayed toxicological effects
3) Dose-response relationship
4) Signs and symptoms of mild, moderate, and severe exposures

ALS/SMK - 1.2 Origin: NFPA 473 6.4.2.1

Identifying Smoke Inhalation Victims. Given examples of various types of fire scenes involving residential or commercial structure fires, vehicle fires, aircraft fires, and other hazardous materials/WMD incidents, the ALS responder shall describe the general health risks of patients exposed to fire smoke and identify those patients who may require clinical interventions, including antidotes for associated cyanide poisoning. .

ALS/SMK 2 Planning to Deliver ALS Patient Care

ALS/SMK - 2.1 Origin: NFPA 473 6.4.3.1

Identifying Resources for Treating Acute Smoke Inhalation Patients. Given examples of smoke inhalation patients, including circumstance of the exposure, signs and symptoms, underlying medical conditions (cardiac arrest, respiratory distress or arrest, seizure, or altered mental status), the ALS responder shall identify the methods and vehicles available to transport smoke inhalation patients and shall determine the location and potential routes of travel to the following appropriate local and regional hospitals, based on patient need:

1) Adult trauma centers
2) Pediatric trauma centers
3) Adult burn centers
4) Pediatric burn centers
5) Hyperbaric chambers
6) Field hospitals
7) Hospitals or medical centers with FDA-approved cyanide antidotes
8) Hospitals or medical centers with the capability of performing whole blood cyanide testing

ALS/SMK 3 Implementing a Prehospital Care Plan

ALS/SMK - 3.1 Origin: NFPA 473 6.4.4.4

Given examples of smoke inhalation patients, including circumstance of the exposure, signs and symptoms, underlying medical conditions (cardiac arrest, respiratory distress or arrest, seizure, or altered mental status), the ALS responder shall demonstrate the ability to perform the critical BLS and ALS clinical interventions, including antidotes for known and suspected cyanide poisoning, within the scope of practice and training competencies established by the AHJ.

ALS/SMK 4 Reporting and Documenting the Incident

ALS/SMK - 4.1 Origin: NFPA 473 6.4.6.4

Given a scenario where treatment of a smoke inhalation patient occurred, the ALS responder shall demonstrate the ability to report and document all facets of patient care in accordance with the incident reporting system used within the AHJ.

Page Intentionally Left Blank

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Hazardous Materials Incident Response Curriculum Guidelines

Hospital First Receivers

Introduction

Hospital First Receivers 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 wellbeing 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 first receivers 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 first receivers 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 whom 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.

Training Audience

Hospital first receivers 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)

Response Training Considerations
Awareness Level Personnel
Operations Level Responders: Core Competencies; Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Recognized DOT, State, regional, or local training curricula should be a basis for hospital first receiver 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.

Methodology Recommendations

Hospital First Receiver training should include a combination of traditional classroom lecture with small-group activities, field exercises involving working in simulated emergencies, and hands-on psychomotor skill training. Content instruction should focus on contamination hazard, decontamination procedures, patient flow within the hospital, health treatment procedures and roles and responsibilities. Trainee activities should focus on assessment and analysis of hazards and determination of appropriate procedures. Skill training should focus on implementing decontamination and patient care procedures, use of reference materials and the use of appropriate personal protective equipment. Written and practical examinations are highly recommended to measure achievement in initial training and refresher programs and to support the employer’s responsibility that all emergency department personnel be trained to competency before being called upon to perform at emergencies. Exercises should focus on acting out the assigned roles and on implementing procedures in the hospital environment. Refresher training should be conducted on a yearly basis and should focus on technical updates, updates on changes in hospital protocol and procedures, and renewal of individual skills in decontamination, patient treatment, and use of personnel protective equipment.

Summary of Training Recommendations

Hospital First Receivers

Audience

Moderate in size. Hospital emergency department personnel who may coordinate treatment to patients who have been exposed to or contaminated by hazardous materials

Prerequisites

None beyond professional competencies associated with role in hospital emergency department.

Training

No specific length of training is recommended. Length of training should be sufficient to achieve competency.

Methodology should include classroom and lab instruction with simulated emergencies, with an emphasis on hands on psychomotor skill training.

Competencies:

- Knowledge of contamination hazards, decontamination procedures, patient flow, health treatment procedures, roles and responsibilities.
- Ability to implement decontamination, use of reference materials, and use of personal protective equipment.

Refresher

Annual refresher training recommended to include technical updates, updates on changes in hospital protocols and procedures, and renewal of skills in decontamination, use of reference materials, and use of personal protective equipment.

Recommended Training Objectives

The following training objectives are recommended for hospital first receivers. 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, which states that all personnel who 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 - 1.1	Origin: JCAHO PE 1.1
This is the identification of the objective that is used in these guidelines.	This indicates the origin of the objective.

HOSP 1 General

HOSP - 1.1 Origin: JCAHO PE

Describe the ways in which a medical center or hospital can become involved in a hazardous material event or response effort.

HOSP 2 Decontamination of Patients

HOSP - 2.1 Origin: JCAHO PE 1

Describe some of the key issues involved in the reception of a patient contaminated by or exposed to a chemical substance.

HOSP - 2.1.1 Origin: JCAHO PE 1.1

Presented with a contaminated patient(s), determine the initial screening or assessment of the patient(s) physical, psychological, and social status to determine the need for care, the type of care to be provided, and the need for any further assessment.

HOSP - 2.1.2 Origin: JCAHO PE 1.2, PE 1.2.1, PE 1.2.2

Determine the scope and intensity of any further patient assessment which is determined by:

1. The patient’s diagnosis;
2. The care setting

HOSP - 2.1.3 Origin: JCAHO PE 1.4

Given a contaminated patient(s), identify the diagnostic testing, including laboratory and other invasive and noninvasive diagnostic and imaging procedures, relevant to the determination of the patient(s) health care or treatment needs and to the actual care or treatment of the patient(s) to be performed.

HOSP - 2.1.4 Origin: JCAHO IM 9, 9.1, 9.2, 10.11.1

List and describe the hospital’s hazardous materials information resources and assure that they are authoritative and up to date.

HOSP - 2.1.5 Origin: JCAHO IM 9, 9.1, 9.2, 10.11.1

Define the following toxicological terms as they relate to the treatment of a contaminated patient in the hospital setting:

1. Threshold Limit Value - TLV
2. Threshold Limit Value - Time Weighted Average -TLV-TWA

3. Threshold Limit Value - Short-term Exposure Limit - TLV-STEL
4. Threshold Limit Value - Ceiling - TLV-C
5. Immediately Dangerous to Life and Health - IDLH
6. Lethal Dose 50 - LD50
7. Lethal Concentration 50 - LC50

HOSP - 2.1.6 Origin: JCAHO IM 9, 9.1, 9.2, 10.11.1

Define the effect chemicals may have on a contaminated patient using the method of Dose-Response Relationship.

HOSP - 2.1.7 Origin: JCAHO IM 9, 9.1, 9.2, 10.11.1

Describe the routes by which chemicals may enter the body.

HOSP - 2.1.8 Origin: JCAHO IM 9, 9.1, 9.2, 10.11.1

List the target organ systems which may be affected in the contaminated patient.

HOSP - 2.1.9 Origin: JCAHO IM 9, 9.1, 9.2, 10.11.1

List the areas of the body that are most likely to have greater route of chemical absorption into the body.

HOSP - 2.1.10 Origin: JCAHO PE 1.1,2.1,2.2, 2.3, 2.4

Demonstrate that each patient is reassessed at regularly specified times related to the patient's course of treatment to determine the patient's response to treatment;

1. When a significant change occurs in the patient's condition; and
2. When a significant change occurs in the patient's diagnosis.

HOSP - 2.1.11 Origin: JCAHO PE 3.1, 4.2

Demonstrate that patient care decisions are based on the identified patient needs and on care priorities.

HOSP - 2.1.12 Origin: JCAHO PE 4.3

Describe the need for nursing personnel to assess the patient's need for nursing care in all settings where nursing care is to be provided.

HOSP - 2.1.13 Origin: JCAHO IM 9.2, 10.1

Describe the methods used to assure the pharmacy, medical, and nursing staff have access to poison control information.

HOSP - 2.1.14 Origin: JCAHO IM 9.2, 10.1

List at least four resources available to hospital providers to assist with the treatment of a contaminated patient.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders: Core Competencies; Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

HOSP - 2.1.15 Origin: JCAHO IM 9.2, 10.1

List the equipment needed in the emergency department to provide for effective decontamination of a patient.

HOSP - 2.1.16 Origin: JCAHO IM 9.2, 10.1

List and describe the proper usage of Personnel Protective Equipment (PPE) used by emergency department staff during patient decontamination procedures.

HOSP - 2.1.17 Origin: JCAHO IM 9.2, 10.1

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.

HOSP 3 Planning the Response

HOSP - 3.1 Origin: JCAHO LD 1.1, EC 1.6

Describe the need for the hospital to develop emergency response plans.

HOSP - 3.1.1 Origin: JCAHO LD 1.2

Identify the necessity for the hospital administrators to communicate the hospitals plan(s) throughout the organization.

HOSP - 3.1.2 Origin: JCAHO LD 1.3

Identify the areas in the hospital plan(s) that include patient care services in response to identified patient needs and is consistent with the organization’s mission and ability to provide service.

HOSP - 3.1.3 Origin: JCAHO LD 1.3.1

Identify the hospital personnel, and, as appropriate, community leaders and organizations which need to collaborate to design services to be provided by the hospital.

HOSP - 3.1.4 Origin: JCAHO LD 1.3.2

Identify the need to design into the plan patient care services to be provided throughout the hospital organization that are appropriate to the scope and level of care required by the patients that may be served.

HOSP - 3.1.5 Origin: JCAHO LD 1.4

Describe the setting in the planning process for performance-improvement priorities and identify how the hospital adjusts priorities in response to unusual or urgent events.

HOSP - 3.1.6 Origin: JCAHO LD 1.7

Identify the need for the scope of service provided by each department as defined in writing and is approved by the hospitals administration, medical staff, or both, as appropriate.

HOSP 4 Implementing the Planned Response

HOSP - 4.1 Origin: JCAHO EC 1.2

Describe the hospitals documented management plan(s) for the environment of care to be provided during a hazardous materials emergency that considers all factors of the emergency response.

HOSP - 4.1.1 Origin: JCAHO EC 1.3

Describe the safety factors outlined in the plan as listed below:

1. Ensuring that emergency service areas are clearly identified;
2. 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;
3. Requiring an annual evaluation of the objectives, scope, performance, and effectiveness of the documented safety management plan.

HOSP - 4.1.2 Origin: JCAHO EC 1.4

Describe the security factors outlined in the plan listed below:

1. Providing access control, as appropriate, to sensitive areas;
2. Provide vehicular access to emergency service areas;
3. Providing traffic control for emergency service areas.

HOSP - 4.1.3 Origin: JCAHO EC 1.5

Describe the factors outlined in the plan related to Hazardous Wastes within the hospital listed below:

1. Monitor and disposing of hazardous wastes
2. Reporting and investigating all hazardous materials or waste spills and exposures or other incidents that involve patients, visitors, personnel, or property.

HOSP - 4.1.4 Origin: JCAHO EC 1.6

List and describe the factors outlined in the hospital's emergency preparedness program.

HOSP - 4.1.4.1 Origin: JCAHO EC 1.6a

Describe the procedure for establishing, supporting and maintaining an emergency preparedness program.

HOSP - 4.1.4.2 Origin: JCAHO EC 1.6b

Describe the steps for implementing specific procedures in response to a variety of disasters and/or emergencies, internal and external of the hospital.

HOSP - 4.1.4.3 Origin: JCAHO EC 1.6c

Describe the ways of defining and, when appropriate, integrating the hospital's role with community wide emergency preparedness efforts.

HOSP - 4.1.4.4 Origin: JCAHO EC 1.6d

Describe the procedure for notifying the proper authorities outside the hospital in an emergency.

HOSP - 4.1.4.5 Origin: JCAHO EC 1.6m

Describe the procedure for notifying hospital first receivers of an implementation of the emergency preparedness plan.

HOSP - 4.1.4.6 Origin: JCAHO EC 1.6e

Describe the ways of defining, where appropriate, alternate roles and responsibilities of hospital first receivers during disasters and/or emergencies.

HOSP - 4.1.4.7 Origin: JCAHO EC 1.6f

Describe the procedure for assigning available personnel to reflect current staffing patterns within the hospital during times of disaster and/or emergency.

HOSP - 4.1.4.8 Origin: JCAHO EC 1.6g

Describe the procedures for the management of space, supplies and security during disasters and/or emergencies.

HOSP - 4.1.4.9 Origin: JCAHO EC 1.6h

Describe the procedures for evacuating the entire facility if the organization's environment cannot continue to support adequate patient care and treatment.

HOSP - 4.1.4.10 Origin: JCAHO EC 1.6l

Describe the procedures for establishing an alternate care site if the hospital environment cannot continue to support adequate patient care and treatment.

HOSP - 4.1.4.11 Origin: JCAHO EC 1.6i

Describe the ability to identify, where appropriate, available facilities for radioactive or chemical isolation and decontamination if additional resources are needed.

HOSP - 4.1.4.12 Origin: JCAHO EC 1.6n

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 - 4.1.4.13 Origin: JCAHO EC 1.6o

Describe the requirements for an annual evaluation of the objectives, scope, performance, and effectiveness of the hospital's documented emergency preparedness management plan.

