

40-Hr HAZWOPER Module 1

Introduction and Overview

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Section 1.1 Introduction to HAZWOPER

Improper management and handling of hazardous materials (HAZMATs) can have negative effects on the environment, cause harm to people's health, and even lead to fatalities. It's important for workers who handle HAZMATs to learn proper management and handling techniques in order to prevent incidents where these materials are released into the environment.

It can be challenging to define hazardous waste and the process of regulating it is complex. The Resource Conservation and Recovery Act (RCRA), passed in 1976, provided a framework for proper management of hazardous waste from "cradle to grave," including creation, transportation, treatment, storage, and disposal. The Occupational Safety and Health Administration (OSHA) developed the Hazardous Waste Operations and Emergency Response regulations (HAZWOPER) and the Hazard Communication Standard (HCS) to protect workers who may come into contact with HAZMATs during cleanup work, at hazardous waste facilities, or when responding to emergencies. HAZWOPER and HCS are published in the 29 Code of Federal Regulations (CFR) § 1910.120 and 1910.1200, respectively. Note that the HAZWOPER standard is the same for general industry as it is for the construction industry. Table 1.1 below summarizes how hazardous waste regulations have evolved over time.

Table 1.1 Hazardous Waste Regulations Have Evolved Over Time

1970	Occupational Safety and Health Act (OSH Act)	Established Occupational Safety and Health Administration.
1976	Resource Conservation and Recovery Act (RCRA)	This act set rules for how hazardous waste is created, moved, handled, and disposed of.
1980	Comprehensive Environmental Response, Compensation, and Liability Act. CERCLA (Also called the Superfund)	This act created a system for dealing with unexpected spills of hazardous waste and for addressing environmental harm caused by hazardous waste disposal sites that were not controlled or abandoned prior to the RCRA's establishment.
1983	Hazard Communication Standard (HCS)	HCS required manufacturers and importers of chemicals to evaluate the hazards associated with the chemicals they produce and distribute.
1986	Superfund Amendments and Reauthorization Act (SARA)	SARA title 1 required federal OSHA to issue regulations protecting workers engaged in hazardous waste operations
1990	Hazardous Waste Operations and Emergency Response Standard (HAZWOPER)	This Standard laid out guidelines for employers who work with hazardous waste or respond to emergencies involving the release of hazardous substances, in order to ensure the health and safety of those involved.
2012	HazCom2012 or HCS2012	Adopted the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) to improve safety and health of workers.

The HAZWOPER regulations apply to employers engaged in five categories of work operations mentioned in 29 CFR 1910.120(a)(1)(i-v), which are:

- i. Clean-up operations required by a government body, whether federal, state, local or any other involving hazardous substances that are conducted at uncontrolled hazardous waste sites.
- ii. Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976.
- iii. Voluntary clean-up operations at sites identified by governmental bodies as uncontrolled hazardous waste sites.
- iv. Treatment, storage, and disposal facilities operations that involve hazardous waste operations, for instance, a landfill that accepts hazardous waste.
- v. Emergency response operations that involve the release of hazardous substances, for instance, a chemical spill at a manufacturing plant.

Note that these can be grouped into three categories: clean-up operations, TSD facilities, and emergency response.

1.1.1 Hazardous Substances

According to the Environmental Protection Agency (EPA), hazardous substances are chemicals that must be reported if they are released into the environment in certain quantities. The EPA determines the level of involvement necessary based on the potential threat to the environment. The EPA regulates over 500 types of hazardous substances under the Resource Conservation and Recovery Act. A list of the hazardous substances identified by the EPA can be found in Title 40, CFR, Part 302, Table 302.4.

OSHA defines hazardous substances in Title 29, CFR Part 1910.120. According to OSHA, hazardous substances are any substances that can have adverse effects on the health or safety of employees through exposure.

Hazardous waste, which is often referred to as hazardous substances in the HAZWOPER standard, is waste that has properties that can be dangerous or have a harmful effect on human health or the environment. This type of waste can come in many forms, including liquids, solids, gases, and sludges, and is generated from various sources such as industrial manufacturing processes, batteries, and other activities.

