

EPA/540/6-92/XXX
Publication 9285.1-03
June 1992

STANDARD OPERATING SAFETY GUIDES

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, DC 20460

NOTICE

This guidance manual does not constitute a rulemaking by the Agency. The policies set forth in this Directive are intended solely as guidance. They are not intended, nor can they be relied upon, to create any substantive or procedural rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this Directive, or may take action that is at variance with the guidance, policies, and procedures in this Directive, on the basis of an analysis of specific circumstances. The Agency also reserves the right to change this Directive at any time without public notice. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Additional copies of this document can be obtained from:

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

When ordering this document, refer to Publication 9285.1-03.

CONTENTS

Chapter 1	Introduction	1
	1.0 Introduction	3
	1.1 Regulatory Background	4
	1.2 Regulatory Scope	5
Chapter 2	Comprehensive and Site-Specific Health and Safety Program	7
	2.0 Introduction	8
	2.1 General Components of the Health and Safety Program	8
	2.2 HASP Development and Site Characterization	10
	2.2.1 Preliminary Evaluation	15
	2.2.2 Writing the Initial Draft of the HASP	16
	2.2.3 Initial Site Entry	16
	2.2.4 Revising the HASP	18
	2.2.5 On-Going Monitoring	19
Chapter 3	Training	21
	3.0 Introduction	22
	3.1 Training Requirements	22
	3.1.1 General Training Requirements	22
	3.1.2 Site-Specific Requirements	22
	3.2 Initial Training Requirements for Field Personnel	23
	3.3 Equivalent and Refresher Training	24
	3.4 Trainer Qualifications and Certification	26
Chapter 4	Site Control	27
	4.0 Introduction	28
	4.1 Development of the Site Map	28
	4.2 Establishment of Work Zones at the Site	30
	4.2.1 The Exclusion Zone	30
	4.2.2 The Contamination Reduction Zone (CRZ)	32
	4.2.3 The Support Zone	32
	4.2.4 Ensuring Integrity of the Support Zone	33
	4.3 Organization of Workers Using the Buddy System	32
	4.4 Establishment of a Communications Network and Procedures	34
	4.5 Worker Safety Procedures	35
	4.5.1 Site Preparation	35
	4.5.2 Engineering Controls and Safe Work Practices	36
	4.5.3 Standing Orders	36
	4.6 Identification of Nearest Medical Assistance	37

CONTENTS (cont'd)

Chapter 5	Personal Protective Equipment	38
5.0	Introduction	39
5.1	Selecting the Level of PPE	39
5.1.1	Level A	39
5.1.2	Level B	46
5.1.3	Level C	46
5.1.4	Level D	46
5.2	Elements of the PPE Program	46
5.2.1	Personal Use Factors and Equipment Limitations	47
5.2.2	Work Mission Duration	47
5.2.3	Storage and Maintenance	48
5.2.4	Training and Proper Fitting	48
5.2.5	Donning and Doffing Procedures	49
5.2.6	Inspection Procedures	49
5.2.7	PPE Program Evaluation	50
5.2.8	Other Considerations	50
Chapter 6	Air Monitoring	53
6.0	Introduction	54
6.1	Objectives of Air Monitoring	54
6.2	Identifying Airborne Contaminants	55
6.2.1	Direct Reading Instruments	55
6.2.2	Air Sampling	59
6.3	Air Sampling Equipment and Media	60
6.4	Sample Collection and Analysis	60
6.5	General Monitoring Practices	63
6.5.1	Perimeter Monitoring	63
6.5.2	Periodic Monitoring	63
6.5.3	Personal Monitoring	63
6.6	Meteorological Considerations	64
6.7	Long-Term Air Monitoring Programs	64
6.8	Variables in Hazardous Waste Site Air Monitoring	64
6.9	Using Vapor/Gas Concentrations to Determine Level of Protection	65
6.9.1	Factors for Consideration	65
6.9.2	Level A Protection (500 to 1,000 ppm)	66
6.9.3	Level B Protection (5 to 500 ppm)	66
6.9.4	Level C Protection (Background to 5 ppm)	67

CONTENTS (cont'd)

Chapter 7	Medical Surveillance Program	69
7.0	Introduction	70
7.1	Employees Covered by the Monitoring Program	70
7.2	Frequency and Content of Medical Examinations	70
7.2.1	Baseline Screening	71
7.2.2	Periodic Medical Examinations	73
7.2.3	Termination Examination	73
7.3	Emergency Treatment	73
7.4	Chemical Contamination	73
7.5	Medical Records and Program Review	80
Chapter 8	Heat Stress and Cold Exposure	81
8.0	Introduction	82
8.1	Heat Stress	82
8.1.1	Heat Stress and PPE	82
8.1.2	Monitoring for Heat Stress	82
8.1.3	Preventing Heat Stress	83
8.2	Cold Exposure	84
8.2.1	PPE and Cold Exposure	84
8.2.2	Monitoring for Cold Exposure	84
8.2.3	Preventing Cold Exposure	85
8.2.4	A Control Program for Cold Stress	89
Chapter 9	Decontamination	90
9.0	Introduction	91
9.1	The Decontamination Plan	91
9.2	Developing the Plan	91
9.3	The Contamination Reduction Corridor	92
9.4	Decontamination Procedures and Equipment	93
9.4.1	Physical Removal of Contaminants	93
9.4.2	Chemical Removal of Contaminants	94
9.4.3	Decontamination Equipment	94
9.5	Protection of Decontamination Personnel	96
9.6	Health and Safety Hazards	96
Chapter 10	Drum Handling	98
10.0	Introduction	99
10.1	Inspection	99
10.2	Drum Excavation and Removal Equipment	102
10.3	Drum Handling	102
10.4	Drum Opening	103
10.5	Drum Sampling	104
10.6	Characterization	104

CONTENTS (cont'd)

Chapter 11	Other Requirements and Safety Considerations	115
11.0	Introduction	116
11.1	Emergency Response and Prevention	116
11.1.1	Prevention	117
11.1.2	Communications	117
11.1.3	Site Mapping	117
11.2	Hazards	118
11.2.1	Explosion and Fire	118
11.2.2	Oxygen Deficiency	118
11.2.3	Ionizing Radiation	118
11.2.4	Biological Hazards	119
11.2.5	Safety Hazards	119
11.2.6	Noise Hazards	119
11.2.7	Work Hazards	121
11.3	Confined Space Entry	121
11.4	Information and New Technology Programs	124
11.5	Construction Requirements	124
	Acronyms and Abbreviations	126
	Appendices	
APPENDIX A	Sources of Information and Response Assistance	127
APPENDIX B	Other Common Applicable OSHA Standards	135
APPENDIX C	Incident Safety Check-Off List	141
APPENDIX D	Characteristics of the Photoionization Detector (PID) and the Flame Ionization Detector (FID)	144
APPENDIX E	Sample Decontamination Layouts and Procedures for Levels of Protection A Through C	149
APPENDIX F	Regional Contacts	162

ACKNOWLEDGEMENTS

This manual was developed by the Environmental Response Branch of EPA's Office of Emergency and Remedial Response, Emergency Response Division. The project manager wishes to acknowledge and express its appreciation for those persons who assisted in the research, development, and preparation of the document. In addition, many thanks are offered to the technical reviewers who provided constructive comments on the document in its final stages of development.

CHAPTER 1 INTRODUCTION



CHAPTER 1 INTRODUCTION

1.0 INTRODUCTION



Protecting the health and safety of workers is a major consideration when hazardous substances are present at a site. Not only must site personnel perform a variety of technical tasks correctly and efficiently, but they also must

work in an often unpredictable and potentially dangerous environment. By adequately equipping and training personnel, and by using appropriate standard operating procedures, the potential for harm from exposure to hazardous substances can be greatly reduced.

The purpose of this document is to provide guidance for ensuring the health and safety of site personnel who work with hazardous substances or who work at uncontrolled hazardous waste sites. This guidance is intended for federal, state, and local managers and personnel at sites where hazardous materials are present. It is meant to supplement professional training, experience, and knowledge, and can be used as:

- A planning and management tool for field managers;
- An educational tool that addresses fundamental aspects of the required health and safety programs and plans at hazardous waste sites;
- A reference document for site personnel who may need to review important aspects of on-site health and safety.

The U.S. Occupational Safety and Health Administration (OSHA) has established regulations governing the health and safety of employees engaged in hazardous waste operations and emergency response. These regulations, codified at 29 CFR §1910.120, contain general requirements for health and safety programs, site characterization and analysis, site control, training, medical surveillance, engineering controls and work practices, personal protective equipment, exposure monitoring, informational programs, material handling, decontamination, and emergency procedures. EPA has incorporated these standards by reference into its regulations at 40 CFR Part 311. Both sets of regulations are discussed in further detail in Section 1.1.