HOSP - 4.1.4.14 Origin: JCAHO EC 1.6A

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 Incident Response Training Guidelines

Appendix:
Related Standards And Special Topics

Table of Contents

Related Standards

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

RELATED STANDARDS

There are important Occupational Safety and Health Act (OSHA) or Environmental Protection Agency (EPA) regulations that must be followed when responding to an incident involving hazardous materials. These include regulations which prescribe level of protective equipment, selection and use of respirators, training curriculum criteria, or procedures that must be followed during the response, stabilization, and recovery efforts. This section of the *Guidelines* contains an quick reference summary of these regulations.

Regulations and standards are often referred to as standard of care documents. While portions of existing regulations and standards may vary in application by individual State, Tribal, Territory and local policy, it should be remembered that these established procedures and guidelines are federal requirements that are considered by the emergency response profession in general as minimal and essential standards of care. Therefore it is important that employers, training program managers, and instructors be aware of and familiar with the provisions of these standard of care documents.

The following summaries of response related regulations are intended to provide a quick reference guide and overview of the provisions of each regulation. For the details of any regulation or standard covered in this summary it is necessary to review the entire section or document. Do not use this summary for compliance with the regulation, use the official document.

Summaries are provided in this section for the following regulations and standards of care:

- -Hazardous Waste Operations and Emergency Response (HAZWOPER) 29 CFR 1910.120
- First Responder Operations Level Offensive Operations: OSHA Quips
- Employee Records 29 CFR 1910.20
- Personal Protective Equipment, including Eye and Face Protection 29 CFR 1910.133, Respiratory Protection 29 CFR 1910.134, Occupational Head Protection 29 CFR 1910.135, and Occupational Foot Protection 29 CFR 1910.136, Hand Protection 29 CFR 1910.138
- Confined Space Operations 29 CFR 1910.146
- Ventilation for Confined Space Operations
- Bloodborne Diseases 29 CFR 1910.1030
- Lockout / Tagout 29 CFR 1910.147
- Right-to-Know and Material Safety 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

  -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.

<u>Record Keeping</u>

- Written programs and documentation:
  - Organizational Structure
  - Work Plan
  - Standard Operating Procedures (SOP's)
  - Medical Surveillance Program
  - Decontamination Program
  - Emergency Response Plan
  - Safety and Health Program
  - Hazardous Communication Program
  - Training Program
  - Post Emergency Response Plan

2. Summary of HAZWOPER by Sections

(a) Scope, application, and definitions *pg 9317*

1. Scope - This section covers the following operations, unless the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards.

    (i) Clean-up required by a government

    (ii) Work at RCRA sites

    (iii) Voluntary clean-up at sites recognized by a government

    (iv) Work at treatment, storage, and disposal sites

    (v) Emergency response operations

2. Application - Defines who regulations apply to

    (i) All applicable 1910 and 1926 regulations of Title 29 apply to hazardous waste and emergency response

    (ii) Hazardous substance clean-up operations must comply

    (iii) Operations at sites listed in 1 (iv)

    (iv) Emergency response operations which are not listed in 1 (I) through 1 (iv) must only comply with the requirements of paragraph (q)

3. Definitions

    Buddy system - groups of 2 or more to provide rapid response to employees in the event of an emergency

    Clean-up operation - work removing hazardous substances

    Decontamination - removal of hazardous substance to preclude adverse effects

    Emergency response or responding to emergencies - response effort from outside the immediate release area or by other designated responders (i.e. mutual aid groups, local fire departments, etc.)

    Facility - any building, structure, pipeline, etc.

    Hazardous materials response (HAZMAT) team - means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring the possible close approach to the substance for the purpose of control or stabilization of the incident. A HAZMAT team may be a separate component of a fire brigade or fire department

    Health hazard - a chemical, mixture of chemicals, or a pathogen that acute or chronic exposure may occur

    IDLH - immediately dangerous to life or health which may cause irreversible health effects

Oxygen deficiency - atmosphere with less than 19.5% oxygen

(b) Safety and Health Program *pg 9318*

(1) General - required for hazardous waste operations and contains 7 specific areas of planning

(2) Organizational structure part of site program - describes lines of authority

(3) Comprehensive workplan of the site program - addresses logistics and resources

(4) Site-specific safety and health plan part of program - addresses hazards

(c) Site characteristics and analysis *pg 9319*

(1) General - evaluation used to identify specific hazards

(2) Preliminary evaluation - performed prior to entry

(3) Hazard identification - identify hazards to health by inhalation, absorption, etc.

(4) Required information - gathered prior to employees entering site

(5) Personal protective equipment - includes chemical exposure protection and respiratory protection

(6) Monitoring - using instruments to evaluate health hazards

(7) Risk identification - once hazard is identified evaluate risks involved

(8) Employee notification - all known chemicals and hazards must be explained to employees

(d) Site control *pg 9320*

(1) General - appropriate site control measures shall be taken

(2) Site control program - program to protect employees must be developed

(3) Elements of a site control program - items such as site map, buddy system. etc.

(e) Training (this does not apply to emergency responders) *pg 9320*

(1) General - all employees, supervisors, etc. working on site shall be trained

(2) Elements to be covered - names, hazards, PPE, work practices, engineering controls, and medical surveillance

(3) Initial training

- General site workers must receive 40 hours training off site and a minimum of 3 days field experience .

-Workers on site occasionally - must receive 24 hours training off site and 1 day field experience

-Workers on site in areas where exposures are under permissible limits - must receive 24 hours training off site and 1 day field experience

- Workers with 24 hours of training who may become general site workers must receive 16 additional hours of training and 2 days of field experience

(4) Management supervisor training - on-site management who supervise employees engaged in hazardous waste operations shall receive 40 hours of training and 3 days field experience

(5) Qualifications of trainers - satisfactorily completed training and be an instructor

(6) Training certification - a certificate shall be issued upon completion of training

(7) Emergency response - Those who may respond at a hazardous waste clean-up site and may expose 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

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

(k) Decontamination *pg 9325*

(1) General - Procedures shall be developed and followed

(2) Decontamination procedures - Procedures shall be developed, communicated to staff, and implemented before any employee or equipment may enter site

(3) Location - Done in an area to minimize exposure

(4) Equipment and solvents - Shall be properly disposed of

(5) Personal protective equipment - Shall be decontaminated, cleaned, laundered, maintained or replaced as needed

(6) Unauthorized employees - Shall not remove clothing from change rooms

(7) Commercial laundries or cleaning establishments - shall be informed of potentially harmful effects of exposure

(8) Showers and change rooms - When a shower is needed for decontamination special procedures special procedures are needed and must meet the requirements of 29 CFR 1910.141

(l) Emergency response by employees at uncontrolled hazardous waste sites *pg 9325*

(1) Emergency response plan shall be developed and implemented by employer

(2) Elements of the emergency response plan - Describes 11 minimum elements

(3) Procedures for handling emergency incidents - Includes features of site, and seven operational procedures to be followed

(m) Illumination - Provides guidelines for amount of light to be provided *pg 9325*

(n) Sanitation at temporary work place *pg 9325*

(1) Potable water - Such as for drinking

(2) Nonpotable water - Such as for firefighting purposes

(3) Toilet facilities - Describes number and types

(4) Food handling - Shall meet applicable regulations of local jurisdiction

(5) Temporary sleeping quarters - Heated, ventilated, etc.

(6) Washing facilities - In near proximity to work site

(7) Showers and change rooms - Provisions for facilities

(o) New technology programs *pg 9326*

(1) Employer shall develop and implement procedures for new technologies and equipment

(2) New technologies - Such as foam, absorbents, adsorbents, etc. shall be evaluated

(p) Certain operations conducted under RCRA of 1976 *pg 9326*

(1) Safety and health program - Develop and implement written plan

(2) Hazard communication program - Must meet 29 CFR 1910.1200

(3) Medical surveillance program

(4) Decontamination program

(5) New technology program

(6) Materials handling program

(7) Training program

(8) Emergency response program

(q) Emergency response to hazardous substance releases *pg 9328*

This paragraph covers employers whose employees are engaged in emergency response no matter where it occurs

(1) Emergency response plan - Shall be developed in writing and implemented to handle anticipated emergencies

(2) Elements of an emergency response plan - As a minimum the plan shall address 11 elements which range from pre-emergency plans to equipment

(3) Procedures for handling emergency response - Includes 10 operational procedures including the need for an incident commander and site safety officer

(4) Skilled support personnel - Includes operational procedures for personnel (not necessarily the employer’s own) for such functions as equipment operators of cranes, or earth moving

(5) Specialist employees - Include employee who as part of their job have with special knowledge, skill or ability which includes training an competency demonstration

(6) Training - Includes five levels of response training

Note: Employer should read the job descriptions of these five levels to determine which best describes the type or level of activity their employees will participate in. This will determine the level of the employers emergency response plan and level of training required. See pg 9329

(i) First responder awareness - no set hour requirement, has 6 competency skill areas

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

(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

Appendix C - Compliance guidelines *pg 9333*

1. Occupational safety and health program is discussed
2. Training (emergency response pg 9334, middle column, second paragraph)
3. Decontamination procedures are outlined
4. Emergency response plans (Hazardous Materials Emergency Response Planning Guide - NRT 1 is helpful)
5. Personal protective equipment programs is reviewed
6. Incident command system (ICS) is discussed
7. Site safety and control plans are important to the incident commander

Appendix D - References *pg 9335*

Amendments to original document of March 6, 1989

(Federal Register Vol. 59 No. 161/ Monday August 23, 1994

Appendix B - Last two paragraphs were revised which describes chemical protective clothing

Appendix E - Training curriculum guidelines *pg 43270*

It is noted that the legal requirements are set forth in the regulatory text of 1910.120. The guidance set forth here represents a highly effective program that in the areas covered would meet or exceed the regulatory requirements. In addition, other approaches could meet the regulatory requirements.

Suggested core criteria: *pg 43270*

1. Training facility - Sufficient resources to conduct training
2. Training director - Person in charge
3. Instructors - Criteria for staff including instructional review procedures
4. Course materials - Reviewed and approved by training director
5. Students - Includes screening procedures
6. Ratios - Recommends student-instructor ratio
7. Proficiency assessment - Includes testing procedures
8. Course certificate - Written documentation of completion of course
9. Record keeping - Describes record keeping procedures
10. Program quality control - Annual audit of program quality

Suggested program quality control criteria: *pg 43271*

A. Training plan - Is it adequate and appropriate

B. Program management, training, director, staff, consultants - Is the program adequate and are staff effective

C. Training facilities and resources - Is it adequate and appropriate

D. Quality control and evaluation - Quality control and evaluation plans

E. Students - Adequate procedure for accepting students

F. Institutional environment and administrative support - Enough help

G. Summary/evaluation questions - Overall program evaluation procedures

Suggested training curriculum: *pg 43272*

A. General hazardous waste operations and site-specific training

  1. Off-site training - Hazardous waste operations

  2. Refresher training - Criteria for annual refresher

  3. On-site training - Specific site training/information

B. RCRA Operations training for treatment, storage, and disposal (note: See appendix for additional information about TSD operations)

  1. Minimum training requirements

  2. Provide training prior to entering site

C. Emergency response training - 1910.120 (q) - may be appropriate for public sector emergency response personnel

  a. General considerations - May require interaction between emergency responder and site operators

    (1) First responder awareness

    (2) First Responder operations

    (3) Hazardous materials technician

    (4) Hazardous materials specialist

    (5) Incident commander

First Responder Operations Level Offensive Operations: OSHA Quips

First Responders that are trained in emergency response under the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation 29 CFR 1910.120q are generally trained to the First Responder Awareness and First Responder Operations levels, but are not generally trained to the Technician level. As a result, First Responders are limited to engaging in only defensive operations and are legally prevented from approaching the release to plug, patch or otherwise stop the release.

For decades first responders such as firefighters and public works personnel routinely plugged leaks in containers such as automobile fuel tanks, truck saddle tanks, and leaks in residential natural gas lines. However, the HAZWOPER regulation precluded first responders from continuing to perform these tasks.

To facilitate the ability to engage in this type of offensive work many agencies have written standard operating procedures (SOP) that provide guidelines for conducting these procedures. They submit the SOP to the Occupational Safety and Health Administration (OSHA) that has jurisdiction and, in most cases, find that OSHA will approve the SOP. Once the SOP is approved by OSHA, the actions are considered acceptable by operations level personnel as long as the scope of the SOP is not violated.

For jurisdictions that desire to have their operations level personnel engage in offensive operations they need to:

A. Develop a separate Standard Operating Procedure for each offensive operation, such as plugging vehicle fuel tank leaks, plugging saddle tank leaks, plugging natural gas line leaks. The content of each SOP should be, at a minimum:

    1. The title of the SOP
    2. The scope of the SOP
    3. The PPE required for conducting the offensive operation.
    4. The actual procedure to be followed when engaging in the offensive operation
    5. The training required prior to allowing personnel to engage in the offensive operation, with emphasis on the proper PPE and NOT exceeding the scope of the SOP

B. Submit the SOP to your OSHA representative for approval

C. Following approval of the SOP by your OSHA representative, train your personnel as defined in the SOP

D. Don't allow your trained personnel, in actual field operations, to exceed the scope as defined in the SOP

By addressing these simple steps, the capabilities of your first responder operations level personnel can be greatly enhanced and your dependence on Technician level personnel will be reduced for these routine type of incidents.

OSHA Quips

The following question/answer (Quips) interpretations of OSHA 1910.120 have been issued related to the subject of Operations Level offensive operations.

Operations Level Firefighters

29 CFR 1910.120(q)(6)(ii)

May an emergency responder trained only at the operations level under paragraph (q)(6)(ii) of the standard perform aggressive or offensive actions at an emergency involving a small spill or leak of gasoline without the employer being in violation of the Standard? Typical actions would include plugging or patching a leaking automobile gas tank.