What is Solid Waste?

According to the RCRA, "solid waste" refers to any garbage, refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material resulting from industrial, commercial, mining, agricultural operations, and community activities. In essence, almost everything we do leaves behind some form of waste.

The definition of solid waste is not limited to wastes that are physically solid. Many solid wastes are liquid, semi-solid, or contain gaseous material. A solid waste is any material that is discarded by being abandoned, inherently waste-like, a discarded military munition, recycled in certain ways, or is not excluded from the definition of solid waste under specific exclusions listed in 40 CFR section 261.4(a). To be considered abandoned, a material is thrown away, disposed of, burned, incinerated, or sham recycled.

Some materials pose such a threat to human health and the environment that they are always considered solid wastes, and these materials are labeled "inherently waste-like". Examples of inherently waste-like materials include certain dioxin-containing wastes.

Military munitions are considered solid wastes when they are abandoned, treated prior to disposal, rendered non-recyclable or non-usable through deterioration, or declared a waste by an authorized military official. Used munitions may also be solid waste if collected for storage, recycling, treatment, or disposal.

A material is recycled if it is used or reused, reclaimed, or used in certain ways, such as used in or on the land in a manner constituting disposal, burned for energy recovery, or accumulated speculatively. Many exclusions to the definition of solid waste are related to recycling.

Materials that do not meet this definition are not considered solid wastes and are not subject to RCRA regulation.

Identifying a Hazardous Waste

To be considered a hazardous waste, a material must first meet the definition of solid waste but not all solid wastes are considered hazardous wastes. If a material is excluded from the definition of solid waste, it is not subject to hazardous waste regulation under RCRA subtitle C. There are several reasons why certain materials are excluded from the definition of solid waste, such as public policy, economic impact, regulation by other laws, lack of data, or impracticality of regulation. Examples of materials that are not considered solid wastes and therefore not subject to RCRA subtitle C regulation include pulping liquors, spent sulfuric acid, radioactive waste, domestic sewage, and some scrap metal.

The EPA has developed a regulatory definition and process to identify hazardous waste. This process includes identifying specific substances known to be hazardous and providing objective criteria for including other materials in the regulated hazardous waste universe. This identification process can be very complex, so the EPA encourages waste generators to approach the issue using a series of questions.

The first step in this process is to determine if a material is a solid waste, as it must be classified as such to be considered a hazardous waste. The second step examines whether the waste is specifically excluded from regulation as a solid or hazardous waste.

Once a generator determines that their waste meets the definition of solid waste, they investigate whether the waste is a listed or characteristic hazardous waste (refer to the figure below). Note that some facilities may petition the EPA to delist their waste from regulation under the Resource Conservation and Recovery Act Subtitle C.

Figure 1.1 Solid Waste Classification



1.1.2 Evaluating and Classifying Hazardous Substances

In order to ensure the safety of employees when handling chemicals in the workplace, it is crucial for employers to provide comprehensive information about the identities and hazards associated with these chemicals. The purpose of the HCS is to ensure the classification of hazards for all chemicals produced or imported and the transmission of hazard information to employers and employees. This includes developing a written Hazard Communication Program, listing hazardous chemicals, labeling containers, preparing Safety Data Sheets (SDSs), and providing employee training. The classification process includes identifying hazards associated with a chemical, deciding whether it meets the definition of a hazardous chemical, and determining the appropriate hazard classes and categories.

The HCS mandates that employers and manufacturers develop and distribute chemical information following specific guidelines.

In 2012, the HCS was aligned with the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS), which offers several significant advantages, including:

1. Consistent Classification and Communication

The GHS provides a uniform and coherent approach to classifying chemicals and conveying hazard information through labels and Safety Data Sheets. This promotes

consistency in the understanding of hazards among different stakeholders.

2. Improved Hazard Information

By adopting the GHS, the quality and consistency of hazard information in the workplace are enhanced. This ensures that workers have access to accurate and standardized information, enabling them to take appropriate safety precautions.

3. Reduced Trade Barriers

The implementation of a globally harmonized system for chemical classification and labeling helps to reduce trade barriers. It simplifies the process of exchanging chemical information between different countries and facilitates international trade.