A number of documents have been developed to provide guidance for protecting the health and safety of workers exposed to hazardous substances. The purpose of this document is to update the U.S. EPA's July 1988 *Standard Operating Safety Guides* (SOSG) to incorporate the new requirements at 29 CFR §1910.120 and 40 CFR Part 311. This document also includes information presented in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (the "Four-Agency document"), which was written jointly by OSHA, EPA, the National Institute for Occupational Safety and Health (NIOSH), and the U.S. Coast Guard (USCG). The Guide also draws from other EPA documents, including the EPA *Health and Safety Manual*, the EPA *Health and Safety Audit Guidelines*, and the EPA's Standard Operating Procedures for hazardous waste site operations. Refer to **Appendix A** for a list of other useful sources of information.

This revised SOSG is intended to provide a comprehensive overview of the information needed by employers to meet their responsibility to assure the health and safety of employees engaged in operations at hazardous waste sites. Developing and implementing a worker protection program is a dynamic process that requires both initial and ongoing planning, periodic revision, and attention to a variety of site details. This guidance document provides a comprehensive overview of the structure of that process as a whole, as well as a more detailed discussion of each of the individual components. Thus, this document is intended to supplement the OSHA regulations at 29 CFR §1910.120, but is not meant for use as a legal document or as a replacement to those regulations. This document is structured as follows:

- **Chapter 1** provides an overview of the purpose and scope of the document, and discusses how the requirements at 29 CFR §1910.120 and 40 CFR Part 311 fit into the regulatory framework of worker protection standards.
- **Chapters 2 and 3** discuss initial planning activities that take place before work may begin at the site. *Chapter 2: Comprehensive and Site-Specific Health and Safety Program* outlines the components of the health and safety requirements at both the corporate and the site-specific level, and

describes the relationship of the site characterization process to the development of the site-specific Health and Safety Plan (HASP). *Chapter 3: Training* discusses the health and safety training program required for workers and managers engaged in hazardous waste operations.

- **Chapters 4 through 11** provide a discussion of health and safety considerations for preliminary and on-going site activities. These include:

Chapter 4: Site Control

Chapter 5: Personal Protective Equipment

Chapter 6: Air Monitoring

Chapter 7: Medical Surveillance Program

Chapter 8: Heat Stress and Cold Exposure

Chapter 9: Decontamination

Chapter 10: Drum Handling

Chapter 11: Other Requirements and Safety Considerations.

1.1 REGULATORY BACKGROUND

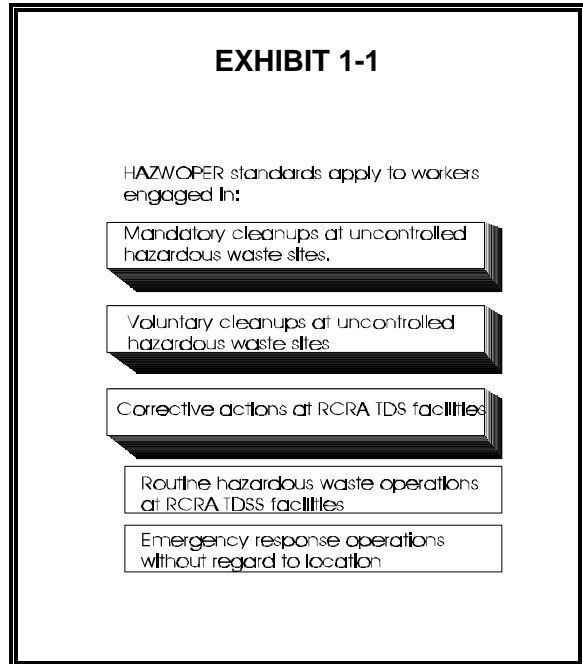
Under the authority of section 126 of the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA and OSHA promulgated identical health and safety standards to protect workers engaged in hazardous waste operations and emergency response. The OSHA regulations, codified at 29 CFR §1910.120, became effective on March 6, 1990 (54 FR 9294). (Corrections to the OSHA regulations were published on April 13, 1990 (55 FR 14072).) The EPA regulations incorporate the OSHA standards by reference and are codified at 40 CFR Part 311 (54 FR 26654).



The EPA and OSHA worker protection standards for hazardous waste operations and emergency response (HAZWOPER) apply to five groups of workers, as shown in **Exhibit 1-1**. This document addresses the standards as they apply to the first three groups of workers, those engaged in voluntary or mandatory cleanups at uncontrolled hazardous waste sites, or in corrective actions at treatment, storage, and disposal (TSD) facilities regulated under the Resource Conservation and Recovery Act (RCRA).

The HAZWOPER requirements for these workers, specified at 29 CFR §1910.120(a) through (o), are summarized in **Exhibit 1-2**. In

addition, these provisions apply to any activities performed during the preliminary planning and evaluation stages of the remedial investigation and feasibility study (RI/FS), such as the preliminary assessment and site investigation (PA/SI).



HAZWOPER does not, however, apply to employees who do not have the potential to be exposed to hazardous substances. For example, administrative support personnel in the Site Command Post may not be covered by HAZWOPER, but are, of course, protected by other OSHA standards. They should also be made aware of the provisions of the emergency response plan, and must be briefed on emergency procedures and general site operations, such as the location of work zones.

1.2 REGULATORY SCOPE

The occupational safety and health standards, published at 29 CFR, established minimum requirements to ensure protection for all private sector employees in the U.S. The general industry standards at 29 CFR Part 1910 were derived largely from standards developed by industry consensus organizations and non-OSHA Federal safety and health standards. These requirements reflect practices previously recognized by most industrial sectors prior to regulation under the OSHA. The OSHA standards, however, make these practices mandatory. Many of the OSHA standards at 29 CFR Part 1910 establish generic specifications for using worker tools, maintaining industrial

EXHIBIT 1-2
Hazardous Waste Operations and Emergency Response at Uncontrolled Hazardous Waste Sites
(29 CFR §1910.120(a)-(o))

- | | |
|--|--|
| (a) Scope, application, and definitions. | (h) Monitoring. |
| (b) Safety and health program. | (i) Informational programs. |
| (c) Site characterization and analysis. | (j) Handling drums and containers. |
| (d) Site control. | (k) Decontamination. |
| (e) Training. | (l) Emergency response by employees at uncontrolled hazardous waste sites. |
| (f) Medical surveillance. | (m) Illumination. |
| (g) Engineering controls, work practices, and personal protective equipment for employee protection. | (n) Sanitation at temporary workplaces. |
| | (o) New technology programs. |

structures, installing equipment to make the workplace safer (e.g., sprinkler systems), providing medical attention, and other general health and safety practices applicable to all types of employment. Other sections in 29 CFR Part 1910, however, are specific to employees engaged in a specific activity or industry, such as hazardous waste operations.

Specifically, §1910.120 (HAZWOPER) contains requirements to minimize the health and safety hazards associated with conducting hazardous waste operations at uncontrolled hazardous waste sites and RCRA TSD facilities, and conducting emergency response. In some instances, the HAZWOPER standards incorporate general worker protection provisions by reference. For example, §1910.120(g) requires employers engaged in hazardous waste operations and emergency response to follow the provisions in §1910.94 through §1910.100, which require controls to protect employees from exposure to hazardous substances and safety and health hazards. Those referenced sections may apply to other industries and activities as well, but HAZWOPER applies only to hazardous waste operations and emergency response during the covered activities and locations.

In addition to the requirements set forth at 29 CFR Part 1910, OSHA codified regulations at 29 CFR 1926, Subpart C, that set forth safety and health standards specifically applicable to the construction industry. Both 29 CFR Part 1910 and Part 1926 require employers to provide whatever training and education is appropriate for employees to safely perform a given task. **Exhibit 1-3** presents a list of the OSHA standards that might apply at uncontrolled hazardous waste sites. **Appendix B** describes these standards in greater detail. The remainder of this guide discusses the types of activities that must be undertaken during hazardous waste operations to ensure worker health and safety and to comply with the HAZWOPER requirements.