Operations level training by itself is designed to enable emergency responders to safely perform defensive action at a safe distance from the point of release; personnel who have not been trained beyond the operations level are not considered adequately trained to take aggressive action at the point of release and are not permitted to do so. Such action would be in violation of 29 CFR 1910.120(q)(6)(iii), which defines the training requirements for personnel designated to take aggressive action (i.e., hazmat techs).

However, "a small spill or leak of gasoline" would not necessarily constitute an emergency or potential emergency covered under the HAZWOPER standard. Firefighters with or without operations level training may be permitted to handle non-emergency releases of an identified hazardous substance which they are adequately trained and equipped to control. Where an emergency or potential emergency release has occurred, personnel who have not been trained beyond the operations level may perform defensive action, only, deferring aggressive action to more highly trained personnel.

De Minimis Training Policy for Firefighters

29 CFR 1910.120(q)(6)(iii)

29 CFR 1910.120 is a performance based regulation, providing some flexibility to the employer in meeting the requirements of the regulation. With regard to training, paragraph (q)(6) states " training shall be based on the duties and function to be performed by each responder;" all employees must be adequately trained to perform their assigned job duties without danger to themselves or others.

Hazardous materials technician (hazmat tech) training is necessary for emergency responders who take aggressive action in a potentially dangerous area to stop the release. OSHA may, in appropriate circumstances, consider violations of hazmat tech training to be "de minimis," however, when they do not impact on the ability of responders to safely perform their assigned job duties. The burden would be on the employer to demonstrate to OSHA that the violation did not pose a hazard to the safety or health of employees and that the violation was in fact de minimis in nature.

Therefore, in certain limited circumstances, personnel who do not meet all of the training requirements for the hazmat tech level, but who have training beyond the first responder operations level, would be considered by OSHA to be adequately trained to perform a specific task not otherwise permitted for operations level personnel.

The September 20, 1991 letter addressed to Ron Runge to which you refer was intended to apply only to firefighters. OSHA considers properly trained firefighters to already have extensive training and experience in handling gasoline or other fuel incidents by nature of their regular job duties. However, where the identity of the hazardous substance involved in an uncontrolled release cannot be determined, or where the hazardous substance is one for which firefighters have not received specific training or do not have adequate control equipment, aggressive action should be deferred to a fully trained HAZMAT team. Further, response by a fully trained HAZMAT team may be necessary whenever there are factors which may complicate response efforts.

Consideration for the de minimis policy for 29 CFR 1910.120(q)(6)(iii) is generally limited to small scale emergency involving limited quantities of a known hazardous substance which firefighters are adequately trained and equipped to handle.

Roles and Duties, Hazard Assessment, and Firefighters

29 CFR 1910.120(q)(2)(ii) and (q)(6)(iii)

You can that the HAZMAT team in one of your urban counties has adopted the policy that gasoline spills of 25 gallons or less do not require response by a HAZMAT team, and can be safely handled by firefighters with “operations plus” training.

OSHA has no authority to determine how State and local authorities divide responsibilities between their fire departments and HAZMAT teams, and express no view on that issue. However, if fire department members with inadequate HAZWOPER training tool aggressive action to respond to a hazardous substance emergency, a violation of 29 CFR 1910.120(q)(6)(iii) would exist; this would not be the case is the fully trained and equipped HAZMAT team were to respond. OSHA does acknowledge that in many cases firefighters may have the capabilities to safely respond to spills where fewer than 25 gallons of gasoline are involved without full hazmat tech training provided they have extensive training in the safe handling of gasoline.

However, the hazard assessment of which incidents can be safely handled by responders without full hazmat tech training cannot be based on quantity alone. Ambient conditions and specific hazards at the scene must be included in the hazard assessment. Which incidents can be safely handled by responders who do not meet all of the competencies required for hazmat tech level would depend also on the extent and content of the additional training beyond the operations level which they had received.

Employers must establish in their written emergency response plan, required in paragraph (q)(2)(ii), guidelines for determining in which scenarios aggressive action should be deferred to the fully trained HAZMAT team. Personnel who will be expected to take aggressive action, but who have not been assigned the full duties of the hazmat tech level, should as part of their training be instructed in these guidelines to enable them to determine which scenarios are beyond their ability to handle safely.

Firefighters Responding to Propane and Gasoline Fires

29 CFR 1910.120(q)(6)(ii) and (iii)

Firefighters trained to the operations level, who are also trained in the hazards of propane, may enter the danger area to shut off the valves that will starve the fire and thus extinguish it. Normally, employees trained to the operations level would be restricted from taking aggressive action. This is considered to be a special case. The principle hazards from propane are fire and explosion, not toxicity. Because propane fires are common, most firefighters are fully trained and equipped to respond to propane fires, including taking aggressive action by shutting off the valves in the danger area.

If firefighters are fully trained and equipped (which is a high degree of training), and have also received first responder operations level training, OSHA believes they have sufficient training to take aggressive action due to propane's relatively low toxicity.

It would be only a technical violation of 29 CFR 1910.120(q)(6) for not having the additional training required of a HAZMAT technician if a firefighter took aggressive action in the danger area during a propane fire of leak, was fully trained and equipped to handle the fire and had first responder operations level training. In this circumstance OSHA would not issue a citation.

Releases of gasoline similar to the example involving propane discussed above may be addressed by operations level emergency responders if they have the required PPE, emergency response equipment, and specific training in the safety and health hazards associated with gasoline.

Employers who expect firefighters to shut off a gasoline valve in the danger area, and who can show that employees are trained to the operations level and adequately trained in the hazards of gasoline, have committed a technical violation of 1910.120 (q)(6)(iii) for such employees not having the training required of a HAZMAT technician.

NOTE: The fire and explosion hazards of propane and gasoline are very substantial. The interpretations herein are applicable only when firefighters are fully trained and equipped to handle the explosion and fire hazards of propane, gasoline, or similar gases and liquids.

Firefighters Taking Aggressive Action and Technical Violations

29 CFR 1910.120(q)(6)(iii)

It would be only a technical violation of 29 CFR 1910.120(q)(6) for not having the additional training required of a HAZMAT technician if a firefighter took aggressive action in the danger area during a propane fire or leak, was fully trained and equipped to handle the fire and had first responder operations level training. In this circumstance OSHA would not issue a citation.

If an injury occurred during an emergency response involving these responders (operations level plus additional training) the CSHO would need to consider whether the responders' training and experience were sufficient for the tasks being performed.

A violation of training requirements that resulted in an actual injury to an employee during an emergency response by definition cannot be a “technical violation.” Thus, if an injury occurred and the CSHO determined that the responders’ training and experience were not sufficient for the tasks being performed, then a citation should be issued noting a violation of 29 CFR 1910.120(q)(6)(iii) and carrying a penalty that requires abatement. Whether abatement should require full training in all of the competencies of the HAZMAT technician level, or whether certain training requirements could safely be omitted, would depend on the training needed to safely perform the tasks in question.

If, however, the CSHO determined that the training which had been provided to the employees in question had been provided to the employees in question had been adequate, then the training violation would be considered a de minimis violation and no citation would be issued for inadequate training. In this situation the CSHO might determine that the cause of the injury was due to a violation of some other requirement of 29 CFR 1910.120 or other standards, for which a citation carrying a fine and requiring abatement would be appropriate.

Employee Records

29 CFR 1910.20

The purpose of this section is to give general guidelines concerning the retention of and employee access to medical and exposure records. It is always advisable to make copies rather than loan out documents. If the request for documents is of a serious nature, seek legal counsel.

Current employees, former employees, employees being transferred to a new location, and their representatives have the right to review and receive a copy of any record mentioned below which is *relevant to that employee*.

Medical Records

- Audio Testing
- Chest X-Ray *(These must be available for review, but they do not have to be loaned or copied)*
- Descriptions of Treatments
- Employee Medical Complaints
- First Aid Log
- Post-Employment Physical
- Pre-Employment Physical
- Previous Employment Medical Tests
- Respiratory Fit Testing *(A test to determine which size respirator to wear and to test its fit)*

Exposure Records

- Air monitoring records
- Copy of 29 CFR 1910.20, access to employee exposure and medical records
- Employee medical access training records *(The documentation that informs employees of their right to access exposure and medical records)*
- Measures for controlling worker exposure to chemicals *(Personal protective equipment, ventilation, material handling procedures, etc.)*
- Methodologies used to gather data *(Types of monitoring devices used, procedures, areas included, and substances monitored such as vapors, fumes, gases, or dusts)*
- Noise monitoring records
- Records by the Assistant Secretary of Labor for Occupied Safety and Health

- Record of OSHA 200 Log *(A list of occupational injuries, illnesses, and deaths suffered by employees, which is required by OSHA for all companies employing 10 or more employees)*

Records Not Required to be Released

- Drug testing results
- Health insurance claims *(If it is kept in a file other than the employee's medical file, you do not have to release this information)*
- Medical records prepared for litigation
- Records by the Assistant Secretary of Labor for Occupational Safety and Health
- Voluntary Employee Assistance Programs (EAP) *(Drug and alcohol programs, family/personal counseling)*

Employee 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)*

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 employers required to use PPE

- (1) PPE training must cover: when PPE is necessary; what PPE is necessary; how to don, doff, adjust and wear PPE; limitations of PPE; proper care, maintenance, useful life and disposal
- (2) Employees must demonstrate an understanding of training topics and ability to use PPE
- (3) Retraining may be required
- (4) Written certification of training required

29 CFR 1910.133 Eye and face protection

(a) General provisions

(1) Protective eye and face equipment shall be required when there is a reasonable probability of injury than can be prevented by such equipment.

(2) Protectors shall meet minimum requirements for fit, durability, etc.

(3) Persons with corrective lenses in spectacles - Specifies special equipment

(4) Eye and face PPE shall be distinctly marked to facilitate identification of the manufacturer.

(5) Employer must ensure that each affected employee uses equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation.

(b) Criteria for devices

(1) Purchased after July 5, 1994 shall comply with ANSI Z87.1-1989, “American National Standard Practice for Occupational and Educational Eye and Face Protection,”.

(2) Purchased before July 5, 1994 shall comply with the ANSI “USA standard for Occupational and Educational Eye and Face Protection,” Z87.1-1968.

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

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

(8) Appropriate surveillance or work area and degree of exposure or stress shall be maintained

(9) Regular inspection and evaluation to determine effectiveness of program

(10) Persons shall not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent. The respirators user's medical status should be reviewed periodically (for instance annually)

(11) Approved or accepted respirators shall be used

(c) Selection of respirators

(1) Proper selection according to American National Standard Practices for Respiratory Protection Z88.2-1969

(d) Air quality

(1) Grade D breathing air

(2) Breathing air may be supplied by cylinders or compressor

(3) Air line couplings shall be appropriate

(4) Breathing air containers shall be marked accordingly

(e) Use of respirators

(1) Standard procedures shall be developed for use

(2) Correct respirator shall be specified for each job

(3) Written procedures shall be prepared covering safe use in dangerous atmospheres

(4) Frequent random inspections of equipment

(5) Proper instruction shall be provided to wearer

(f) Maintenance and care of respirators

(1) Program for maintenance and care shall be established

(2) Inspection procedures

(3) Routinely used respirators shall be collected and cleaned as frequently as necessary to insure proper protection to the wearer

(4) Replacement or repairs shall be done by experienced persons

(5) Shall be properly stored after inspection and cleaning

(g) Identification of gas mask canisters

(1) Properly worded labels shall be used to identify units

(2) Those who issue units shall see that they are properly used and labeled

(3) Units shall have proper markings

(4) Special high-efficiency filter for protection against radionuclides shall be properly labeled

(5) Units may only be used in atmospheres above 16% oxygen level

(6) Each unit shall be painted a distinctive color

29 CFR 1910.135 Occupational head protection

(a) General provisions

(1) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.

(2) The employer shall ensure that a protective helmet designed to reduce electrical shock hazard is worn by each such affected employee when near exposed electrical conductors which could contact the head.

(b) Criteria for devices

(1) Protective helmets purchased after July 5, 1994 shall comply with ANSI Z89.1-1986, “American National Standard for Personnel Protection-Protective Headwear for Industrial Workers-Requirements”.

(2) Protective helmets purchased before July 5, 1994 shall comply with the ANSI standard “American National Standard Safety Requirements for Industrial Head Protection,” ANSI Z89.1-1969.

29 CFR 1910.136 Occupational foot protection

(a) The employer shall ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee’s feet are exposed to electrical hazards.

(b) Criteria for devices

(1) Protective footwear purchased after July 5, 1994 shall comply with ANSI Z41-1991, “American National Standard for Personal Protection-Protective Footwear”.

(2) Protective footwear purchased before July 5, 1994 shall comply with the

ANSI standard “USA Standard for Men’s Safety-Toe Footwear,” Z41.1-1967

29 CFR 1910.137 Electrical protective devices.

This section outlines the performance criteria for electrical shock protection, in addition to minimal maintenance requirements, for Personal Protective Equipment, where applicable (i.e. gloves).

29 CFR 1910.138 Hand protection

(a) Employers shall select and require employees to use appropriate hand protection when exposed to hazards such as:

(1) Skin absorption of harmful substances

(2) Severe cuts and lacerations

(3) Severe abrasions

(4) Punctures

(5) Chemical or thermal burns

(6) Harmful temperature extremes

(b) Employers shall base selection on an evaluation of performance characteristics of the hand protection relative to:

(1) Task(s) to be performed

(2) Conditions present

(3) Duration of use

(4) Hazards and potential hazards identified

Permit-Required Confined Spaces

for General Industry

29 CFR 1910.146: Final Rule

(Federal Register Vol. 58 No. 9/ Thursday January 14, 1993)

The purpose of this section is to describe the recommended procedures to be followed with regard to confined spaces in industry. Also, it includes definitions of both permit and non-permit required confined spaces and the regulations that apply to each. Confined spaces are often overlooked in industry, yet they are one of the leading causes of death in today's industrial environment.