4. Productivity Enhancements

Businesses that handle, store, and use hazardous chemicals on a regular basis benefit from the consistent application of hazard communication standards. The harmonization of chemical labeling and classification systems leads to increased productivity and operational efficiency.

5. Cost Savings

Adhering to the GHS requirements for updating SDSs and labels for classified chemicals results in cost savings for businesses. It streamlines the process of periodic updates and ensures compliance with the latest hazard communication standards.

By following the HCS and aligning with the GHS, employers can effectively communicate chemical hazards, protect their workers, and promote a safer work environment.

The HCS applies to chemicals present in the workplace that may expose employees under normal conditions of use or in foreseeable emergencies. A foreseeable emergency refers to potential occurrences such as equipment failure or uncontrolled release of a hazardous chemical. If a hazardous chemical is known to be present by the chemical manufacturer or the employer, it is covered by the standard. A hazardous chemical is defined as one classified as a physical hazard, health hazard, simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified. It includes chemicals employees may be exposed to during normal operations or in emergencies. Office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered. However, employees operating equipment that involves hazardous chemicals as part of their work duties are covered by the provisions of the HCS.

The HCS does not apply to certain substances and situations. These exceptions include:

- Regulated hazardous waste during remedial or removal action.
- Tobacco or tobacco products
- Wood or wood products that are not processed or treated with hazardous chemicals (except when generating dust)

- Manufactured items that have a specific shape or design and do not release significant amounts of hazardous chemicals during normal use
- Food, alcoholic beverages, and cosmetics intended for personal consumption or retail sale
- Consumer products used in the workplace as intended by the manufacturer, with exposure levels comparable to consumer use
- Nuisance particulates that do not pose health or physical hazards
- Ionizing and non-ionizing radiation
- Biological hazards

Chemical manufacturers, distributors, and importers have different requirements than employers who use manufactured chemicals. Manufacturers and importers must evaluate and classify the chemicals they produce or import according to the HCS. Employers are not required to classify chemicals unless they choose not to rely on the classification provided by the manufacturer or importer. Employers have responsibilities such as proper labeling, maintaining SDSs, providing information and training, and developing a written Hazard Communication Plan. Manufacturers, importers, and employers must consider available scientific literature and evidence when classifying chemicals.

1.1.3 Hazardous Waste Sites and Generators

A hazardous waste site is an area (land or water) contaminated by hazardous waste that poses a risk to human health or the environment. Abandoned or uncontrolled hazardous waste sites that EPA identifies for cleanup are known as Superfund sites. Such sites can be on public or private property.

Many businesses produce hazardous waste as a byproduct of their operations, and they typically store it temporarily before sending it to a facility that specializes in treating, storing, or disposing of hazardous waste (known as a TSD facility).

The term "generator" refers to any individual or organization that produces hazardous waste as listed or characterized in part 261 of title 40 of the CFR. The amount of hazardous waste generated in a calendar month determines which regulations apply to the generator.

Under RCRA, hazardous waste generators are the first link in the hazardous waste management chain. It is the responsibility of generators to determine if their waste is hazardous and to ensure that it is properly managed and treated prior to recycling or disposal. Generators must document that the hazardous waste they produce is appropriately identified, managed, and treated. After generation, hazardous waste transporters can move the waste to a facility that can recycle, treat, store, or dispose of it. Treatment, storage, and disposal facilities (TSDFs) provide temporary storage and final treatment or disposal for hazardous waste. Because TSDFs manage large volumes of waste and conduct activities that may present more risk, they are stringently regulated.

To account for variations in the amount of hazardous waste generated, the EPA has established three categories of generators in its regulations:

Very Small Quantity Generators (VSQGs) produce 100 kilograms or less of hazardous waste each month, or one kilogram or less of acutely hazardous waste. VSQGs are required to:

- Identify all hazardous waste generated.
- Accumulate no more than 1,000 kilograms of hazardous waste at any time.
- Ensure that hazardous waste is delivered to an authorized person or facility for management.