EXHIBIT 1-3
Other Potentially Applicable OSHA Standards under 29 CFR*

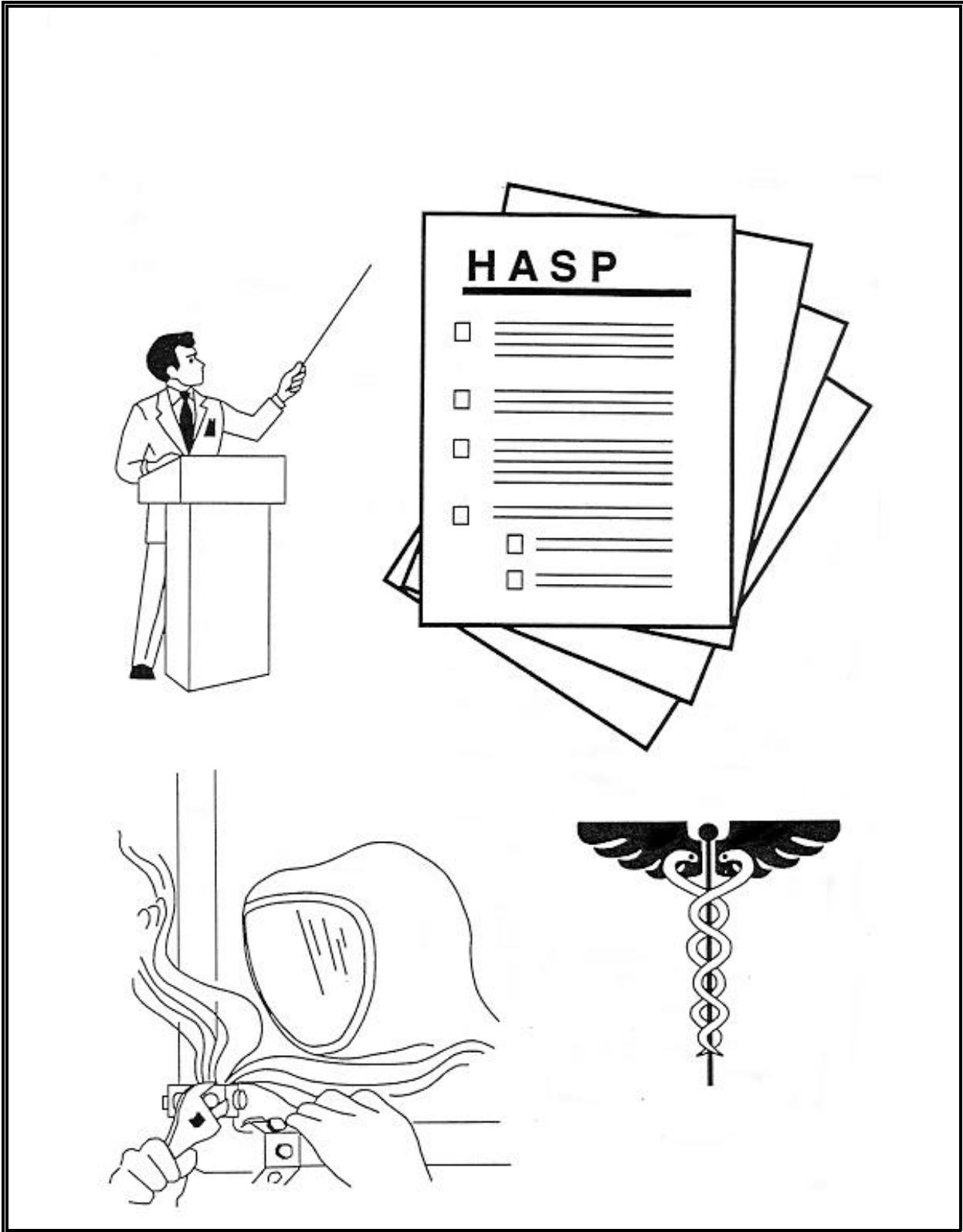
1910.20	Access to Employee Exposure and Medical Records	1910.165	Employee Alarm Systems
1910.24	Fixed Industrial Stairs	1910.181	Derricks
1910.27	Fixed Ladders	1910.252	Welding, Cutting, and Brazing
1910.28	Safety Requirements for Scaffolding	1910.307	Hazardous Locations
1910.38	Employee Emergency Plans and Fire Prevention Plans	1910.1000	Toxic and Hazardous Substances
1910.94	Ventilation	1910.1200	Hazard Communication
1910.95	Occupational Noise Exposure	1926.20	General Safety and Health Provisions
1910.101	Compressed Gases	1926.21	Safety Training and Education
1910.133	Eye and Face Protection	1926.56	Illumination
1910.134	Respiratory Protection	1926.58	Asbestos
1910.135	Occupational Head Protection	1926.59	Hazard Communication
1910.136	Occupational Foot Protection	1926.151	Fire Prevention
1910.141	Sanitation	1926.152	Flammable and Combustible Liquids
1910.151	Medical Services and First Aid	1926.200	Accident Prevention Signs and Tags
1910.157	Fire Extinguishers	1926.301	Hand Tools
1910.212	General Requirements for all Machines	1926.400	Electrical General Requirements
		1926.401	Grounding and Bonding
		1926.651	Specific Excavation Requirements
		1926.652	Trenching Requirements

*Not intended as a complete list

FURTHER GUIDANCE: For additional information on employee health and safety at uncontrolled hazardous waste sites, see:

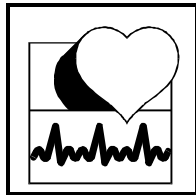
1. *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH/OSHA/USCG/EPA, 1985, NIOSH Publication 85-115).
2. *EPA Health and Safety Audit Guidelines* (U.S. EPA, 1989, EPA 540/G-89/010).
3. *OSWER Integrated Health and Safety Standard Operating Practice* (U.S. EPA, 1992, Publication 9285.0-01).
4. *Standard Operating Procedures for Site Safety Planning* (U.S. EPA, 1985, Publication 9285.2-

CHAPTER 2 COMPREHENSIVE AND SITE-SPECIFIC HEALTH AND SAFETY PROGRAM



CHAPTER 2 COMPREHENSIVE AND SITE-SPECIFIC HEALTH AND SAFETY PROGRAM

2.0 INTRODUCTION



The HAZWOPER regulations at 29 CFR §1910.120(b) require that any employer whose workers engage in hazardous waste operations at an uncontrolled hazardous waste site or who perform corrective actions at a RCRA

TSD facility must develop and implement a written health and safety program. This program must be designed to identify, evaluate, and control health and safety hazards at any site, and to provide for emergency response during site operations. The program must be maintained by the employer and made available to: (1) any employee or employee representative; (2) any contractor, subcontractor, or other representative working for the employer who may be potentially exposed to hazardous substances; (3) OSHA personnel; and (4) personnel of federal, state, and local agencies with regulatory authority over the site. If an employer already has developed a health and safety program to meet the requirements of other federal, state, or local regulations, the employer may use the existing program to satisfy the HAZWOPER requirements, provided that any additional information not covered in the existing program, but required under HAZWOPER, is incorporated into the program.

The primary purpose of the written health and safety program is to serve as an organization-wide health and safety policy that applies to all employees of the organization, regardless of the location of the actual site where they are working. The HAZWOPER regulations at 29 CFR §1910.120(b) establish the components of the general program, as shown in **Exhibit 2-1**.

Because the written health and safety program is intended to be organization-wide, only one health and safety program should be developed by an employer, even if the employer has workers who perform operations at several different sites. As required by HAZWOPER, this program should define the organizational structure, describe the general health and safety training and medical surveillance programs, and establish the standard operating procedures for health and safety. In addition, the health and safety program must also require that both a

comprehensive workplan and a Health and Safety Plan (HASP) be developed for each site where workers are engaged in hazardous waste operations. Each HASP includes plans for implementing, on a site-specific basis, applicable requirements set forth in the organization's health and safety program (see **Exhibit 2-1**). For this reason, the health and safety program should include procedures needed for coordination between the comprehensive and site-specific health and safety activities.

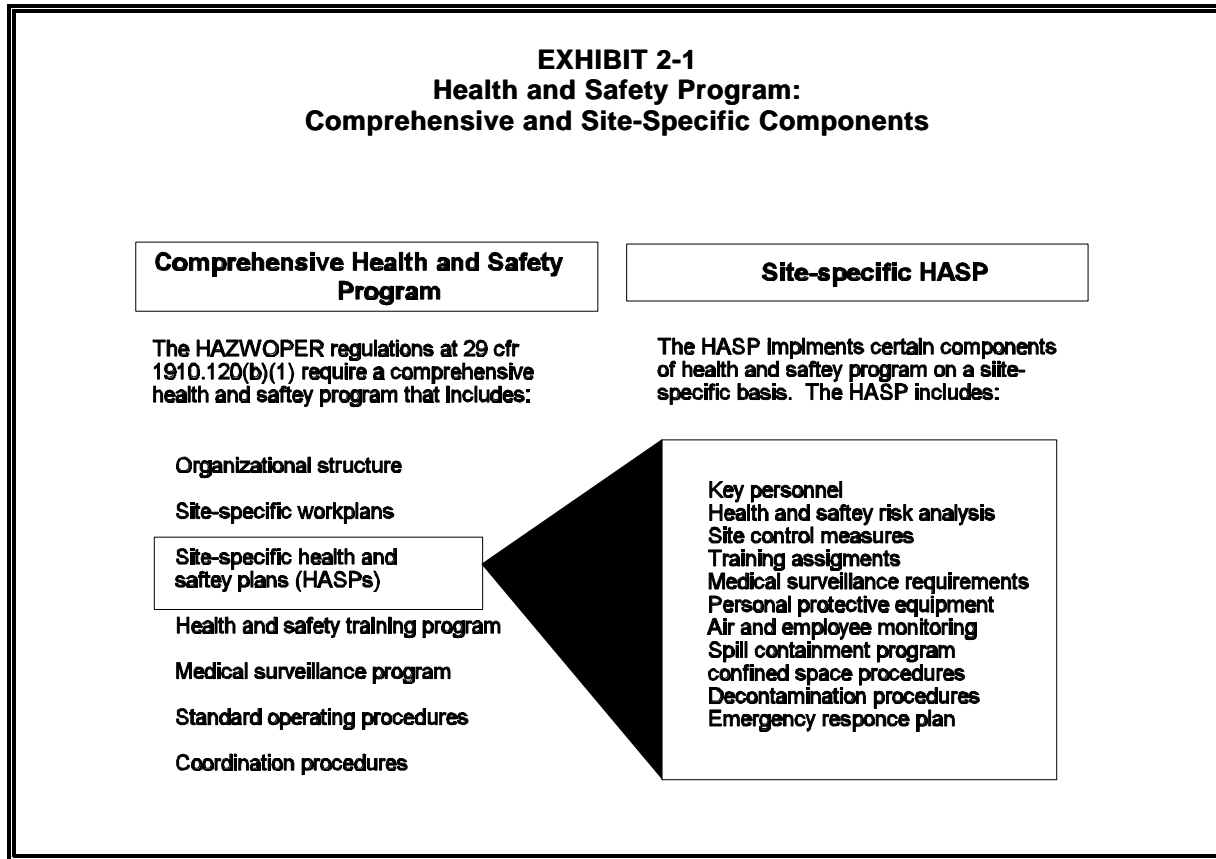
Section 2.1 below describes in more detail these general components of the written health and safety program. Because HASP development is a complex, iterative process, Section 2.2 focuses on the procedures for developing the HASP.