(a) Scope and application *pg 4549*

This regulation contains requirements for practices and procedures to protect

employees in general industry from the hazards of entry into permit-required confined spaces. This section does not apply to agriculture, to construction, or shipyard employment.

(b) Definitions *pg 4549*

- "Acceptable entry conditions" - Conditions that must exist to allow entry
- "Attendant" - Individual stationed outside who monitors authorized entrants
- "Authorized entrant" - Employee authorized to enter a permit space
- "Blanking or binding" - Absolute closure of a pipe, line, duct, etc.
- "Confined space" - Large enough to enter, limited or restricted egress and entry, is not designed for employee occupancy
- "Double block and bleed" - Closure of line, pipe, duct, etc. and opening drain
- "Emergency" - event that may endanger occupants
    - • "Engulfment" - Material surrounding victim that can be aspirated and cause death by strangulation, constriction, or crushing
- "Entry" - Pass through an opening into permit-required space
- "Entry permit" - Written document provided by employer to allow and control entry
- "Entry supervisor" - Person such as foreman, crew chief, etc.
- "Hazardous atmosphere" - Atmosphere that may expose employees to risk of death, incapacitation, impairment of ability to self-rescue, or injury from causes such as
    - Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit

    - Airborne combustible dust at a concentration that meets or exceeds its lower flammable limits
    - Atmospheric oxygen concentration below 19.5 percent or above 23.5
    - Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published
    - Any atmospheric condition that is immediately dangerous to life or health
- “Hot work permit” - A permit for welding, cutting, etc.
- “Immediately dangerous to life and health” - Any condition that poses an immediate or delayed threat to life
- “Inerting” - Means the displacement of the atmosphere with a noncombustible gas
- “Isolation” - Completely removed and protected against the release of energy
- “Oxygen deficient atmosphere” - Oxygen level below 19.5 percent
- “Permit required space” - Space that contains a hazardous atmosphere, material that
    - has the potential for engulfment, or has internal configuration that may
    - trap an individual such as inwardly converging walls
- “Prohibited condition” - Any condition in a permit space not allowed during an entry
- “Rescue service” - The personnel designated to rescue employees from permit spaces
- “Retrieval system” - Equipment to lift persons from a permit space
- “Testing” - Process by which hazards are identified and evaluated

(c) General requirements *pg 4551*

(1) The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.

(2) If permit area is determined, the employer shall inform exposed employees.

(3) If the employer deems there will be no entry, take measures to prohibit entry.

(4) If the employer deems entry is appropriate, develop written plan.

(5) An employer may use specified alternate procedures to enter area.

(6) When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, the employer shall reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

(7) A space classified by the employer as a permit-required confined space may be reclassified as a non-permit confined space under specific procedures.

(8) When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry, the host employer shall inform the contractor of permit spaces, apprise the contractor of the elements, that make it a permit space, apprise the contractor of any precautions, coordinate entry operations with contractor and debrief contractor.

(9) In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall obtain available information about permit space hazards, coordinate entry operations, and inform host employer of permit space program contractor will follow.

(d) Permit space program

(1) Implement the measures necessary to prevent unauthorized entry.

(2) Identify and evaluate the hazards of permit spaces before employees enter them.

(3) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations.

(4) Provide the following equipment at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly.

(5) Evaluate permit space conditions using specified procedures when entry operations are conducted.

(6) Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations.

(7) If multiple spaces are to be monitored by a single attendant, include procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces.

(8) Designate the persons who are to have active roles in entry operations, identify the duties of each such employee, and provide each such employee with the appropriate training.

(9) Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue.

(10) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this section.

(11) Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space.

(12) Develop and implement procedures necessary for concluding the entry after entry operations have been completed.

(13) Review and revise entry operations when the employer has reason to believe that the 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 these 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.

(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.

Ventilation

Basic Field Application for Confined Space Operations

The purpose of this section is to show when and where ventilation is necessary, as well as the various types of ventilation used.

General Requirements

- Any time an area is known to be contaminated with dust or fumes (toxic or not), a ventilation system shall be installed.

- A respiratory protection program shall be established wherever it is necessary to use respiratory protection equipment. (See *Personal Protective Equipment*)

Examples of hazards to look for in the work area include:

- dust hazards from abrasive blasting
- blast cleaning enclosures
- organic abrasives which are combustible
- areas where particulate fibers are present
- dust hazards in general

Ventilation Requirements

Testing should be done in the ventilation area before any operation takes place in an area where oxygen concentration is less than 19.5% or the Lower Explosive Limit (LEL) is greater than 10%.

Types of Ventilation Systems

- Open air ventilation

- Constant air flow systems

Exhaust Systems

Fans shall be grounded in areas ventilating flammable dusts or fumes. The fan shall be approved for the particular conditions or hazard.

Bloodborne Diseases

29 CFR 1910.1030

The purpose of this section is to serve as a guide to help protect employees from exposure to blood or infectious materials in the work place. It will help employers and supervisors provide written programs and policies that will help ensure work place safety when there is a possibility of exposure to body fluids. Also, it serves as a training guideline for employees and promotes awareness of bloodborne dangers in the work place.

(a) Scope and Application

This section applies to all occupational exposure to blood or other potentially infectious materials. This section outlines those measures that can be taken to prevent or minimized exposure to bloodborne pathogens through proper planning. It also provides guidelines for the proper cleanup and disposal of those materials, including bodily fluids, which may cause disease.

(b) Definitions

- “Assistant Secretary” means the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.
- “Blood” means human blood, human blood components, and products made from human blood.
- “Bloodborne Pathogens” means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).
- “Clinical Laboratory” means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.
- “Contaminated” means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.
- “Contaminated Laundry” means laundry which has been soiled with blood or other potentially infectious materials or may contain sharps.
- “Contaminated Sharps” means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.
- “Decontamination” means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

- “Director” means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.
- “Engineering Controls” means controls (e.g., sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.
- “Exposure Incident” means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee’s duties.
- “Handwashing Facilities” means a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.
- “Licensed Healthcare Professional” is a person whose legally permitted scope of practice allows him or her to independently perform the activities required by paragraph (f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up.
- “HBV” means hepatitis B virus.
- “HIV” means human immunodeficiency virus.
- “Occupational Exposure” means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee’s duties.
- “Other Potentially Infectious Materials” means (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.
- “Parenteral” means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.
- “Personal Protective Equipment” is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.
- “Production Facility” means a facility engaged in industrial-scale, large-volume or high concentration production of HIV or HBV.
- “Regulated Waste” means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.
- “Research Laboratory” means a laboratory producing or using research-laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV but not in the volume found in production facilities.

- "Source Individual" means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims; clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.
- "Sterilize" means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.
- "Universal Precautions" is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.
- "Work Practice Controls" means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

(c) Exposure Control

(1) Each employer having an employee(s) with occupational exposure shall establish a written Exposure Control Plan designed to eliminate or minimize employee exposure, which includes the exposure determination, the schedule and method of implementation of the plan, and the procedure for the evaluation of circumstances. Each employer shall ensure that a copy of the Exposure Control Plan is accessible to employees in accordance with 29 CFR 1910.1020(e) and that the plan will be reviewed and updates at least annually.

(2) Each employer who has an employee(s) with occupational exposure shall prepare an exposure determination. This exposure determination shall be made without regard to the use of personal protective equipment.

(d) Methods of Compliance

(1) Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

(2) Engineering and work practice controls shall be used to eliminate or minimize employee exposure, engineering controls shall be examined and maintained, employers shall provide handwashing facilities which are readily accessible to employees or provide either an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes, and ensure that employees wash their hands any other skin with soap and water immediately.

- Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed.

- Shearing or breaking of contaminated needles is prohibited.

- Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed.

- Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.

- Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets or on countertops or benchtops where blood or other potentially infectious materials are present.

- All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.

- Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

- Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

- Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary, unless the employer can demonstrate that decontamination of such equipment or portions of such equipment is not feasible.

(3) When there is occupational exposure, the employer shall provide, at no cost to the employee, and ensure employee uses appropriate personal protective equipment such as, but not limited to, gloves, gowns, laboratory coats, face shields or masks and eye protection, and mouthpieces, resuscitation bags, pocket masks, or other ventilation devices.

(4) Employers shall ensure that the worksite is maintained in a clean and sanitary condition. The employer shall determine and implement an appropriate written schedule for cleaning and method of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area.

(e) HIV and HBV Research Laboratories and Production Facilities

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

(1) This paragraph applies to research laboratories and production facilities engaged in the culture, production, concentration, experimentation, and manipulation of HIV and HBV. It does not apply to clinical or diagnostic laboratories engaged solely in the analysis of blood, tissues, or organs. These requirements apply in addition to the other requirements of the standard.

(2) Research laboratories and production facilities shall meet a specified criteria, including but not limited to, incinerating or decontaminating all regulated waste, keeping lab doors closed when working with HIV or HBV, placing all contaminated materials in a durable, leakproof, labeled or color-coded container, limiting to authorized persons, posting hazard warning signs, conducting activities in biological safety cabinets that involve potentially infectious materials, and wearing appropriate protective clothing. Certified biological safety cabinets (Class I, II, or III) or other appropriate combinations of personal protection or physical containment devices shall be used for all activities with other potentially infectious materials.

(3) HIV and HBV research laboratories shall meet the specified criteria, including each laboratory shall contain a facility for hand washing and an eye wash facility which is readily available within the work area, and an autoclave for decontamination of regulated waste shall be available.

(4) HIV and HBV production facilities shall meet the specified criteria, including work areas shall be separated from areas that are open to unrestricted traffic flow within the building, work area shall be water resistant, sink for hand washing shall be provided, access doors shall be self- closing, an autoclave shall be available within or near work area, and a ducted exhaust-air ventilation system shall be provided.

(f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up

(1) The employer shall make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident and shall ensure that all medical evaluations and procedures including the hepatitis B vaccine and vaccination series and post-exposure evaluation and follow-up, including prophylaxis, are made available and conducted at no cost to the employee by an accredited laboratory, provided at a reasonable time and place, performed by or under the supervision of a licensed physician or under the supervision of another licensed healthcare professional, and provided according to recommendations of the U.S. Public Health Service current at the time these evaluations.

(2) Hepatitis B vaccination shall be made available after the employee has received the training required in and within 10 working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

(3) Post-exposure Evaluation and Follow-up. Following a report of an exposure incident, the employer shall make immediately available to the exposed employee a confidential medical evaluation and follow-up, including documentation of the route(s) of exposure, and the circumstances under which the exposure incident occurred, identification and documentation of the source individual, unless the employer can establish that identification is infeasible or prohibited by state or local law; collection and testing of blood for HBV and HIV serological status, post-exposure prophylaxis, when medically indicated, counseling, and an evaluation of reported illnesses.

(4) The employer shall ensure that the healthcare professional responsible for the employee's Hepatitis B vaccination is provided a copy of this regulation and ensure that the healthcare professional evaluating an employee after an exposure incident is provided with a copy of this regulation, a description of the exposed employee's duties as they relate to the exposure incident, documentation of the route(s) of exposure and circumstances under which exposure occurred, results of the source individual's blood testing, if available, and all medical records relevant to the appropriate treatment of the employee including vaccination status which are the employer's responsibility to maintain.

(5) The employer shall obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

(6) Medical records required by this standard shall be maintained.

(g) Communication of Hazards to Employees

(1) Warning labels shall be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials. Labels required by this section shall include a legend, shall be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color, shall be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

(2) Employers shall ensure that all employees with occupational exposure participate in a training program which must be provided at no cost to the employee and during working hours.

(h) Recordkeeping

(1) The employer shall establish and maintain an accurate record for each employee with occupational exposure, in accordance with 29 CFR 1910.1020, including employee name and social security number, a copy of the hepatitis B vaccination status, a copy of all results of examinations, medical testing, and follow-up procedures, a copy of the healthcare professionals written opinion, and a copy of information provided to the

healthcare professional. The employer shall ensure that employee medical records kept confidential, and not disclosed or reported without the employee's express written consent to any person within or outside the workplace except as required by this section or as may be required by law.

(2) Training records shall include the following information: the dates of the training sessions; the contents or a summary of the training sessions; the names and qualifications of persons conducting the training; and the names and job titles of all persons attending the training sessions. Records shall be maintained for 3 years from the date on which the training occurred.

(3) The employer shall ensure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director, employees, to employee representatives, to the Director, and to the Assistant Secretary, and the subject employee for examination and copying.

(4) The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h). If the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the Director, at least three months prior to their disposal and transmit them to the Director, if required by the Director to do so, within that three month period.

(i) Effective Dates

(1) The standard shall become effective on March 6, 1992.

(2) The Exposure Control Plan shall be completed on or before May 5, 1992.

(3) Information and Training and Recordkeeping shall take effect on or before June 4, 1992.

(4) Engineering and Work Practice Controls, Personal Protective Equipment, Housekeeping, HIV and HBV Research Laboratories and Production Facilities, Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up, and Labels and Signs, shall take effect July 6, 1992.

Lockout / Tagout

29 CFR 1910.147

(a) Scope, application and purpose

This standard covers the servicing and maintenance of machines and equipment in which the “unexpected” energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy. This standard applies to the control of energy during servicing and/or maintenance of machines and equipment. This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy in order to prevent injury to employees.