Small Quantity Generators (SQGs) produce more than 100 but less than 1,000 kilograms of hazardous waste per month.

- SQGs can store hazardous waste on-site for up to 180 days without a permit (or 270 days if shipping distance is greater than 200 miles).
- On-site hazardous waste must never exceed 6,000 kilograms.
- SQGs must comply with hazardous waste manifest requirements of 40 CFR part 262, Subpart B and pre-transport requirements at 40 CFR §§262.30 through 262.33.

SQGs must follow specific regulations when managing hazardous waste in tanks or containers, which are detailed in 40 CFR §§262.16(b)(2) and (3). They must also comply with preparedness and prevention requirements outlined in 40 CFR §§262.16(b)(8) and (9), as well as land disposal restriction requirements found in 40 CFR part 268.

In the event of an emergency, at least one employee must be available to respond and act as the emergency coordinator. While SQGs are not required to have detailed, written contingency plans, they are responsible for coordinating any necessary emergency response measures.

Large Quantity Generators (LQGs) are those that produce 1,000 kilograms or more per month of hazardous waste or more than one kilogram per month of acutely hazardous waste. They are allowed to keep the hazardous waste on their premises for up to 90 days before shipping it to a TSD facility. There are certain exceptions to this rule, and LQGs do not have a limit on the amount of hazardous waste they can accumulate on-site.

Hazardous waste generated by LQGs must be managed in tanks, containers, drip pads or containment buildings that meet the requirements outlined in 40 CFR §§ 262.17(a)(1)-(4). In particular, drip pads and containment buildings must meet the requirements of 40 CFR part 265, subparts W and DD, respectively.

LQGs must comply with the hazardous waste manifest requirements at 40 CFR part 262 subpart B and the pre-transport requirements at 40 CFR §§ 262.30 through 262.33. Additionally, they must comply with the preparedness, prevention and emergency procedure requirements at 40 CFR part 262 subpart M and the land disposal restriction requirements at 40 CFR part 268. LQGs are also required to submit a biennial hazardous waste report.

For a complete description of generator regulations, refer to 40 CFR part 262.

1.1.4 HAZWOPER Training

Proper training is essential for employee safety when working with hazardous substances. Employees need to be aware of the site hazards, how to recognize them, and how to control their exposure. The most effective way to train employees is through a combination of classroom instruction, site-specific information, and supervised fieldwork.

Before beginning work at the site, employees must receive appropriate training to ensure their safety. While offsite training is an option, it is crucial to ensure that employees can apply their training to the specific conditions at the site.

Here's what employees need to know:

- The hazards present at the site and how to recognize them.
- The risks associated with exposure to hazardous substances and how to minimize them.
- Medical surveillance requirements
- Decontamination procedures
- How to contain leaks and spills of hazardous substances
- How to use personal protective equipment (PPE) properly and effectively.
- The site-specific emergency response procedures and evacuation plans.
- The safe work practices and procedures to follow at the site.
- The importance of following the chain of command and communicating effectively with other workers and supervisors.

Employees in higher-risk jobs need more training than those in lower-risk jobs. The following table summarizes their initial and refresher training needs:

Table 1.2 Summary of HAZWOPER Training Requirements

Job Category	Initial Training	Refresher Training
Uncontrolled hazardous waste site workers	40 hours	8 hours annually
Workers who handle hazardous waste in a TSD facility	24 hours	8 hours annually
Workers who visit a TSD facility occasionally for a limited task	8 hours	No annual refresher required, but training must be job-specific
Managers and supervisors	8 hours	No annual refresher required, but training must be job-specific
On-site managers and supervisors who are directly responsible for or who supervise	40 hours of off-site instruction and 3	8 hours of annual refresher training

workers engaged in hazardous waste operations.	days of field experience	
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Employees who have received 24 hours of off-site training and are either general site workers or required to wear respirators need additional training. They must complete a total of 40 hours of off-site instruction and three days of field experience.

Once employees have finished their training and field experience, they must receive a written certificate before beginning work at the site.

Employees who already have work experience or training that meets the initial HAZWOPER training requirements must still receive site-specific training and appropriate supervised field experience at the new site.