2.1 GENERAL COMPONENTS OF THE HEALTH AND SAFETY PROGRAM

As required by 29 CFR §1910.120(b), an organization's written health and safety program must include certain general program components. Each of these are described briefly below.

Organizational Structure. The organizational structure component of the written health and safety program identifies the specific chain of command in the employer's organization, and specifies the overall responsibilities of supervisors and employees in carrying out the health and safety program. The structure should identify the general supervisor for all hazardous waste operations; provide a roster of the health and safety supervisors of all the sites; and describe the responsibilities of other personnel engaged in hazardous waste operations or emergency response. The structure should also identify the lines of authority, communication, and coordination among personnel and managers in the organization. It is necessary to review and update the organizational structure periodically to reflect changes in personnel and operations Comprehensive Workplan. As required by HAZWOPER, the written health and safety program should specify that a comprehensive workplan will be developed for each site to evaluate the logistics and resources needed to reach work objectives for site operations. The

EXHIBIT 2-1
Health and Safety Program:
Comprehensive and Site-Specific Components



workplan should identify anticipated cleanup activities as well as normal operating procedures. It should also establish implementation strategies for carrying out the training, informational, and medical surveillance programs of the general health and safety program. The following steps should be undertaken in developing the work plan:

- Review available information, including site records, waste inventories, manifests, sampling data, site photos, and other records;
- Define work objectives;
- Determine methods for accomplishing the objectives (e.g., sampling plan, defining alternate technologies);
- Determine personnel requirements;
- Determine need for additional training (refer to **Chapter 3** for specific requirements); and
- Determine equipment requirements.

Site-Specific Health and Safety Plan (HASP).

In addition to the workplan, a site-specific HASP must be developed and implemented for each site

where workers are potentially exposed to hazardous substances. Section 2.2 below discusses the components of the HASP and the process for its development.

Health and Safety Training Program. HAZWOPER requires that the health and safety program include a component to establish organization-wide health and safety training requirements for all site workers and supervisors. The training program must address the hazards present on-site, use of personal protective equipment, work practices to minimize risks, safe use of engineering controls and equipment, and medical surveillance requirements. The HASP for a particular site may implement these general training requirements on a site-specific basis (refer to **Chapter 3** for specific requirements).

Medical Surveillance Program. HAZWOPER requires that the written health and safety program also include a detailed program for ensuring and monitoring the general health of workers engaged in hazardous waste operations. As with the training program, the HASP for a particular site will address the medical surveillance program requirements and any special site-specific medical surveillance concerns. (Refer to **Chapter 7** for more information.)

Standard Operating Procedures. The HAZWOPER standards require employers to have established standard operating procedures for safe work practices. Such procedures should be specified in the written health and safety program. If the employer has already written and implemented these procedures, it is not necessary for new procedures to be developed.

Coordination Procedures. Because the health and safety program includes elements that are implemented on a site-specific basis, HAZWOPER requires that the program include procedures needed for coordination between the comprehensive and site-specific health and safety activities.

2.2 HASP DEVELOPMENT AND SITE CHARACTERIZATION

As discussed above, the HAZWOPER regulations at 29 CFR §1910.120(b)(4) require that a site-specific HASP be developed for each site where workers are engaged in hazardous waste operations. The purpose of the site-specific HASP is to address the health and safety hazards that may exist at each phase of site operations and to identify procedures for protecting employees.

THE RULE IS: ONE SITE, ONE HASP

A new HASP should not be developed if new tasks or hazards are identified at a site; rather, the original HASP should be updated. If a subcontractor is working at a site, the subcontractor should carefully evaluate and identify all tasks associated with the subcontracted activities, and prepare a health and safety plan addressing any identified hazards. This plan should be submitted to the site manager, who will incorporate it into the general site HASP after it has been reviewed for concurrence with the site workplan. **Exhibit 2-2** describes in detail the specific components that should be included in the HASP. Also, **Exhibit 2-3** presents a sample HASP Table of Contents. Some of the areas that must be addressed in the HASP are discussed in further detail in later chapters of this document.

Development of the site-specific HASP is a process that incorporates the information collected during the site characterization phase of hazardous waste operations. Site characterization generally is divided into three phases:

- Prior to site entry, the preliminary evaluation (PE) is conducted off-site to gather information about the site and to conduct reconnaissance from the site perimeter.
- During the second stage, initial site entry, a visual survey is taken and preliminary air monitoring is performed. During this phase, site entry is restricted to properly trained and protected reconnaissance personnel.
- Once the hazards have been identified to the greatest extent possible, other activities may commence at the site. Monitoring continues, however, to provide a continuous source of information about site conditions.

It is important to recognize that site characterization (and, therefore, HASP development) is a continuous process. At each phase of site characterization, information should be obtained and evaluated to define the hazards that the site may pose. This assessment can then be used to develop the HASP for the next phase of work. The more accurate, detailed, and comprehensive the information available about a site, the more the HASP can be tailored to the actual hazards that workers may encounter. In addition to the formal information gathering that takes place during the phases of site characterization described here, all site personnel should be constantly alert for new information about site conditions that may indicate a need to update the HASP.

The sections that follow describe the phases of site characterization and HASP development, and provide a general guide that should be adapted to site-specific situations. **Exhibit 2-4** provides a flowchart that illustrates this process. For additional, detailed information on HASP development, see the Environmental Response Team's (ERT) Health and Safety Planner (also referred to as the generic health and safety plan), which is a menu-driven computerized software system designed to assist in the development, implementation, and updating of a HASP.

2.2.1 Preliminary Evaluation

The first step in developing a HASP is to perform a preliminary evaluation (PE) of the site's characteristics. The PE must be accomplished off-site, so as not to endanger the health and safety of site workers. The purpose of the PE is to obtain preliminary information to help identify the specific hazards at the site and determine the appropriate health and safety control procedures

(e.g., engineering controls, personal protective equipment (PPE), and any additional medical surveillance needs) that are necessary to ensure the protection of employees who perform tasks on-site As set forth in 29 CFR §1910.120(c)(4), the PE should include the following:

- Site location and size.
- Description of response activity and/or the job to be performed.
- Duration of the planned activity.
- Site topography and accessibility.
- Site safety and health hazards expected.
- Pathways for hazardous substance dispersion.
- Present status and capabilities of emergency response teams that would provide assistance for on-site emergencies.
- Hazardous substances and health hazards expected at the site, and the chemical and physical properties of the substances.

There are several ways in which this information can be obtained. For example, records of the site or interviews with persons who are knowledgeable about the site can provide useful information about potential hazards. **Exhibit 2-5** summarizes potentially useful sources of information. **Appendix C** provides a "Sample Incident Safety Check-Off List" to serve as a quick reference on the types of information that must be obtained prior to initial site entry, and the types of follow-up activities that should be conducted.

In addition to interviewing knowledgeable persons and researching the history of the site, gathering data at the site perimeter (i.e., perimeter reconnaissance) may help in identifying site hazards and potential pathways for exposure and determining the appropriate level of PPE for the initial site entry. To identify the appropriate monitoring techniques for perimeter reconnaissance, the Site Health and Safety Officer should review the information obtained during the records or interview research.

NOTE: Perimeter reconnaissance activities during the PE must be conducted off-site. The site manager must not, under any circumstances, allow a worker to enter the site to collect information for the PE.

EXHIBIT 2-5 **Sources of Site-Specific Information**

- Company records, receipts, worker compensation claims, logbooks, or ledgers.
- Records and permits from federal and state pollution control regulatory and enforcement agencies, state Attorney General's office, state occupational safety and health agencies, state Fire Marshal's office.
- Interviews with personnel and their families (all interview information should be verified).
- Generator and transporter records.
- Water department and sewage records.
- Interviews with nearby residents (note possible site-related medical problems and verify all information from interviews).
- Local fire and police department records.
- Court and utility company records.
- Verified media reports.
- Previous surveying (including soil, ground-penetrating radar, and magnetometer surveys), sampling, and monitoring data.