(b) Definitions applicable to this section

- “Affected employee.” An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.
- “Authorized employee.” A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee’s duties include performing servicing or maintenance covered under this section.
- “Capable of being locked out.” An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.
- “Energized.” Connected to an energy source or containing residual or stored energy.
- “Energy isolating device.” A mechanical device that physically prevents the transmission or release or energy, including but not limited to the following: A manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.
- “Energy source.” Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

- “Hot tap.” A procedure used in the repair maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.
- “Lockout.” The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
- “Lockout device.” A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.
- “Normal production operations.” The utilization of a machine or equipment to perform its intended production function.
- “Servicing and/or maintenance.” Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or start-up of the equipment or release of hazardous energy.
- “Setting up.” Any work performed to prepare a machine or equipment to perform its normal production operation.
- “Tagout.” The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.
- “Tagout device.” A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

(c) General Requirements

(1) The employer shall establish a program consisting of energy control procedures, employee training and to periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start-up or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

(2) If an energy isolating device is not capable of being locked out, the employer’s energy control program under paragraph shall utilize a tagout system, unless the employer

can demonstrate that the utilization of a tagout system will provide full employee protection. After January 2, 1990, whenever replacement or major repair of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.

(3) When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program and demonstrate full compliance with all tagout-related provisions

(4) Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section. The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance.

(5) Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources. Lockout devices and tagout devices shall be singularly identified; shall be the only device(s) used for controlling energy; shall not be used for other purposes; and shall meet the specific requirements of durability, standardization, substantialness, and identifiability.

(6) The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

(7) The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. The training shall include authorized employees receiving training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control, affected employees being instructed in the purpose and use of the energy control procedure, employees being instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out, and limitations of tags. The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

(8) Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.

(9) Affected employees shall be notified by the employer or authorized employee of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

(d) Application of control

The established procedures for the application of energy control (the lockout or tagout procedures) shall cover the following elements and actions and shall be done in the following sequence:

(1) Preparation for shutdown - Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

(2) Machine or equipment shutdown- The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

(3) Machine or equipment isolation - All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

(4) Lockout or tagout device application - (1) Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees. (2) Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position. (3) Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

(5) Stored energy - (1) Following the application of logout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe. (2) If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

(6) Verification of isolation - Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

(e) Release from lockout or tagout

Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:

(1) The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

(2) The work area shall be checked to ensure that all employees have been safely positioned or removed. Before and after lockout or tagout devices are removed and before machines or equipment are energized, affected employees shall be notified that the lockout or tagout devices have been removed.

(3) Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure shall include verification by the employer that the authorized employee who applied the device is not at the facility, making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

(f) Additional requirements

(1) In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, in the following sequence of actions: (1) Clear the machine or equipment of tools and materials; (2) Remove employees from the machine or equipment area; (3) Remove the lockout or tagout devices; of this section; (4) Energize and proceed with testing or positioning; (5) Deenergize all systems and reapply energy control measures to continue the servicing and/or maintenance.

(2) Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures and shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

(3) When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

(4) Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to

minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

Hazard Communication Standard
Worker Right to Know (WRK)

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

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

name which will clearly identify the chemical for the purpose of conducting a hazard evaluation.

- "Combustible liquid" means any liquid having a flashpoint at or above 100 deg. F (37.8 deg. C), but below 200 deg. F (93.3 deg. C), except any mixture having components with flashpoints of 200 deg. F (93.3 deg. C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.
- "Commercial account" means an arrangement whereby a retail distributor sells hazardous chemicals to an employer, generally in large quantities over time and/or at costs that are below the regular retail price.
- "Common name" means any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.
- "Compressed gas" means: (i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F (21.1 deg. C); or (ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg. C) regardless of the pressure at 70 deg. F (21.1 deg.C); or (iii) A liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 deg. C) as determined by ASTM D-323-72.
- "Container" means any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this section, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.
- "Designated representative" means any individual or organization to whom an employee gives written authorization to exercise such employee's rights under this section. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.
- "Director" means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.
- "Distributor" means a business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.
- "Employee" means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.
- "Employer" means a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.
- "Explosive" means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.
- "Exposure or exposed" means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure.
- "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)
- "Flammable" means a chemical that falls into one of the following categories:

(c) Definitions (cont)

(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.)

(c) Definitions (cont)

- “Health hazard” means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term “health hazard” includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B describes the criteria to be used to determine whether or not a chemical is to be considered hazardous for purposes of this standard.
- “Identity” means any chemical or common name which is indicated on the material safety data sheet (MSDS) for the chemical. The identity used shall permit cross-references to be made among the required list of hazardous chemicals, the label and the MSDS.
- “Immediate use” means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
- ”Importer” means the first business with employees within the Customs Territory of the United States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.
- “Label” means any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.
- “Material safety data sheet (MSDS)” means written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (g) of this section.
- “Mixture” means any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.
- “Organic peroxide” means an organic compound that contains the bivalent -O-O-structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.
- “Oxidizer” means a chemical other than a blasting agent or explosive as defined in 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.
- “Physical hazard” means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.
- “Produce” means to manufacture, process, formulate, blend, extract, generate, emit, or repackage.
- “Pyrophoric” means a chemical that will ignite spontaneously in air at a temperature of 130 deg. F (54.4 deg. C) or below.
- “Responsible party” means someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

- “Specific chemical identity” means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

(c) Definitions (cont)

- “Trade secret” means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer’s business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D sets out the criteria to be used in evaluating trade secrets.
- “Unstable (reactive)” means a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.
- “Use” means to package, handle, react, emit, extract, generate as a by-product, or transfer.
- “Water-reactive” means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.
- “Work area” means a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.
- “Workplace” means an establishment, job site, or project, at one geographical location containing one or more work areas.

(d) Hazard determination

(1) Chemical manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them to determine if they are hazardous. Employers are not required to evaluate chemicals unless they choose not to rely on the evaluation performed by the chemical manufacturer or importer for the chemical to satisfy this requirement.

(2) Chemical manufacturers, importers or employers evaluating chemicals shall identify and consider the available scientific evidence concerning such hazards. For health hazards, evidence which is statistically significant and which is based on at least one positive study conducted in accordance with established scientific principles is considered to be sufficient to establish a hazardous effect if the results of the study meet the definitions of health hazards in this section.

(3) The chemical manufacturer, importer or employer evaluating chemicals shall treat the following sources as establishing that the chemicals listed in them are hazardous: (i) 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA); or, (ii) “Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment,” American

Response Training Considerations | Awareness Level Personnel | Operations Level Responders: Core Competencies, Mission-Specific Competencies | Haz Mat Technician | Haz Mat Technician with Speciality | Incident Commander | Specialist Employee C,B,A | Haz Mat Officer | Haz Mat Safety Officer | BLS Basic Life Support Responder | ALS Advanced Life Support Responder | ALS Mission Specific Competencies | Hospital First Receiver | Appendix: Standards & Special Topics

Conference of Governmental Industrial Hygienists (ACGIH) (latest edition). The chemical manufacturer, importer, or employer is still responsible for evaluating the hazards associated with the chemicals in these source lists in accordance with the requirements of this standard.

(4) Chemical manufacturers, importers and employers evaluating chemicals shall treat the following sources as establishing that a chemical is a carcinogen or potential carcinogen for hazard communication purposes: (i) National Toxicology Program (NTP), “Annual Report on Carcinogens” (latest edition); (ii) International Agency for Research on Cancer (IARC) “Monographs” (latest editions); or (iii) 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

(5) The chemical manufacturer, importer or employer shall determine the hazards of mixing chemicals.

(6) Chemical manufacturers, importers, or employers evaluating chemicals shall describe in writing the procedures they use to determine the hazards of the chemical they evaluate, to be made available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director.

(e) Written hazard communication program

(1) Employers shall develop, implement, and maintain at each workplace, a written hazard communication program which at least describes how the criteria specified for labels and other forms of warning, material safety data sheets, and employee information and training will be met, including a list of the hazardous chemicals known to be present, and the methods the employer will use to inform employees of the hazards of non-routine tasks and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

(2) Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed shall additionally ensure that the hazard communication programs developed and implemented include the methods the employer will use to provide the other employer(s) on-site access to material safety data sheets for each hazardous chemical the other employer(s)’ employees may be exposed to while working; the methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace’s normal operating conditions and in foreseeable emergencies; and, the methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.

(3) The employer may rely on an existing hazard communication program to comply with these requirements.

(4) The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with the requirements of 29 CFR 1910.1020 (e).

(5) Where employees must travel between workplaces during a workshift, the written hazard communication program may be kept at the primary workplace facility.

(f) Labels and other forms of warning

(1) The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the identity of the hazardous chemical(s), the appropriate hazard warnings, and the name and address of the chemical manufacturer, importer, or other responsible party.

(2) For solid metal, solid wood, or plastic items that are not exempted as articles due to their downstream use, or shipments of whole grain, the required label may be transmitted to the customer at the time of the initial shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes. The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of the first shipment.

(3) Chemical manufacturers, importers, or distributors shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked in accordance with this section in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act (49 U.S.C. 1801 et seq.) and regulations issued under that Act by the Department of Transportation.

(4) If the hazardous chemical is regulated by OSHA in a substance-specific health standard, the chemical manufacturer, importer, distributor or employer shall ensure that the labels or other forms of warning used are in accordance with the requirements of that standard.

(5) The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the following information, expect as otherwise provided: (i) Identity of the hazardous chemical(s) contained therein; and, (ii) Appropriate hazard warnings, or alternatively, words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

(6) The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information.

(7) The employer is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer.

(8) The employer shall not remove or deface existing labels on incoming containers of hazardous chemicals, unless the container is immediately marked with the required information.

(9) The employer shall ensure that labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift.

(10) The chemical manufacturer, importer, distributor or employer need not affix new labels to comply with this section if existing labels already convey the required information.

(11) Chemical manufacturers, importers, distributors, or employers who become newly aware of any significant information regarding the hazards of a chemical shall revise the labels for the chemical within three months of becoming aware of the new information.

(g) Material safety data sheets

(1) Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data sheet in the workplace for each hazardous chemical which they use.

(2) Each material safety data sheet shall be in English, and shall contain the following information: the identity used on the label, and on trade secrets, physical and chemical characteristics of the hazardous chemical, physical hazards of the hazardous chemical, health hazards of the hazardous chemical, the primary route(s) of entry, the OSHA permissible exposure limit, ACGIH Threshold Limit Value, and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the material safety data sheet, where available, whether the hazardous chemical is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens (latest edition), any generally applicable precautions for safe handling and use, any generally applicable control measures which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, emergency and first aid procedures, the date of preparation of the material safety data sheet or the last change to it; and, the name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the material safety data sheet, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

(3) If no relevant information is found for any given category on the material safety data sheet, the chemical manufacturer, importer or employer preparing the material safety data sheet shall mark it to indicate that no applicable information was found.

(4) Where complex mixtures have similar hazards and contents, the chemical manufacturer, importer or employer may prepare one material safety data sheet to apply to all of these similar mixtures.

(5) The chemical manufacturer, importer or employer preparing the material safety data sheet shall ensure that the information recorded accurately reflects the scientific evidence used in making the hazard determination.

(6) Chemical manufacturers or importers shall ensure that distributors and employers are provided an appropriate material safety data sheet with their initial shipment, and with the first shipment after a material safety data sheet is updated and either provide material safety data sheets with the shipped containers or send them to the distributor or employer prior to or at the time of the shipment.

(7) Distributors shall ensure that material safety data sheets, and updated information, are provided to other distributors and employers with their initial shipment and with the first shipment after a material safety data sheet is updated. The distributor shall either provide material safety data sheets with the shipped containers, or send them to the other distributor or employer prior to or at the time of the shipment; Wholesale distributors shall also provide material safety data sheets to employers or other distributors upon request.

(8) The employer shall maintain in the workplace copies of the required material safety data sheets for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s).

(9) Where employees must travel between workplaces during a workshift, the material safety data sheets may be kept at the primary workplace facility.

(10) Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals.

(11) Material safety data sheets shall also be made readily available, upon request, to designated representatives and to the Assistant Secretary, in accordance with the requirements of 29 CFR 1910.1020(e). The Director shall also be given access to material safety data sheets in the same manner.

(h) Employee information and training

(1) Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Information and training may be

designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and material safety data sheets.

(2) Employees shall be informed of: the requirements of this section, any operations in their work area where hazardous chemicals are present, and, the location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.

(3) Employee training shall include: methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area, the physical and health hazards of the chemicals in the work area, the measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, and the details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

(i) Trade secrets

(1) The chemical manufacturer, importer, or employer may withhold the specific chemical identity, including the chemical name and other specific identification of a hazardous chemical, from the material safety data sheet, provided that the claim that the information withheld is a trade secret can be supported, information contained in the material safety data sheet concerning the properties and effects of the hazardous chemical is disclosed, the material safety data sheet indicates that the specific chemical identity is being withheld as a trade secret, and, the specific chemical identity is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of this paragraph.

(2) Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity of a hazardous chemical is necessary for emergency or first-aid treatment, the chemical manufacturer, importer, or employer shall immediately disclose the specific chemical identity of a trade secret chemical to that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement.

(3) In non-emergency situations, a chemical manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity, otherwise permitted to be withheld, to a health professional providing medical or other occupational health services to exposed employee(s), and to employees or designated representatives, under specific conditions.

(4) The confidentiality agreement may restrict the use of the information to the health purposes indicated in the written statement of need, may provide for appropriate legal

remedies in the event of a breach of the agreement, including stipulation of a reasonable pre-estimate of likely damages, and, may not include requirements for the posting of a penalty bond.

(5) Nothing in this standard is meant to preclude the parties from pursuing non-contractual remedies to the extent permitted by law.

(6) If the health professional, employee, or designated representative receiving the trade secret information decides that there is a need to disclose it to OSHA, the chemical manufacturer, importer, or employer who provided the information shall be informed by the health professional, employee, or designated representative prior to, or at the same time as, such disclosure.