1.1.5 Medical Surveillance

To ensure employee safety, medical surveillance may be necessary for those who are exposed to hazardous substances during their work. This includes regular medical exams and consultations for individuals who may be at risk of overexposure to such substances. The following table outlines which employees are required to undergo medical surveillance.

Table 1.3 Summary of HAZWOPER Medical Surveillance

Employee Type	Medical Surveillance
Employees who may be exposed to hazardous substances at or above Permissible Exposure Limits (PELs) or published exposure levels for 30 or more days a year.	<ul style="list-style-type: none"> • Before assignment • Every 12 months unless the physician recommends a longer interval (not to exceed 24 months) • At termination of employment and reassignment
Employees who wear a respirator for 30 or more days a year or who are required by 1910.134, Subdivision 2/I to wear a respirator. Members of HAZMAT teams.	<ul style="list-style-type: none"> • Immediately after reporting symptoms indicating overexposure
Employees who show symptoms of overexposure to hazardous substances.	<ul style="list-style-type: none"> • As soon as possible after an employee reports symptoms • When a physician determines that an examination is necessary

Some key points about the medical examination are:

- The health assessment should be conducted under the guidance of a licensed medical practitioner.
- The doctor should be well informed about the worker's responsibilities, their exposure to harmful substances, and the personal protective gear they utilize.
- A written report of the physician's findings should be provided to the employee.
- The employer is obliged to maintain records of the health assessment, which include the employee's name and the doctor's written judgment regarding the employee's health suitability to perform hazardous waste tasks or to use respiratory protection.

1.1.6 Who is Responsible for HAZWOPER Regulations

To ensure employee safety and health at the site, it's crucial to identify the individuals responsible for it. Here are some of the roles to consider:

- Site Safety and Health Officer (SSHO): responsible for developing the site-specific Safety and Health Program and ensuring compliance with HAZWOPER requirements.
- General supervisor: responsible for directing site operations.
- Emergency responders: qualified individuals responsible for responding to emergencies.
- Contractors and subcontractors: responsible for complying with HAZWOPER requirements.

Section 1.2 HAZWOPER for Cleanup Operations

The employer involved in cleaning up, handling, or processing hazardous substances at a hazardous waste site, must comply with all parts of HAZWOPER except 1910.120 (p) and (q).

Cleanup operations involve employees who remove, contain, incinerate, neutralize, stabilize, process, or handle hazardous substances at a hazardous waste site to make it safe for people or the environment.

There are three kinds of cleanup operations:

1. Cleanup operations required by a government agency at an uncontrolled hazardous waste site
2. Corrective actions that involve cleanup at sites covered by RCRA
3. Voluntary clean-up operations

Voluntary means a government agency recognizes that a site contains hazardous substances that may pose a safety or health threat to workers or the environment until it is controlled.

These operations include those hazardous substance operations under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (CERCLA), including initial investigations at CERCLA sites before the presence or absence of hazardous substances has been determined.

Examples of types of uncontrolled hazardous waste sites that would be covered by HAZWOPER include those:

- Listed or proposed for listing on the National Priority List (NPL)
- Listed or proposed for listing on a state priority list
- Identified or listed by a governmental agency as an uncontrolled hazardous waste site (this includes voluntary cleanup operations)
- Regulated as a corrective action covered by the Resource Conservation and Recovery Act

1.2.1 Safety and Health Program

The main requirement for conducting cleanup operations under HAZWOPER is to have a written Safety and Health Program that outlines the policies, practices, and procedures to be followed by employees. The program should also establish a chain of command that links the person in charge of overall site operations to those responsible for specific tasks, including a general supervisor, a site safety-and-health supervisor, those involved in cleanup operations, and those who will respond to emergencies.

If there is an existing written workplace Safety and Health Program in place, the employer does not need to develop another one specifically for cleanup operations. But the site-specific program must address site conditions and include information about the worksite organizational structure, a comprehensive work plan, a site-specific Health and Safety Plan (HASP), a safety and health training program, a medical surveillance program, and standard operating procedures for safety and health.