Key Personnel and Hazard Communications Plan
(29 CFR 1910.120(b)(2))

The HASP should include the names of key personnel such as Project Manager, Field Operations Leader, Site Supervisor, and Site Health and Safety Officer, as well as their alternates. The Hasp Should be held at any time they appear necessary to ensure that employees are adequately apprised of the health and safety procedures being followed at the site.

Health and Safety Risk Analyses
(29 CFR 1910.120(b)(4))

Health and safety risk analyses should be established for each task and operation identified in the site-specific workplan. Discussion of these analyses should include identification of the chemical contaminants, affected media, concentrations, and potential routes of exposure for use in risk anticipated on-site operations and safety problems.

Site Control Measures
(29 CFR 1910.120(b)(4))

The site control program in the HASP specifies the procedures that will be used to minimize employee exposure to hazardous substances before clean up operations commence and during site operations. The program must be developed during the planning stages of hazardous waste cleanup operations, and must be modified as any new information becomes available. The site control program should include a site map, designation of work zones, site communication, safety work practices, identification of the nearest medical assistance, and description of the "buddy system" for site operations. Chapter 4 describes the requirements of the site control program.

Employee Training Assignments
(29 CFR 1910.120(e))

Training assignments should address the employee's initial health and safety training, annual health and safety refresher training, on-the-job training, supervisory training, and first-aid and CPR training. Employees should not be permitted to participate in or supervise field activities until they have received training commensurate with their responsibilities. Chapter 3 describes the applicable training requirements in greater detail.

Medical Surveillance
(29 CFR 1910.120(f))

The medical surveillance program is required for monitoring the health status of personnel who are potentially exposed to hazardous substances in the field and who wear respirators 30 days or more per year. It must include initial and periodic medical examination, upon termination of employment, and medical recordkeeping. Chapter 7 describes the medical surveillance requirements specified in HAZWOPER.

Personal Protective Equipment (PPE)
(29 CFR 1910.120(g))

The HASP must describe the different PPE ensembles that will be used to address potential hazards during site activities. The HASP should also include or refer to a comprehensive PPE program that addresses site hazards, duration of site activities, limitations of PPE during temperature extremes, PPE selection, maintenance, storage, and decontamination, and training for PPE use, inspection, and monitoring. Such PPE should be used only when engineering controls and work practices are insufficient to adequately protect against exposure. Chapter 5 discusses PPE requirements in greater detail.

Air and Personnel Monitoring
(29 CFR 1910.120(h))

The HASP must describe the employee and air monitoring equipment and environmental sampling techniques and instrumentation that will be used on-site for evaluating potential exposure to contamination that results from site activities. The monitoring program must include procedures for initial entry monitoring, periodic monitoring and monitoring of high risk employees. Chapter 6 discusses monitoring requirements and procedures.

Spill Containment Program
(29 CFR 1910.120(b)(9))

The HASP should include any elements of the spill containment program that may be relevant to the site, and should provide procedures to contain and isolate the entire volume of hazardous substance spilled in the course of a transfer, major spill, or an on-site release.

Confined Space Entry Procedures
(29 CFR 1910.120(b)(9))

If confined space entry is anticipated on-site, the HASP should describe procedures for entry into confined space. Such procedures ensure the safety of site personnel who must enter areas where natural ventilation is insufficient to reduce contaminant concentrations. Chapter 11 Presents the requirements for developing confined space entry procedures.

Decontamination Procedures
(29 CFR 1910.120(k))

The HASP should include decontamination procedures, both for individuals and equipment on-site and in places where there is a potential for exposure to a hazardous substance. These procedures should explain how to conduct personal and equipment decontamination when leaving a contaminated area. Chapter 9 presents the requirements for a decontamination program.

Emergency Response Plan
(29 CFR 1910.120(l))

The emergency response plan in the HASP must include a description of how anticipated emergencies would be handled at the site and how the risk associated with a response would be minimized. The emergency response plan must be developed and implemented prior to beginning site operations. Chapter 11 discusses the requirements for an emergency response plan at an uncontrolled hazardous waste site.

EXHIBIT 2-3
Sample HASP Table of Contents for Site "A"

1.0 INTRODUCTION

- 1.1 Scope and Applicability of the Site Health and Safety Plan
- 1.2 Visitors

2.0 KEY PERSONNEL/IDENTIFICATION OF HEALTH AND SAFETY PERSONNEL

- 2.1 Key Personnel
- 2.2 Site-Specific Health and Safety Personnel
- 2.3 Organizational Responsibility

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS

- 3.1 Historical Overview of Site
- 3.2 Task-by-Task Risk Analysis

4.0 PERSONNEL TRAINING REQUIREMENTS

- 4.1 Preassignment and Annual Refresher Training
- 4.2 Site Supervisors Training
- 4.3 Training and Briefing Topics

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED

- 5.1 Levels of Protection
- 5.2 Level A Personal Protective Equipment
- 5.3 Level B Personal Protective Equipment
- 5.4 Level C Personal Protective Equipment
- 5.5 Level D Personal Protective Equipment
- 5.6 Reassessment of Protection Program
- 5.7 Work Mission Duration
- 5.8 Chemical Resistance and Integrity of Protective Material
- 5.9.5 SCBA Inspection and Checkout
- 5.10.1 Inspection

6.0 MEDICAL SURVEILLANCE REQUIREMENTS

- 6.1 Baseline or Preassignment Monitoring
- 6.2 Periodic Monitoring
- 6.3 Site-Specific Medical Monitoring
- 6.4 Exposure/Injury/Medical Support
- 6.5 Exit Physical

EPA HASP Version 3.0: This sample HASP Table of Contents reflects specific health and safety considerations for Site "A". Other sites may address different topics in the HASP, subject to site-specific hazards and activities.

EXHIBIT 2-3 (cont'd)

Sample HASP Table of Contents for Site "A"

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING

- 7.1 Direct-Reading Monitoring Instruments
- 7.3.1 Site Air Monitoring and Sampling Program

8.0 SITE CONTROL MEASURES

- 8.1 Buddy System
- 8.2 Site Communications Plan
- 8.3 Work Zone Definition
- 8.4 Nearest Medical Assistance
- 8.5 Safe Work Practices
- 8.6 Emergency Alarm Procedures

9.0 DECONTAMINATION PLAN

- 9.1 Standard Operating Procedures
- 9.2 Levels of Decontamination Protection Required for Personnel
- 9.3 Equipment Decontamination
- 9.4 Disposition of Decontamination Wastes

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

- 10.1 Pre-Emergency Planning
- 10.2 Personnel Roles and Lines of Authority
- 10.3 Emergency Recognition/Prevention
- 10.4 Evacuation Routes/Procedures
- 10.7 Emergency Contact/Notification System
- 10.8 Emergency Medical Treatment Procedures
- 10.9 Fire or Explosion
- 10.10 Spill or Leaks
- 10.11 Emergency Equipment/Facilities

11.0 CONFINED SPACE ENTRY PROCEDURES

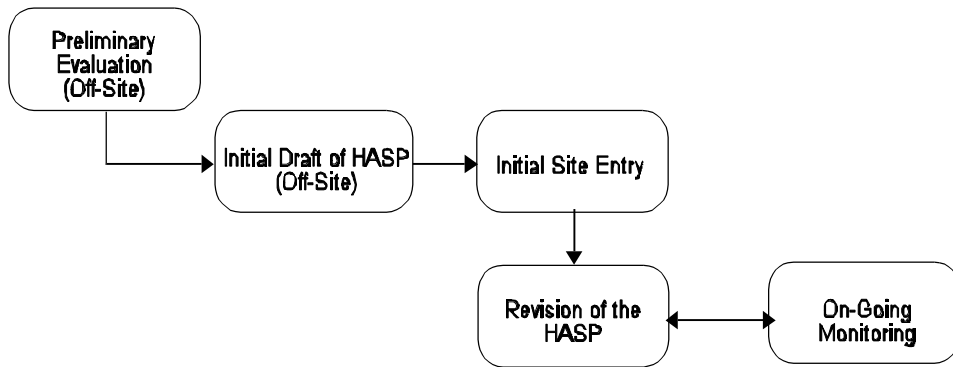
- 11.1 Definitions
- 11.2 General Provisions
- 11.3 Procedure for Confined Space Entry
- 11.4 Confined Space Observer (Stand-by Person)

12.0 SPILL CONTAINMENT PROGRAM

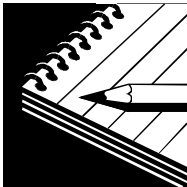
13.0 HAZARD COMMUNICATION

EPA HASP Version 3.0: This sample HASP Table of Contents reflects specific health and safety considerations for Site "A". Other sites may address different topics in the HASP, subject to site-specific hazards and activities.