(7) If the chemical manufacturer, importer, or employer denies a written request for disclosure of a specific chemical identity, the denial must be provided to the health professional, employee, or designated representative, within thirty days of the request, be in writing, include evidence to support the claim that the specific chemical identity is a trade secret, state the specific reasons why the request is being denied, and, explain in detail how alternative information may satisfy the specific medical or occupational health need without revealing the specific chemical identity.

(8) The health professional, employee, or designated representative whose request for information is denied may refer the request and the written denial of the request to OSHA for consideration.

(9) When a health professional, employee, or designated representative refers the denial to OSHA, OSHA shall consider the evidence to determine if: the chemical manufacturer, importer, or employer has supported the claim that the specific chemical identity is a trade secret, the health professional, employee, or designated representative has supported the claim that there is a medical or occupational health need for the information, and, the health professional, employee or designated representative has demonstrated adequate means to protect the confidentiality.

(10) If OSHA determines that the specific chemical identity requested is not a "bona fide" trade secret, or that it is a trade secret, but the requesting health professional, employee, or designated representative has a legitimate medical or occupational health need for the information, has executed a written confidentiality agreement, and has shown adequate means to protect the confidentiality of the information, the chemical manufacturer, importer, or employer will be subject to citation by OSHA. If the execution of a confidentiality agreement would not provide sufficient protection against the potential harm from the unauthorized disclosure of a trade secret specific chemical identity, the Assistant Secretary may issue such orders or impose such additional limitations upon the disclosure.

(11) If a citation for a failure to release specific chemical identity information is contested by the chemical manufacturer, importer, or employer, the matter will be adjudicated before the Occupational Safety and Health Review Commission in accordance with the Act's enforcement scheme and the applicable Commission rules of procedure.

(12) Notwithstanding the existence of a trade secret claim, a chemical manufacturer, importer, or employer shall, upon request, disclose to the Assistant Secretary any

information which this section requires the chemical manufacturer, importer, or employer to make available. Where there is a trade secret claim, such claim shall be made no later than at the time the information is provided to the Assistant Secretary so that suitable determinations of trade secret status can be made and the necessary protections can be implemented.

(13) Nothing in this paragraph shall be construed as requiring the disclosure under any circumstances of process or percentage of mixture information which is a trade secret.

(j) Effective dates

Chemical manufacturers, importers, distributors, and employers shall be in compliance with all provisions of this section by March 11, 1994.

Joint Commission on Accreditation of Healthcare Organizations

Joint Commission on Accreditation of Healthcare Organizations (JCAHO) is the primary standard setting body for the health care industry. The standards published by JCAHO reflect the work of many advisory groups from private, state and federal sectors, representing the expertise in the delivery of healthcare. The standards are a minimum benchmark for healthcare organizations to achieve in order to become accredited by JCAHO. The cornerstone of this process is *The Comprehensive Accreditation Manual for Hospitals: The Official Handbook (CAMH).* This manual is updated on a quarterly basis to reflect the most current accreditation information and updated standards. The 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

Process Safety Management of Highly Hazardous Chemicals

29 CFR 1910.119

This section contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. These releases may result in toxic, fire or explosion hazards.

(a) Application

(b) Definitions

- "Atmospheric tank" means a storage tank which has been designed to operate at pressures from atmospheric through 0.5 p.s.i.g. (pounds per square inch gauge, 3.45 Kpa).
- "Boiling point" means the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (p.s.i.a.) (760 mm.). For the purposes of this section, where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products, ASTM D-86-62, which is incorporated by reference as specified in Sec. 1910.6, may be used as the boiling point of the liquid.
- "Catastrophic release" means a major uncontrolled emission, fire, or explosion, involving one or more highly hazardous chemicals, that presents serious danger to employees in the workplace.
- "Facility" means the buildings, containers or equipment which contain a process.
- "Highly hazardous chemical" means a substance possessing toxic, reactive, flammable, or explosive properties and specified by paragraph (a)(1) of this section.
- "Hot work" means work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.
- "Normally unoccupied remote facility" means a facility which is operated, maintained or serviced by employees who visit the facility only periodically to check its operation and to perform necessary operating or maintenance tasks. No employees are permanently stationed at the facility. Facilities meeting this definition are not contiguous with, and must be geographically remote from all other buildings, processes or persons.
- "Process" means any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities. For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.

- “Replacement in kind” means a replacement which satisfies the design specification.
- Trade secret” means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer’s business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D contained in 1910.1200 sets out the criteria to be used in evaluating trade secrets.

(c) Employee participation

(1) Employers shall develop a written plan of action regarding the implementation of the employee participation required by this paragraph.

(2) Employers shall consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other

elements of process safety management in this standard.

(3) Employers shall provide to employees and their representatives access to process hazard analyses and to all other information required to be developed under this standard.

(d) Process safety information

(d)(1)(i) through (d)(2)(i)(E). 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) Process hazard analysis

(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.

(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 Considerations | Awareness Level Personnel | Operations Level Responders: Core Competencies, Mission-Specific Competencies | Haz Mat Technician | Haz Mat Technician with Speciality | Incident Commander | Specialist Employee C,B,A | Haz Mat Officer | Haz Mat Safety Officer | BLS Basic Life Support Responder | ALS Advanced Life Support Responder | ALS Mission Specific Competencies | Hospital First Receiver | Appendix: Standards & Special Topics

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.

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.
- Engaging in dilution operations, in an attempt to neutralize a corrosive, and allowing the water to become a vehicle that spreads the spill without recognizing that the volume of water needed to truly dilute the spill cannot be managed by the emergency responders (e.g., to dilute one gallon of a corrosive with pH of 1 to a pH of 6 requires 111,110 gallons of water).
- Failure to protect the environment, by using salvage covers or visqueen to cover exposed soil, when redirecting a spilled material into a ditch or other area being used as a catch basin or holding pond.
- Failure to segregate spilled oxidizers from spilled fuels, such as diesel fuel, to prevent a chemical reaction that results in an ignition and subsequent negative impact on the environment from the intensity of the fire or the spattering that may occur.

- Failure to segregate spilled materials that have oxidizing characteristics from spilled fuels, such as diesel fuel, to prevent a chemical reaction that results in an ignition and subsequent negative impact on the environment from the intensity of the fire.

Terrorism and Illicit Use of Hazardous Materials:

First Responder Training Issues and Ramifications

Introduction

Terrorism is defined as the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, or social objectives. Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of the United States government or population without foreign direction. International terrorism involves terrorist activities committed by groups or individuals who are foreign-based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries.

In the aftermath of the attacks of September 11, the nation's emergency response community has been increasingly concerned about the risks posed to responders by hazardous materials-related weapons of mass destruction. The basic principles of safe response to incidents involving chemical, biological and radiological agents are generally the same as for any dangerous hazardous materials incident. However, the health risks to responders, the unique criminal dimensions to the incident that must be 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 Anthrax 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 anywhere 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.

Responders to such incidents who are trained to traditional hazardous materials response competencies may encounter unique exposure risks, emergency control challenges, unusual materials, and complex mass casualty situations that are beyond their experience and current training. For example, public sector responders have been trained traditionally to identify hazardous materials based on outward warning signs and detection clues. However, at incidents involving terrorism or other criminal use of hazardous materials where there is attempted deception about the materials involved, clues such as occupancy location, container shapes, markings, and colors may not be consistent with traditional hazardous materials training. Consequently, rapid identification of the materials and type of problem may be difficult.

Responders to incidents involving terrorism may encounter unusual chemicals or biological agents or unusual uses of those hazardous materials that have not been addressed thoroughly in current hazardous materials training. For example, nuclear response training for first responders has traditionally been for major catastrophes (i.e., nuclear war and power plant emergencies), and not for small isolated terrorist events. As a second example, the high risk chemical and biological agents that might be involved in terrorist incidents may require unusual protocols and procedures for patient decontamination and treatment that are not addressed in current EMS training. As an additional example, some of the materials that may be involved have unusual dispersal characteristics that responders may not be trained to accommodate when determining of safe perimeters and public protection/evacuation requirements at the incident.

Current training for community emergency planning and preparedness strategies and existing response plans use risk predictions based upon known vulnerabilities and hazard identifications, such as commodity flow studies, fixed facility storage of material, etc. This allows responders to plan for the response prior to an emergency and to assess whether the response capability and resources in the area are sufficient to meet potential emergencies. However, terrorist and other illicit acts involving hazardous materials may occur in untraditional locations that are not normally thought of as high risk hazardous materials locations, such as public gathering places or remote transportation areas. As a result, current protocols for allocating response resources and preparing for hazardous materials emergencies may not allow sufficient response capability for terrorist-related hazardous materials emergencies.

Finally, hazardous materials emergencies involving terrorism or other illicit use of hazardous materials may involve additional and unusual risks to responders beyond those presented by the hazardous materials themselves. Public sector responders may be at additional risk due to secondary releases targeted at responders, primary releases that intentionally create extremely high risk rescue situations, and even to primary releases targeted at public response facilities.

The Challenge to Public Sector Response and Planning Organizations

Public sector response and planning organizations should examine all facets of their response system to ensure preparedness for response to incidents of terrorism and illicit use of hazardous materials. This review should include existing plans, operating procedures, equipment, training and exercises.

Plans should include:

- Consistency and interface with plans from all levels of government, specifically the Federal Response Plan (FRP) and the FRP Terrorism Annex;
- Presidential Decision Directive 39, specifically examining responsibility for crisis management and consequence management in their community;
- Unified command operations with all levels of government; and
- Thorough, in-depth plans for response to mass casualty chemical incidents.

Operating procedures should include:

- Command post operations including command post security, responder accountability, and on-site responder identification;
- Protection against secondary explosive devices and other secondary events;
- Responsibility for and support to crime scene operations, evidence collection and chain of custody; and
- Emergency decontamination at mass casualty chemical incidents.

Equipment should be evaluated to ensure appropriate protection and detection of nuclear, chemical and biological agents (NBC). Existing training, including annual refresher training, for all responders should be enhanced to include competencies for response to incidents involving terrorism or other illicit use of hazardous materials. Finally, agencies should identify a person or persons within their organization as their point of contact for issues regarding terrorism and the illicit use of hazardous materials. These persons should interface with appropriate response agencies to include EMS, fire, hazmat, 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.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

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.

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 disbursed as an aerosol. However, since in its liquid form it is odorless, colorless, and tasteless probably it would be used to intentionally contaminate food or drinks. If your community has a dermatologist's office you probably have a medically pure version of botulinum toxin, known as Botox®, in your community already. The substance is used as a temporary "wrinkle remover." There is an antitoxin to treat botulism, but the antitoxin is not widely available.

Plague: Historically it was the bubonic plague, carried by infected fleas on rodents, which decimated Europe. The more deadly version is pneumonic plague, which results from inhaling these bacteria. While difficult to intentionally produce in this form (as a weaponized agent that can be aerosolized), the resulting pneumonic plague has a very high mortality rate. Treatment with antibiotics, again if begun early enough, can be quite effective.

Smallpox: Declared eradicated by the World Health Organization in 1980 the last case in the United States is variously reported as occurring in 1947 or 1949. Regardless, it has been a 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 protection. Based on that data, the current American population has virtually no immunity to smallpox, since most people have not had a vaccination for over 30 years. Ongoing efforts are directed at a multi-phased approach: Phase I consists of vaccinating health and hospital personnel, and Phase II of first responders. Although the President originally announced that voluntary vaccinations of the public would be done it appears that in the absence of an actual smallpox outbreak that will not happen soon. Further comments about smallpox are included in the action planning steps below.

Tularemia: While not nearly as deadly as plague, botulism, or smallpox the reason tularemia is in Category A is its high infectivity. It takes but one of its bacterium to cause infection. While the relative mortality rate of tularemia, compared to smallpox or plague, is low this biological agent could be used to "overwhelm" our pre-hospital and in-hospital health care system with many extremely sick patients. Antibiotics are used in treating tularemia, and work is underway to develop an improved vaccine.

Viral hemorrhagic fevers, such as Ebola: This is actually of grouping of four "families" – arenaviruses, bunyaviruses, filoviruses, and flaviruses. Of these the most troublesome are the filoviruses (which include Ebola and Marburg) and have high mortality rates, high infectivity rates, and no known effective treatments or vaccines.

Category B Agents

The next group of agents include those that have low to moderate mortality rates, are somewhat easy to disseminate; and require improvements to the Centers for Disease Control and Prevention's diagnostic capacity and enhanced disease surveillance. These agents include Brucellosis, E. Coli, Ricin (the castor bean extract), and Q Fever.

Category C Agents

The final group of agents includes emerging pathogens, such as hantavirus respiratory syndrome. These could be used for mass dissemination in the future because of their availability and their ease of production. Although the recent cases of Severe Acute Respiratory Syndrome (SARS) and West Nile Virus seem to be natural occurrences the incidents point out our vulnerability to new viruses.

Chemical Weapons

In the following brief discussion about chemical weapons agents, the reader should bear in mind that to some extent most hazardous materials responders already know a great deal about chemical weapons. That is because historically many of these agents were developed for industrial use. Responders will immediately recognize them because of the industrial chemicals which are their civilian counterparts (the blood agents are cyanides, the nerve agents are organophosphates, etc.). In addition, unlike the biological warfare agents, the chemical ones usually cause signs and symptoms quickly: when you "roll up" to a scene you will often know immediately that you have a serious problem.

The military has organized chemical weapons into five groups of agents: nerve, blister, blood, choking, and irritants. These names were originally believed to indicate the way the particular agent affected the human body. Blood agents were carried by and harmed the blood system, nerve agents were carried by and harmed the nerves, etc. We now know that a sufficient dose of any of these agents will produce a systemic result, but the old names persist. Another misnomer is the use of the term "gases" when discussing these agents. In their natural state they are usually liquids or solids.