**EXHIBIT 2-4
The Site Characterization Process**



2.2.2 Writing the Initial Draft of the HASP

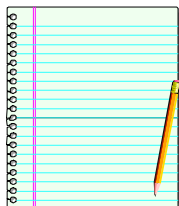


Once the PE is completed and the appropriate information has been obtained, the information is used to develop the initial draft of the site-specific HASP. The initial draft of the HASP must include all elements listed in Exhibit 2-

2. Specifically, it must identify each anticipated health and safety hazard for each work operation or activity, and describe how those hazards will be eliminated or controlled. It must also indicate that employees have received training and are enrolled in a medical surveillance program. In addition, the HASP should identify appropriate monitoring procedures and PPE for the initial site entry. The HASP must remain on-site at all times and only one HASP should be developed for each site.

2.2.3 Initial Site Entry

Once the HASP has been developed and implemented, the second stage of the site characterization and analysis (i.e., initial site entry) may begin. The purpose of the initial site entry is to gather additional information and further evaluate the site-specific risks and hazards for use in selecting and developing appropriate engineering controls, site controls, medical monitoring plans, and PPE. Risks that should be considered during the initial site entry include:



- Physical hazards.
- Exposure exceeding the permissible exposure limits (PELs) and published exposure levels.
- Immediately dangerous to life and health (IDLH) concentrations.
- Potential skin absorption and irritation.
- Explosion sensitivity and flammability ranges.
- Oxygen deficiency.
- Confined spaces.

At a minimum, activities during the initial site entry should consist of air monitoring and a visual survey for potential hazards. Multi-media sampling should also be performed if the site manager has any reason to believe that soil or water contamination may be present. **Exhibit 2-6** provides a checklist of conditions and potential hazards that should be noted during the initial site entry. An accurate and comprehensive visual survey of the site will assist the site manager in identifying and determining additional information (e.g., sampling of soil or containers) that may be needed. For example, a visual survey might note the condition of waste containers (e.g., rusted or other unusual conditions) and identify potential exposure pathways.

The specific monitoring requirements for initial site entry are specified at 29 CFR §1910.120(c)(6) and (h)(2) and are summarized in **Exhibit 2-7**. Personnel entering the site should monitor the air using direct reading instruments to

detect IDLH conditions (e.g., toxic substances) and for ionizing radiation. Such monitoring, however, need only be conducted if the PE produces information that suggests: (1) the possibility of existing IDLH conditions; or (2) the potential for ionizing radiation. Air monitoring should also be conducted if the information from the PE is insufficient to reasonably conclude that neither of these two conditions exists. When monitoring, entry personnel should look for signs of actual or potential IDLH hazards or other dangerous conditions. Examples of hazards that may be identified at a site include confined space entry, ground subsidence, visible vapor clouds, or areas that contain biological indicators, such as dead vegetation. **Exhibit 2-8** gives examples of frequently used monitoring devices and exposure limits. The appropriate level of protection for initial entry should be conservative, because there is often little known information on specific hazards at that time. Refer to **Chapter 6** for additional information on selecting appropriate levels of protection.

In addition to air monitoring, soil and water sampling should be performed during the initial site entry if the site manager believes contamination may exist. Soil sampling techniques will differ with each site; for specific sampling strategies, refer the purpose of the effort and the ultimate use of the data be established. Specific strategies should be selected based on the information required.

Chapter 6 provides a more detailed discussion of monitoring techniques and equipment. Prior to beginning site activities, it is imperative that to Volume 1 (Soil) of the *Removal Program Representative Sampling Guidance* (Interim Final).

2.2.5 On-Going Monitoring

One important goal of the initial site entry is to identify the risks and hazards at the site so that the work zones can be established. The three most frequently identified zones are the Exclusion Zone, the Contamination Reduction Zone, and the Support Zone (also known as the clean zone). The Support Zone should be an area of the site that is free from contamination and that may safely be used as a staging area for other hazardous waste operations at the site. The Exclusion Zone is the area with actual or potential contamination and the highest potential for exposure to hazardous substances. For additional information on work zones and site control, refer to **Chapter 4**.

2.2.4 Revising the HASP

Once the initial site entry is completed, the site manager is responsible for updating the HASP to ensure that it adequately identifies any new tasks or hazards at the site. At most sites, any sampling performed during the initial site entry will provide accurate information regarding the appropriate level of PPE to be worn by site employees and the proper designation of work zones.

After the initial site characterization activities have been completed, any information concerning the chemical, physical, and toxicological properties of hazardous substances identified during the initial site entry must be made available to employees prior to the commencement of operations at the site.

Once the HASP is revised to reflect the information gathered during the initial site entry, on-going monitoring may be needed to ensure that all new hazards are identified in a timely manner and that the appropriate controls are implemented to protect site employees.

Periodic monitoring should be conducted whenever there is any indication that exposures have risen above the permissible exposure limits (PELs), when other dangerous conditions exist, such as the presence of flammable atmospheres or oxygen-deficient environments, or when new tasks are initiated or site conditions change. (Refer to **Exhibit 4-4** in **Chapter 4** of this Guide for examples.) Monitoring should be conducted on those employees suspected of having the highest exposures to hazardous substances and health hazards.

EXHIBIT 2-6 Initial Site Entry: Visual Inspection Checklist

- Note the types of containers, impoundments, or other storage systems:
 - Paper or wood packages.
 - Metal or plastic barrels or drums.
 - Underground tanks.
 - Aboveground tanks.
 - Compressed gas cylinders.
 - Pits, ponds, or lagoons.
- Note any tags, labels, markings, or other identifying indicators.
- Note the condition of waste containers and storage systems:
 - Sound (undamaged).
 - Visibly rusted or corroded.
 - Leaking or bulging.
 - Size and type of container.
 - Labels on containers indicating corrosive, explosive, flammable, radioactive, or toxic materials.
- Note the physical condition of the materials:
 - Gas, liquid, or solid.
 - Color and turbidity.
 - Behavior, e.g., corroding, foaming, vaporizing, or crystallizing.
 - Conditions conducive to splash or contact.
- Identify natural wind barriers:
 - Buildings.
 - Fences.
 - Vegetation.
- Determine the potential pathways of dispersion:
 - Air.
 - Biologic routes, such as animals and food chains.
 - Ground water.
 - Land surface.
 - Surface water.
- Note any indicators of potential exposure to hazardous substances:
 - Dead fish, animals or vegetation.
 - Dust or spray in the air.
 - Fissures or cracks in solid surfaces that expose deep waste layers.
 - Pools of liquid.
 - Gas generation or effervescence.
 - Deteriorating containers.
 - Cleared land areas or possible landfilled areas.
 - Subsiding areas indicating waste burial locations.
- Note any safety hazards. Consider:
 - Conditions of site structures.
 - Obstacles to entry and exit.
 - Terrain homogeneity.
 - Terrain stability.
 - Stability of stacked material.
- Identify any reactive, incompatible, flammable, or highly corrosive wastes.
- Note land features.
- Note the presence of any potential naturally occurring skin irritants or dermatitis-inducing agents, for example:
 - Poison ivy.
 - Poison oak.
 - Poison sumac.
- Collect samples:
 - Air (see Chapter 6, Air Monitoring).
 - Drainage ditches.
 - Soil (surface and subsurface).
 - Standing pools of liquids.
 - Storage containers.
 - Streams and ponds.
 - Ground water (upgradient, beneath site, downgradient).

EXHIBIT 2-8
Atmospheric Hazard Action Guides

Monitoring Equipment	Atmospheric Hazard ^a	Level	Action
Combustible Gas Indicator	Explosive	< 10% LEL ^b	Continue monitoring with caution.
		10-25% LEL	Continue monitoring, but with extreme caution, especially as higher levels are encountered.
		> 25% LEL	Explosion hazard! Withdraw from area immediately.
Oxygen Level		< 19.5%	Monitor wearing SCBA. NOTE: Combustible gas readings not valid in atmospheres with less than 19.5% oxygen.
		19.5-25%	Continue monitoring with caution. SCBA not needed based <u>only</u> on oxygen content.
		> 25%	Discontinue monitoring. Fire potential! Consult specialist.
Radiation Survey Instrument	Gamma Radiation	Above background:	Continue monitoring. Consult a health physicist.
		< 1 mR/hr ≥ 1 mR/hr	Withdraw. Continue monitoring only upon the advice of a Health Physicist.
Colorimetric Tubes	Organic & inorganic vapors/gases	Depends on chemical	Consult reference manuals for air concentration vs. PEL/TLV and toxicity data.
Photoionization Detector	Organic vapors/gases	Depends on chemical	Consult reference manuals for air concentration vs. PEL/TLV and toxicity data.
Flame Ionization Detector	Organic vapors/gases	Depends on chemical	Consult reference manuals for air concentration vs. PEL/TLV and toxicity data.

^a **NOTE:** Hazard classes are general and not all compounds in these classes can be measured by realtime instruments.

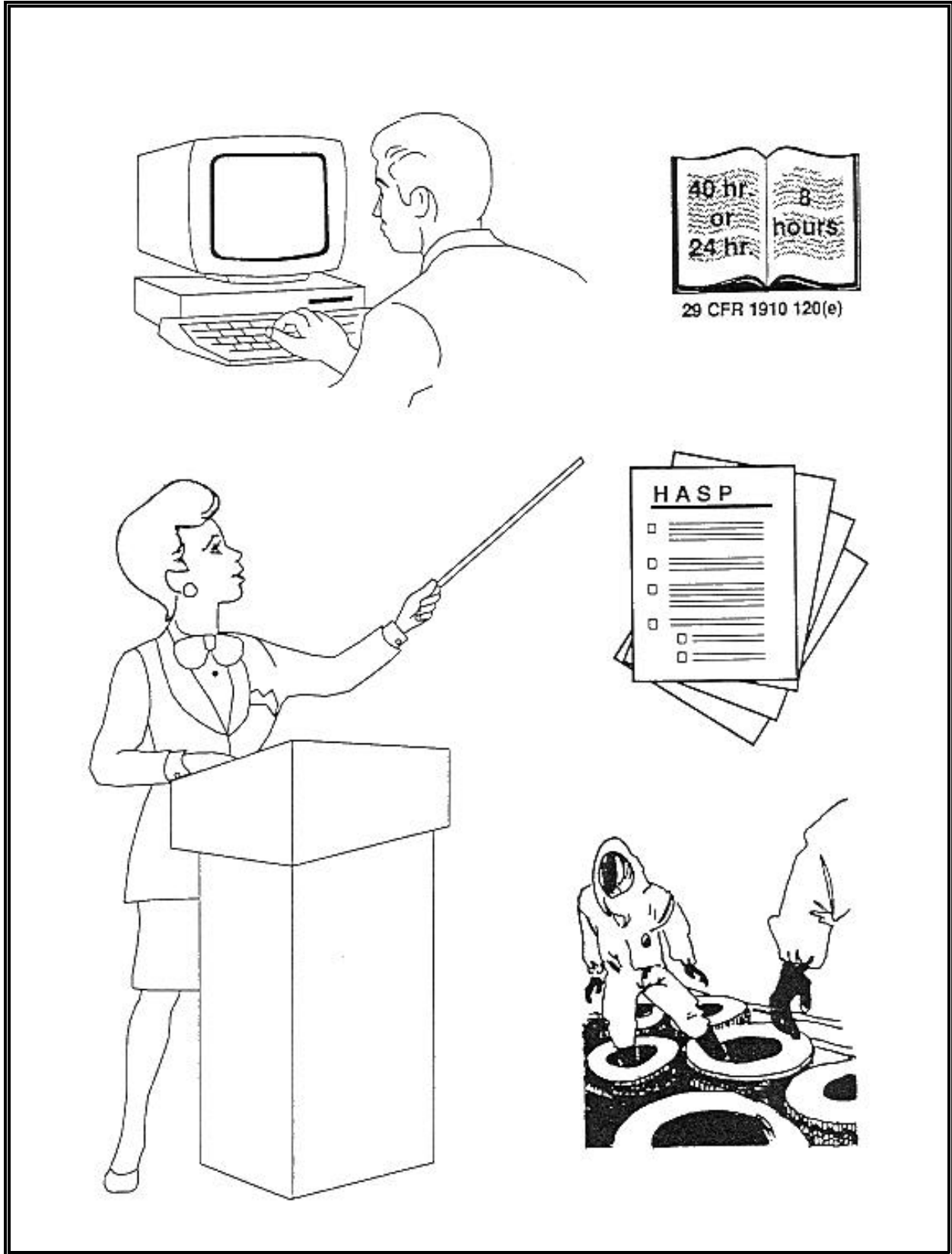
^b LEL = lower explosive limit.

NOTE: The correct interpretation of any instrument readout is difficult. If the instrument operator is uncertain of the significance of a reading, especially if conditions could be unsafe, a technical specialist should immediately be consulted. Consideration should be given to withdrawing personnel from the area until approval by the safety officer is given to continue operations.

FURTHER GUIDANCE: For further information on developing the written health and safety plan and the site-specific HASP, see:

1. *Characterization of Hazardous Waste Sites -- A Methods Manual: Vol.II. Available Sampling Methods, 2nd ed.* (U.S. EPA, 1984, EPA 600/4-84-076).
2. *EPA Health and Safety Planner: Software and User's Guide* (U.S. EPA, 1990, Publication 9285.8-01).
3. *EPA Health and Safety Audit Guidelines* (U.S. EPA, 1989, EPA 540/G-89/010).
4. *Standard Operating Guidelines for Site Entry* (U.S. EPA, 1985, Publication 9285.2-01A).
5. *Standard Operating Procedures for Site Safety Planning* (U.S. EPA, 1985, Publication 9285.2-05).
6. *OSWER Integrated Health and Safety Standard Operating Practice* (U.S. EPA, 1992, Publication 9285.0-01).
7. *Hazardous Waste Operations and Emergency Response: Uncontrolled Hazardous Waste Sites and RCRA Corrective Action* (U.S. EPA, 1991, Publication 9285.2-08FS).
8. *Removal Program Representative Sampling Guidance. Volume 1 - Soil* (Interim Final), (U.S. EPA, 1991, Publication 9360.4-10).

CHAPTER 3 TRAINING



CHAPTER 3 TRAINING

3.0 INTRODUCTION



Health and safety training is an integral part of the total health and safety program. Site response personnel should receive frequent training to maintain proficiency in using safety equipment and knowledge of site safety practices. Personnel who work at hazardous waste sites must recognize and understand the potential hazards to health and safety associated with the cleanup of that site. Personnel actively engaged in cleanup activities must be familiar with the safety programs and procedures at the site, including the HASP and site control measures, and must be trained to work safely in contaminated areas. Employees may not participate in or supervise any site activity until they have been properly trained.

The objectives of the HAZWOPER training program for employees engaged in hazardous waste site activities are to:

- Educate workers about the potential health and safety hazards they may encounter at the site;
- Provide the knowledge and skills necessary to minimize risk to worker health and safety;
- Provide thorough training in the proper use and potential limitations of safety and PPE; and
- Ensure that workers can safely avoid or escape from emergencies.

The HAZWOPER standards at 29 CFR §1910.120(e) reflect a tiered approach to training. They link the amount and type of training required to an employee's potential for exposure to hazardous substances and other health hazards encountered during hazardous waste operations. The greater the potential hazard to an employee, the more extensive and stringent are the training requirements. The training program should involve both classroom instruction in a wide range of health and safety topics, demonstrations, and "hands-on" practice consisting of off-site drills that simulate site activities and conditions. Any training program for work around hazardous substances should also incorporate on-site experience under the direct supervision of trained, experienced personnel. All employees are required to complete refresher training, at least annually, to re-emphasize the initial training and

to update workers on any new policies or procedures.

3.1 TRAINING REQUIREMENTS

3.1.1 General Training Requirements

HAZWOPER outlines a specific set of training criteria based upon a given employee's position, duties, and experience. The intent of the training provisions is to provide employees with the knowledge and skills necessary to perform hazardous waste cleanup operations with minimal risk to their safety and health.

The rule requires that all on-site employees who are exposed, or potentially exposed, to hazardous substances, health hazards, or safety hazards receive training meeting specific requirements before they are permitted to engage in hazardous waste operations. This rule also applies to site supervisors and personnel responsible for health and safety at the site. Employees should not be permitted to participate in or supervise field activities until they have been trained to a level commensurate with their job function and responsibility.

The HAZWOPER standards specify hourly requirements for five different categories of site workers. These hourly training requirements, and the requirements for each category, are discussed in more detail in Section 3.2.

3.1.2 Site-Specific Requirements

Each employer at a site is responsible for ensuring that their respective employees are properly trained and equipped prior to commencing work. HAZWOPER training must enable site workers to identify the hazards present on-site, the medical surveillance requirements, certain elements of the HASP, and operating practices and procedures, including the use of PPE and proper engineering controls. **Exhibit 3-1** outlines the specific issues and topics that are required to be addressed during training.

3.2 INITIAL TRAINING REQUIREMENTS FOR FIELD PERSONNEL

Although all employees engaged in hazardous waste operations must receive training in health and safety, the type of training required depends on the employee's on-site activities and potential for exposure to hazardous substances. **Exhibit 3-2** summarizes the HAZWOPER hourly training requirements for five categories of site workers.

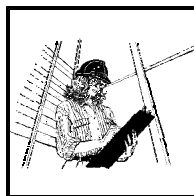
Exhibit 3-3 provides a matrix of training requirements for site personnel.

General site workers (e.g., equipment operators, general laborers, and supervisory personnel) engaged in hazardous substance removal or other activities that potentially expose workers to hazardous substances and health hazards are required to receive at least 40 hours of off-site instruction, as well as a minimum of 3 days actual field experience under the direct supervision of a trained, experienced supervisor.