Also, note that there are other military agents that are infrequently seen, such as incapacitating agents like BZ (which causes mental disorientation), and vomiting agents like DA, DM, and DC.

Nerve Agents

The organophosphates are common ingredients in pesticides. Their military equivalents, which include Sarin, Soman, Tabun and VX; cause a recognizable set of signs and symptoms which can be remembered by using the acronym SLUDGEM: **S**alivation (excessive oral and nasal secretions), **L**acrimation (tearing of the eyes), **U**rination, **D**efecation, **G**astrointestinal irritation (nausea and stomach cramps), **E**mesis (vomiting), **M**iosis (pinpointing of the pupils). Add “twitching, seizures, and convulsions” to that list and you have the classic signs of high dose contamination via nerve agents. Medical treatment after decontamination includes atropine, diazepam, and pralidoxime chloride (2-PAM).

Blister Agents

These chemical agents include Mustard, Distilled Mustard, Nitrogen Mustard, and Lewisite. The eyes are most susceptible to mustard vapor. The characteristic sign of vessicants or blisters on the skin takes from 2 to 24 hours to develop. Medical treatment after decontamination includes topical antibiotics, fluid replacement, and pain medications.

Blood Agents

These cyanides include Hydrogen Cyanide and Cyanogen Chloride. They cause extremely rapid respiratory and cardiac arrest, in seconds to minutes. Signs and symptoms include dyspnea (difficulty breathing), headache, confusion, decreased vision, convulsions, and coma. Medical treatment after decontamination includes sodium nitrite, amyl nitrite, and sodium thiosulfate (these are all contained in a pre-packaged pharmaceutical group known as the “Pasadena Cyanide Antidote Kit.”)

Choking Agents

These agents include chlorine and phosgene. An indicator of inhalation is a heavy sensation in the chest and difficulty breathing – the beginning of pulmonary edema or fluid in the lungs. Medical treatment after decontamination includes removing the victim to outside of the contaminated area, administering oxygen, and in the case of phosgene diuretics may be given to reduce fluid retention.

Irritant Agents

These agents, including Mace, CS, CN, and OC; are often employed by law enforcement agencies in crowd control situations. Signs and symptoms include a burning sensation on the skin, tearing and pain in the eyes, nausea, and occasionally vomiting. These agents generally do not cause serious short-term or long-term effects. However, a victim with pre-existing severe respiratory disease (such as emphysema) may experience life-threatening results upon exposure. Medical treatment for most other victims after decontamination may include a further decontamination with soap and water, or a baby shampoo and water solution. No other treatment is usually needed.

Alternative Fuels

Background

Since the oil embargo of the 1970's, alternative fuel development for vehicles has gained a greater portion of the market share. In addition, many cities are faced with EPA clean-air standards, expressing the need to convert vehicles to alternative cleaner burning fuels. As legislation , such as the Clean Air Act, starts to become fully implemented and states such as New York and California implement their vehicle emission standards the demand for motor vehicles that operate on fuels other than gasoline and diesel fuel will significantly increase.

Many vehicles today are operating on Liquefied Petroleum Gas (propane), Compressed Natural Gas (CNG), and Methanol or Ethanol fuels. The next major materials in the propulsion market will be electric power and Liquefied Natural Gas (LNG). Personal cars and fleets of all types ranging from taxi cabs, buses, delivery vehicles, and trains are operating today in most major cities and metropolitan areas on fuels other than the standard gasoline or diesel product. Manufacturers of cars, trucks, and buses using new fuels sources is on the increase. The flexible-fueled vehicles (FFV's) can run on gasoline or ethanol, compressed natural gas (CNG), liquefied hydrogen, propane, as well as electric batteries.

All vehicles, whether powered by alternative fuel or conventional gasoline, must be certified by the manufacturer to meet federal motor vehicle safety standards (FMVSS). Even though these standards for safety are met, there has been no method developed to identify the type of fuel the first responder would be faced with.

Challenges for Public Sector Response Training

The new systems pose a wide variety of new concerns to the emergency community of fire, police, and emergency medical personnel. Electric vehicles may be using large quantities of lead-acid batteries or generating electricity of 300 volts. Other vehicles may be using methanol or ethanol fuels which require special extinguishing agents to control fires. Compressed natural gas cylinders of 3,000 pounds pressure are now located in trunks of vehicles and railroad engines are now operating on Liquefied Natural Gas supplies being pulled behind the engine in a special tank car. Filling stations across the nation are installing compressor and cascade bottle fueling systems to fuel the natural gas vehicle. Small trailer mounted cascade systems are being pulled behind vehicles to provide roadside service to those vehicles that run out of natural gas. Utility companies in New York State will soon be marketing home compressors for vehicle owners to refuel their Compressed Natural Gas vehicle in their own garage. The National Highway Transportation Safety Board has found the issue of alternative fuels significant enough to publish a special awareness bulletin alerting responders of the potential dangers of the new fuels.

Emergency response personnel need to be trained to recognize or identify vehicles with alternative fuel systems and be trained in the appropriate safety issues associated with each new fuel system. Since all the systems are using hazardous materials, it is most appropriate that the training be covered under hazardous materials curriculum.

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.

A full alarm indicates that dangerous levels of CO have been reached and that immediate action should be taken. These actions include evacuation, ventilation, investigation, and denying access until the source of the CO is secured.

Additionally, the increased use of CO detectors has resulted in many local responders (fire, police, and EMS) being burdened with numerous calls but without a clear and definitive standard operating procedure (SOP) and proper training. Many published SOPs conflict with each other. It is reported by American Medical Association (AMA) that CO is responsible for 800 to 1,000 deaths per year and some 10,000 people seek medical attention.

Challenges for Public Sector Responder Training

Most current Awareness and Operations level training programs do not address this issue sufficiently.

Provider of hazardous materials response training should enhance training for the first responder at the awareness and operations levels with material and competency instruction on the following topics:

- CO hazards and toxicity
- Limitations of home detectors
- Limitations of responder carried monitoring devices
- CO recognition and identification, including signs and symptoms of CO poisoning;
- Proper entry procedures and techniques,
- Evacuation, ventilation and source investigation procedures
- CO source control and management
- Post incident action and follow-ups.

Training should also be supported by appropriate standard operating guidelines for first responder A sample of an SOP is provided below.

All CO detector alarms shall be addressed as an emergency until no hazard has been identified. Steps taken shall include, but are not limited to:

- Verify detector is CO type
- Check for CO related symptoms and evacuate structure as necessary
- Check power supply to detector
- Assess scene for CO sources
- Determine need for additional resources: Haz mat or other units for CO meters, utility company, police department, etc.
- *Utility company shall be notified if any signs or symptoms are present.*

Clandestine Drug Lab Operations

During routine emergency responses to fires or other emergencies it is possible that responders will discover the presence of a clandestine drub laboratory. Clandestine drub laboratories by their nature are disguised and are often encountered accidentally in a great variety of situations, including warehouses, store fronts, apartment buildings, single family dwellings, rural outbuildings and even truck trailer accidents. It should be generally understood that response to a clandestine drug laboratory is a hazardous materials incident. These types of incidents may expose you to toxic, flammable, explosive, and corrosive atmospheres. Without proper training, your health and safety are at risk.

Proper personal protective equipment at a clandestine drub lab incident is absolutely critical for avoiding exposure. Structural fire fighting or EMS gear offers little, if any, protection in such situations. In order to be able to recognize when you are inadequately protected, you must be aware of the limitations of your clothing and SCBA. You must understand that clothing which is adequate in one situation may be inadequate or even dangerous in another. No one protective clothing system will protect you from all situations.

In any emergency situation involving clandestine drub labs there is a risk of exposure to toxins; those materials that are capable of causing injury or death when absorbed. Through an understanding of the types of toxins, their effects, the various routes of entry, and specific biological hazards, emergency response agencies can take more appropriate actions to ensure their own health and safety during clandestine drug laboratory operations. In addition, it should be noted that effective clandestine drug lab incident response requires a well-functioning Incident Management System (IMS). Operating without an IMS or without a complete understanding of how an IMS works is inefficient and dangerous to all agencies involved. Listed in the guidelines are the current OSHA and NFPA laws and standards that apply to emergency response agencies who respond to hazardous materials incidents. Below is a discussion of the application of those hazardous materials competencies to the special hazardous materials response challenges posed by clandestine drug lab operations.

Learning Objectives

The following learning objectives *should be the minimum in any* Clan Lab Course. Upon completion of the course, participants will be able to:

- Discuss terminology associated with drug labs (glossary).
- Discuss history of clan labs.
- Demonstrate, through chemical reaction and/or video format, the possible catastrophic results of chemical interactions and reactions.
- Be familiar with the hazards associated with drug lab operations.
- Be familiar with some chemicals found at a drug lab operation.
- Explain the need for a personal protective equipment program for fire, police, and EMS personnel.

- Explain the routes of exposure and toxicological effects of short term exposures (acute) to these precursor chemicals and the possible long term (chronic) effects of clan lab chemicals on the human body.
- Discuss the federal laws and national standards associated with the use of PPE and chemical response programs.
- List common locations of clan lab operations.
- Explain the needs for well-established standard operating procedures within the fire department and between other agencies.
- Describe, through generic standard operating procedures, the operational goals and objectives for each of the following organizations:
    - Fire Department (First Responder)
    - Fire Department HMRT (Hazardous Materials Response Team)
    - Local Police
    - EMS
- Speak to the issue of responsibility for clean-up and termination of a clan lab incident.
- Explain the importance of scene management at a clan lab incident.
- List the common components of an Incident Management System.
- Overview decontamination procedures.
- Overview termination procedures.
- Explain why post-incident analysis and evaluation are necessary elements of scene management.

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, methlamphelaime. In 1927, a substance called 1-phenyl 2-aminopropane and its action were first described leading to the further research and development of benzedrine and dexedrine (common drugs used during the late sixties and early seventies for weight control).

Clandestine Drug Labs

The following general information is based on Drug Enforcement Agency (DEA) Special Agent Patrick Gregory's testimony before the California Select Committee on Drug and Alcohol Abuse on November 15, 1985.

On a national average, one of five (or twenty percent) of all clandestine laboratories result in, and/or are discovered through, fires and/or explosives. During 70 clandestine laboratory investigations, ten percent involved agents being confronted by suspects who had fully automatic and silenced weapons and some form of booby traps or explosive devices. In thirty percent of the cases, defendants were using electronic countermeasures, ranging from scanners to sophisticated video monitors to sound sensing devices.

During the course of these investigations, thirteen firefighters and four police officers required medical treatment as a result of exposure to hazardous chemicals and chemical wastes. Minor injuries resulted from exposure to hazardous chemicals and chemical wastes. Because of exposure to caustic, corrosive, carcinogenic, irritating, explosive, and flammable substances encountered at lab sites, every agent has suffered minor injuries including burns, rashes, headaches, light headedness, and nausea.

The first lab seized in California was in 1963 (amphetamine) in Santa Cruz.

- 1984 - 93 labs seized in California

- 1985 - 215 labs seized in California
- 1986 - 325 labs seized in California

Of the 325 labs seized in California, 293 were Methamphetamine. Of those 293 labs, 82.5% were using Ephedrine as the primary chemical.

- 1986 - 509 labs seized nationwide
- 1987 - 489 labs seized in California
- 1987 - 682 labs seized in the United States
- 1988 - Approximately 1,200 laboratories were seized by law enforcement agencies, federal, state, and local police nationwide.

Clandestine Drug Laboratories remain the principle source for methamphetamine. States where most clandestine laboratories appear to be operating are:

- Southern and Northern California
- Florida
- Eastern Texas
- Pennsylvania
- Oregon and Washington
- New Jersey
- New Mexico

Types of Labs and Hazards

A. Extraction Labs

This is where raw plant material is changed into a finished drug by the use of chemical solvents and/or acids. The chemical structure of the drug is not altered. Some examples of this are marijuana to hashish, opium to morphine. Also under this title are indoor or underground confined space marijuana grow farms. Marijuana grow farms have a high rate of booby trap. They grow marijuana in confined space grows so that they can reduce the oxygen levels in the grow area, making the plant produce more sap, which means more tetrahydrocannabinol (THC). This is accomplished by flooding the confined area with either carbon dioxide or propane. Both gases will displace the available oxygen, and, in the case of propane, produce a possible flammable and explosive atmosphere. Without instrumentation, the firefighter has no way of evaluating the hazard, which is O_2 deficient and possibly flammable. If faced with a rescue, these confined spaces should be approached according to OSHA's proposed Confined Space Protocol 29 CFR 1910.146.

B. Conversion Labs

Currently thought to be the most prevalent. In these labs, a raw or unfinished drug product is changed into a finished or refined drug. Here the chemical structure is changed. Examples of this are cocaine base to cocaine hydrochloride (the white powder sold on the streets as cocaine), and cocaine hydrochloride to cocaine sulfate (aka crack or rock cocaine). Numerous flammable liquids, corrosives, acids, and bases, as well as oxidizing agents, are found at these sites.

Public and Private Sector Dispatch: Hazardous Materials Response Issues

Introduction

The role of public safety communication systems in the successful resolution of hazardous materials incidents has, until now, received relatively little attention beyond the U.S. Fire Administration's 1998 Wingspread report. This section will address the following:

- The inter-relationship between public safety communication systems (also known as dispatch systems) and hazardous materials responders,
- The continuing challenges of public safety communication systems,
- The role of public safety communication professional associations, and
- Issues unique to private sector public safety communication systems.

Each of these areas must be addressed if public safety and private sector organizations intend to positively manage their responses to hazardous materials incidents.

Interrelationship 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 affect both public and private sector dispatch systems. In turn, each issue effects hazardous materials response capabilities. Each issue must be dealt with, both in the short term and in the future.