Workers who are on-site only occasionally to perform a specific limited task (e.g., ground-water monitoring or land surveying) and who are unlikely to be exposed to hazardous substances over their PELs, are required to have a minimum of 24 hours of instruction off-site and a minimum of 8 hours of supervised field experience.

Workers regularly on-site who work in areas where exposure levels are monitored and determined to be below PELs, and where no health or atmospheric hazards are posed, must receive 24 hours of off-site instruction and a minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

Workers with 24 hours of training who subsequently become general site workers or whose job requires that a respirator be worn are required to obtain the additional 16 hours and 2 days of training to fulfill the training requirements commensurate with the new position's responsibilities.



Managers and supervisors of the four groups of employees described above are required to receive the same amount of initial training and field experience as the employees they supervise, plus 8 additional hours of specialized training in managing hazardous waste operations. For example, a supervisor that only manages employees who work on-site occasionally must have a minimum of 24 hours of instruction off-site and 8 hours of supervised field experience, plus an additional 8 hours of specialized management training. Supervisors will need to be trained in their responsibilities under the health and safety program, the PPE program, the medical surveillance program, and the emergency response plan.

Visitors to the site are not required to have completed any specific training in health and safety, although it is strongly recommended that they be familiar with the hazards on-site as well as

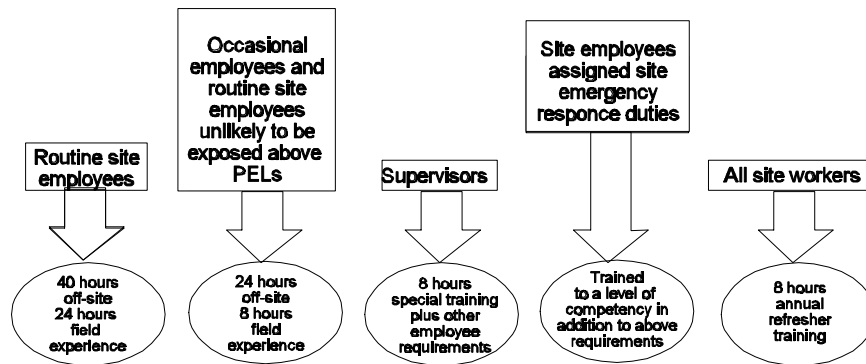
PPE, decontamination procedures, and the site emergency plan. Site visitors **may not** enter any hazardous area (e.g., exclusion or decontamination zones) without the proper training.

EXHIBIT 3-1
Elements to be Covered in Training

29 CFR §1910.120(e)(2) requires that health and safety training ensure that employees are thoroughly familiar with the following information:

- Names of personnel and alternates responsible for site safety and health;
 - Safety, health, and other hazards present on site;
 - Use of personal protective equipment;
 - Work practices by which the employee can minimize risks from hazards;
 - Safe use of engineering controls and equipment on the site;
 - Medical surveillance techniques, and recognition of symptoms and signs that might indicate overexposure to hazards;
 - An emergency response plan meeting the requirements for safe and effective responses to emergencies, including all necessary equipment;
 - Confined space entry procedures;
 - A spill containment program; and
 - Decontamination procedures.
- It is also recommended that training cover the following:
- Proper use of field equipment; and
 - Employee rights and responsibilities.
 - First Aid.

EXHIBIT 3-2
Initial Training Requirements for Employees
at Uncontrolled Hazardous Waste Sites (29 CFR §1910.120(e))



3.3 EQUIVALENT AND REFRESHER TRAINING

Some of the training requirements specified above may be waived if the employee has had prior work experience or training. For example, certain training requirements may be waived if the employee has had experience working at an uncontrolled hazardous waste site or if the employee has participated in training courses offered by independent or federal organizations (e.g., EPA). If the employer believes that an employee has sufficient prior experience or training to waive some or all of the HAZWOPER training requirements, the employer must document the basis for this belief, describing the length and type of experience or training. Equivalent training may include any relevant academic training or the training that may have been gained from actual hazardous waste site work experience. Certified employees new to a site, however, must receive appropriate site-specific training before site entry.

All employees who perform cleanup operations at uncontrolled hazardous waste sites, including managers and supervisors, must receive a minimum of 8 hours of annual refresher training. The purpose of refresher training is to maintain certain competencies essential for ensuring a safe work environment. Attendance at applicable seminars and critiques of actual responses are also acceptable methods of satisfying the annual refresher training requirements. Proper documentation of attendance should be maintained in each employee's personnel file to confirm that every person assigned to a task has had adequate training for that task, and that each employee has

participated in refresher training activities.

3.4 TRAINER QUALIFICATIONS AND CERTIFICATION

Trainers must be adequately qualified to instruct employees about the subject matter that is being presented in training. Such trainers must satisfactorily complete a training program for teaching the subjects they are expected to teach, or they must have the academic credentials and instructional experience necessary for teaching t h e s u b j e c t s.

Instructors are required to demonstrate competent instructional skills and knowledge of the applicable subject matter.

Employees and supervisors who have received and successfully completed the required training and field experience must be certified by their instructor or trained supervisor as having successfully completed the necessary training. A written certificate must be given to each person as proof of his or her certification (although certification may only signify attendance, and not competency). Any person who has not been certified or who does not meet the requirements may not participate in hazardous waste operations at the site.

**EXHIBIT 3-3
Recommended Training by Job Category**

TRAINING TOPIC	EMPHASIS OF TRAINING	General Site Worker	On-site Management & Supervisors	Health & Safety Staff
Biology, Chemistry, and Physics of Hazardous Materials	Chemical and physical properties; chemical reactions; chemical compatibilities.	✓	✓	✓
Toxicology	Dosage, exposure routes, toxicity, IDLH values, PELs, recommended exposure limits (RELs), TLVs.	✓	✓	✓
Industrial Hygiene	Monitoring workers' need for and selection of PPE.	O	✓	✓
	Calculation of doses and exposure levels; hazard evaluation; selection of worker health and safety protective measures.	O	✓	✓
Monitoring Equipment	Selection, use, capabilities, limitations, and maintenance.	✓	✓	✓
Hazard Evaluation/Recognition	Techniques of sampling and assessment.	✓	✓	✓
	Evaluation of field and lab results.	O	✓	✓
	Chemical/Physical	✓	✓	✓
	Risk assessment.		O	✓
Site Safety Plan	Safe practices, safety briefings and meetings, Standard Operating Procedures, site safety map.	✓	✓	✓
Standard Operating Procedures	Hands-on practice.	✓	✓	✓
	Development and compliance.	O	✓	✓
Engineering Controls	The use of barriers, isolation, and distance to minimize hazards.	✓	✓	✓
Personal Protective Clothing and Equipment (PPE)	Assignment, sizing, fit-testing, maintenance, use, limitations, and hands-on training.	✓	✓	✓
	Selection of PPE.	✓	✓	✓
Medical Program	Medical monitoring, first aid, stress recognition.	✓	✓	✓
	CPR and emergencies drills.	O	✓	✓
	Design and planning.		O	✓
	Implementation.	✓	✓	✓
Decontamination	Hands-on training using simulated field conditions.	✓	✓	✓
	Design and maintenance.	✓	✓	✓
Legal and Regulatory Aspects	Applicable safety and health regulations (OSHA, EPA)	O	✓	✓
Emergencies/Accidents	Emergency help, self-rescue, drills, alarms, reporting.	✓	✓	✓
	Emergency response, investigation and documentation.	O	✓	✓
Hazard Communication	Per 29 CFR §1910.1200 and §1926.59 (as applicable)	✓	✓	✓
Employee Rights		✓	✓	✓

✓ = Recommended training O = Optional

FURTHER GUIDANCE: For more information on employee training requirements and programs, see:

1. *Hazardous Materials Incident Response Training (HMIRT) Program: Course Schedule.*

Write to: U.S. EPA/ERT, 26 West Martin Luther King, Cincinnati, OH 45268

or Call: (513) 569-7537 or FTS 684-7537

The HMIRT program is designed for emergency responders and personnel who investigate and clean up uncontrolled hazardous waste sites. The HMIRT program has a curriculum of 12 courses that provide specific training in worker health and safety and in various technical operations that must be performed by site personnel engaged in hazardous materials response activities.

2. *National Institute for Environmental Health Sciences (NIEHS) Worker Health and Safety Training Programs.* Write to: The National Clearinghouse on Occupational and Environmental Health,

c/o Workplace Health Fund, 815 16th Street NW, Suite 301, Washington DC, 20006

or Call: (202) 842-7833

The National Clearinghouse, established by NIEHS, provides information and support services for occupational and environmental health education. The Clearinghouse can provide information about training programs across the country funded by NIEHS Federal training grants.

3. *National Institute for Environmental Health Sciences (NIEHS) Training Grant Program, Technical Workshop on Training Quality Report: Minimum Criteria for Worker Health and Safety Training for Hazardous Waste Operations and Emergency Response (1990).*

4. "Accreditation of Training Programs for Hazardous Waste Operations," Proposed Standard, (55 FR 2776, January 26, 1990).