Training

While training is generally recognized as essential for effective performance there has been too little actual hazardous materials orientation training associated with dispatcher – or to use the more modern term, telecommunicator – initial training or continuing education. This is in spite of the outstanding efforts of both the National Fire Protection Association (NFPA) and the Association of Public-Safety Communications Officials International, Inc. (APCO). The NFPA has developed Standard 1061, which is essentially a voluntary compliance guide for the job performance of public safety telecommunicators. Meanwhile, APCO has developed (and in 1996 approved) a complimentary minimum training standard: Project 33, National Public Safety Telecommunicator Training Standard.

The APCO standard recommends, as a minimum, training in each of eight areas:

- Module 1: Roles and Responsibilities
- Module 2: Legal Aspects
- Module 3: Interpersonal Communications
- Module 4: Technologies
- Module 5: Telephone Communications Techniques and Call Processing
- Module 6: Call Classification
- Module 7: Radio Communications (Dispatch) Techniques
- Module 8: Stress Management

These eight modules total forty hours of instruction. However, the APCO Standard does not include an orientation on hazardous materials. But, it lists several optional subjects such as National Crime Information Center (NCIC), Emergency Medical Dispatch, and hazardous materials.

Clearly, the APCO Training Standard will serve to further professionalize the telecommunicator field. Although the lack of required hazardous materials orientation training merits reconsideration, APCO does provide a video program on this subject. This program, entitled "Hazardous Materials Awareness for Dispatchers" includes a wealth of information, such as:

- Hazardous materials identification
- Proper information gathering
- Using the DOT Emergency Response Guidebook
- Response generation guidelines
- Coordination and support functions

- Developing standard operating procedures

Weapons of Mass Destruction (WMD) and Clandestine Drug Lab Incidents

Both of these issues are more fully addressed as separate Special Topics. However, it bears repeating that both of these types of incidents hold special challenges for telecommunicators. First, and often overlooked, is the fact that the telecommunications center itself may be an infrastructure target of terrorists. To prepare for this eventuality requires knowledge of potential threat groups, physical security countermeasures and other methods of “hardening” the facility.

In addition, both types of incidents require specialized knowledge of the types of hazardous materials that may predominate as WMD agents and/or as commonly used chemicals in drug production, whether at extraction labs or conversion labs. Without this knowledge telecommunicators may miss or fail to pass on to responders important “clues” that could potentially affect the outcome of the response.

Since both types of incidents are criminal acts telecommunicators must have knowledge of, and use (as needed), any pertinent evidence preservation (of items such as dispatch logs and tapes) and documentation techniques. In addition, both terrorist groups and illicit drug manufacturers have a keen interest in the activities of public safety. This requires the telecommunicators to practice effective operations security (OpSec), such as maintaining confidentiality of raid information, proper securing of agency and individual public safety personnel contact information (for example, home telephone numbers and addresses of law enforcement officers).

Non-Emergency Number Systems

In order to process the ever-increasing emergency calls communications systems have begun to develop equivalent non-emergency incident systems. Two such systems, using 311 as the non-emergency number, are operational in Baltimore, Maryland, and Dallas, Texas. The actual number selected is immaterial. But, the development of such systems is necessary or emergency requests for assistance – including those that will result in hazardous materials responses – will be delayed.

Funding Issues

Many public safety communication systems are outdated and perennially under-funded. Traditionally, general fund taxes were the source of such systems. Now, however, alternative funding methods such as surcharges on intra-state long distance calls, and directory assistance fees are being implemented.

But, without a firm financial footing no communication system can operate, perform preventive maintenance, invest in the on-going professional development of telecommunicators, research the specifications for new equipment, purchase and install said equipment, etc. Ultimately, this impacts on call dispatch, which impacts on response, including those involving hazardous materials.

Communication Center Management

Telecommunicators, like all other types of workers in structured organizations, have supervisors, who in turn have managers. These people all use managerial systems to accomplish tasks. Given the funding restraints common to many communications centers (see previous sub-issue about funding issues) the need for efficient and effective management systems and managers is critical.

APCO has worked with the Commission on Accreditation for Law Enforcement Agencies, Inc. (CALEA) to expand CALEA's certification process for communications centers. In the process of becoming certified by CALEA an already excellent public safety communication system should become even better.

Communication Hardware and Software Changes

One of the greatest challenges for communications systems is changing technology. The Federal Communications Commission is now actively researching frequency availability, wireless Enhanced 911 systems, etc. However, for the individual public safety communications system each potential technological change – such as common air interfaces (CAI) to improve interoperability, microwave radio systems, mobile satellite services, etc. – must be analyzed, and if useful, funded, installed, and integrated into the existing system. The task is never-ending. Yet, if not done, or done poorly, the dispatch of emergency calls, including those for hazardous materials incidents, will suffer.

The Role of Public Safety Communication Professional Associations

Anyone reviewing the historical background of American public safety communication systems is immediately struck by the importance of professional associations in the development of these systems. In particular, the Association of Public-Safety Communications Officials International, Inc. (APCO) has played a seminal role in professionalizing the field. Since its inception in 1935 APCO has developed and completed a series of practical projects that have addressed major issues: the "ten signal" cards and other aural brevity methods, frequency coordination, advising the Federal Communications Commission, universal computer aided dispatch standards, etc.

While APCO's role is critical to the success of these systems, it has worked with many other related associations to improve public safety communication. These organizations include the National Association of State Telecommunications Directors, and the National Emergency Number Association. Each of these associations is to be commended. And, each must be challenged to examine its awareness of hazardous materials response issues and develop effective methods to manage those issues.

Issues unique to private sector public safety communication systems

It should be clear that private sector systems share the same continuing challenges – training, funding, communication hardware and software changes, etc. — which were identified earlier in this document. In addition to them, however, there are several other issues that are unique to the private sector that may impact on hazardous materials response. Here are two:

Continuity of Services

Invariably one of the major concerns with any private sector function that was originally performed by government is the long-term survivability of the private company. In an environment where businesses fail – sometimes spectacularly – the concern is quite reasonable. The best indicator of continued endurance is prior successful existence, and the longer that prior existence the better. In addition, the specific track record of the private sector company in other jurisdictions should be carefully examined. Companies that survive do so for a reason: they're carefully managed.

Confidentiality Concerns

Historically, law enforcement has had to be careful about information that, if it fell into the wrong hands, could compromise an on-going investigation or operation. For example, a planned raid on a suspected clandestine drug laboratory perhaps could require the pre-positioning of fire service hazardous materials personnel and emergency medical units. But the dilemma can be that including the public safety communication center in the planning process is sometimes viewed as increasing the risk of inadvertent release of critical information. Good operations security (OpSec) is a constant concern. When a private company operates the communication center it can increase concerns about OpSec. Only close coordination between the involved agencies, and the building of a track record (discussed earlier in the "Continuity of Services" section) of confidentiality will ultimately change this situation.

Summary

This Special Topic section has attempted to describe what heretofore has been little discussed – the role of communication systems in hazardous materials response. Numerous challenges – for agencies, communication systems, telecommunicators, etc. — were identified. Each of these challenges <u>must</u> be addressed if public safety and private sector organizations intend to positively manage their responses to hazardous materials incidents.

Flammable Liquid Unit Trains

The National Challenge

With an increase in the production and movement of commodities such as crude oil and ethanol by rail and highway, it is important that the risk of incidents be minimized through a strategic approach. U.S. crude oil production averaged 8.5 million barrels per day in 2014 and in 2015, according to Energy Information Administration projections, it will average 9.0 million barrels per day. This is a considerable increase since 2008 when the U.S. crude oil production fell to 5.0 million barrels.

Along with the increase in production, the volume of crude oil moving by rail quadrupled in less than a decade. According to the Association of American Railroads, 9,500 carloads of crude oil were transported in 2008 compared to 407,761 carloads in 2013. Recent derailments involving crude oil shipments renewed focus on the safe transportation of bulk hazardous materials by rail. Denatured fuel ethanol, also referred to simply as “ethanol”, is also routinely transported by rail. Ethanol preparedness and response information is included to round out this information resource.

With the increased production of oil from shale reserves in states such as North Dakota and Texas, there has been a dramatic increase in the transportation of crude oil by rail. Rail shipments of crude oil from these regions are typically made using unit trains. Unit trains of crude oil are single commodity trains that generally consist of over 100 tank cars, each carrying approximately 30,000 gallons of crude oil. Unit trains typically move from one location (e.g., shipper’s production facility or transloading facility) to a single destination (e.g., petroleum refinery). Given the usual length of these trains (over a mile long), derailments can cause road closures, create significant detours, and require response from more than one direction to access the scene of the incident.

In the event of an incident that may involve the release of thousands of gallons of product and ignition of tank cars of crude oil in a unit train, most emergency response organizations will not have the available resources, capabilities or trained personnel to safely and effectively extinguish a fire or contain a spill of this magnitude (e.g., sufficient firefighting foam concentrate, appliances, equipment, water supplies). Responses to unit train derailments of crude oil will require specialized outside resources that may not arrive at the scene for hours; therefore it is critical that responders coordinate their activities with the involved railroad and initiate requests for specialized resources as soon as possible. These derailments will likely require mutual aid and a more robust on-scene *Incident Management System* than responders may normally use. Therefore, pre-incident planning, preparedness and coordination of response strategies should be considered and made part of response plans, drills and exercises that include the shippers and rail carriers of this commodity.

Two sets of program materials are discussed below that can assist in addressing this important risk and response challenge: The DOT Transportation Rail Incident Preparedness and Response Flammable Liquid Unit Trains Resources Materials, and the Commodities Preparedness and Incident Management Reference Sheet for Petroleum Crude Oil.

TRIPR

The DOT Transportation Rail Incident Preparedness and Response Flammable Liquid Unit Trains Resource Materials

The Transportation Rail Incident Preparedness and Response Flammable Liquid Unit Trains resource materials provide critical information on best practices related to rail incidents involving Hazard Class 3 flammable liquids such as petroleum crude oil and ethanol. A key component of this initiative is to learn from past experiences and to leverage the expertise of public safety agencies, rail carriers, and industry subject matter experts in order to prepare first responders to safely manage rail incidents involving commodities such as crude oil and ethanol. The information and resources found in the TRIPR modules and scenarios supplement the information outlined in the “Commodities Preparedness and Incident Management Reference Sheet for Petroleum Crude Oil.”

This U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) led program resulted from collaborative efforts to expand awareness on incident management lessons learned related to rail incidents involving Hazard Class 3 flammable liquids such as ethanol and crude oil. These resources offer a flexible approach to increasing awareness of first responders and emergency services personnel in pre-incident planning and response. The resources supplied are not intended to be a standalone training program but are offered to supplement existing programs. All of the information is easily downloadable for public safety organizations and instructors. Each module contains a PowerPoint presentation, Student Workbook, and Instructor Lesson Plan. In addition to these materials, there are three interactive scenarios with animation and introduction videos to help instructor’s lead tabletop discussions. All information can be edited and modified to suit the instructor’s needs. The following is the url for the website: http://dothazmat.vividlms.com/.

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

The Commodities Preparedness and Incident Management Reference Sheet for Petroleum Crude Oil

A sample page from this reference sheet is on the following page. This 17 page reference sheet may be accessed from PHMSA at: https://www.transcaer.com/docs/resources/PHMSA/Petroleum%20Crude%20Oil%20CERG_Final%20Approved_090114.pdf.

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

COMMODITY PREPAREDNESS AND INCIDENT MANAGEMENT REFERENCE SHEET

PETROLEUM CRUDE OIL

CAS NO. 8002-05-9
UN 1267
DOT Hazard Class: 3
FLAMMABLE LIQUID
ERG Guide No. 128

HAZARD RATING = HIGH

DOT Hazard Classification and NFPA 704 - Standard System for the Identification of the Hazards of Materials for Emergency Response

TRANSPORTATION AND PLANNING CONSIDERATIONS

- With the increased production of oil from shale reserves in states such as North Dakota and Texas, there has been a dramatic increase in the transportation of crude oil by rail. Rail shipments of crude oil from these regions are typically made using unit trains. Unit trains of crude oil are single commodity trains that generally consist of over 100 tank cars, each carrying approximately 30,000 gallons of crude oil.
- Unit trains typically move from one location (e.g., shipper's production facility or transloading facility) to a single destination (e.g., petroleum refinery). Given the usual length of these trains (over a mile long), derailments can cause road closures, create significant detours, and require response from more than one direction to access the scene of the incident.
- In the event of an incident that may involve the release of thousands of gallons of product and ignition of tank cars of crude oil in a unit train, most emergency response organizations will not have the available resources, capabilities or trained personnel to safely and effectively extinguish a fire or contain a spill of this magnitude (e.g., sufficient firefighting foam concentrate, appliances, equipment, water supplies).
- Responses to unit train derailments of crude oil will require specialized outside resources that may not arrive at the scene for hours; therefore it is critical that responders coordinate their activities with the involved railroad and initiate requests for specialized resources as soon as possible.
- These derailments will likely require mutual aid and a more robust on-scene *Incident Management System* than responders may normally use. Therefore, pre-incident planning, preparedness and coordination of response strategies should be considered and made part of response plans, drills and exercises that include the shippers and rail carriers of this commodity.

PHMSA PETROLEUM CRUDE OIL REFERENCE - 09/2014 PAGE 1

Response Training Considerations
Awareness Level Personnel
Operations Level Responders
Core Competencies
Mission-Specific Competencies
Haz Mat Technician
Haz Mat Technician with Speciality
Incident Commander
Specialist Employee C,B,A
Haz Mat Officer
Haz Mat Safety Officer
BLS Basic Life Support Responder
ALS Advanced Life Support Responder
ALS Mission Specific Competencies
Hospital First Receiver
Appendix: Standards & Special Topics

Page Intentionally Left Blank