Employees and contractors must be informed of the chemical, physical, and toxicological properties of the hazardous substances they may encounter on the site before beginning work. This information should be included in the written program.

1.2.2 Emergency Response Plan

Your written program must ensure that site employees know what to do in case of an emergency such as fire, personal injury, or chemical release. If local emergency responders like the fire department are relied upon for services, you must ensure that they can appropriately respond to fire, personal injury, and chemical releases. In case they cannot provide the necessary services, you must find responders who can. Your Emergency Response Plan must coordinate with the local Emergency Response Plan within your state or district.

Your Emergency Response Plan must include:

- Description of possible emergencies at the site
- Roles and authority of emergency personnel
- Communication procedures during emergencies

- Procedures for reporting emergencies to local, state, and federal government agencies
- Emergency zones, safe distances, and evacuation areas at the site
- Security and control measures for emergencies
- Site evacuation procedures and routes

1.2.3 Preliminary Site Evaluation

Before employees start cleanup work at a new site, a qualified person designated for the task must conduct a preliminary evaluation. This evaluation aims to identify potential hazards and determine the necessary measures to protect employees using engineering controls, work practices, and personal protective equipment.

The evaluation should focus on areas that pose an immediate danger to life and health (IDLH) or exceed published exposure levels. After employees start working at the site, the qualified person must conduct another evaluation of the site to ensure ongoing safety.

When evaluating a site, it is essential to consider various factors related to employee safety and health, including:

- The hazards present at the site, such as the physical or chemical properties of hazardous substances and the ways employees could be exposed to them.
- The health and safety risks associated with exposure to hazardous substances, which can have long-term effects on employees.
- Potential locations where hazardous substances could leak and cause harm to employees or the environment.
- The site's location, size, topography, and access, which can affect how employees perform their tasks and respond to emergencies.
- The specific tasks that employees will perform at the site and the estimated time required to complete them.
- The qualifications of emergency responders who can handle potential accidents or incidents, as well as their approximate response times.
- The personal protective equipment that employees will need to do their jobs safely and effectively.

1.2.4 Site Control

Site control is a critical aspect of ensuring employee safety when working with hazardous substances. The following factors are essential for effective site control:

- A map of the site that clearly identifies contaminated areas to prevent accidental exposure.
- Identified work zones that prevent unauthorized workers from entering contaminated areas and effectively contain hazardous substances.

- Written communication and safe work procedures for each work zone to ensure that employees understand the risks and necessary precautions.
- A written procedure for a buddy system, where workers are paired to provide mutual assistance during emergencies. Buddies do not need to work for the same employer, but they should have similar training and equipment and be aware of their responsibilities under HAZWOPER.
- Written procedures for warning employees about emergencies to help them respond quickly and appropriately.
- The name and contact information of the nearest emergency medical responder to enable prompt medical attention if needed.

1.2.5 Engineering Controls

To reduce exposure to safe levels, you can control the work environment with engineering controls. Safe-work practices and personal protective equipment are less effective but can be combined with engineering controls to protect employees.

Sanitary Facilities and Water Management

A policy must be included in the written program to ensure that the site has access to potable water and appropriate toilet, washing, and showering facilities. Employees must have access to an adequate supply of drinking water on the site. Employers should provide water in clearly labeled closed portable containers with taps that are used exclusively for drinking water. Disposable cups should be provided in sanitary containers, and employees must dispose of them in separate containers. Non-potable water outlets must be clearly labeled to prevent their use for drinking, washing, or cooking. Toilets must be available to employees on the site. The types of toilets allowed include chemical, recirculating, combustion, or flush toilets. Toilet doors must have locks that can be controlled from the inside. Handwashing facilities must be available to employees working in areas that expose them to harmful contaminants. Shower facilities and change rooms must be provided on the site if employees do cleanup work for at least six months and may be exposed to hazardous substances. Showers and change rooms must be located in areas where exposures are below permissible exposure limits and published exposure levels. Employees must shower at the end of their work shifts or before leaving the site.

PPE

If employees use PPE (which includes respirators) during hazardous waste operations, your written Safety and Health Program must ensure the following:

- Equipment is selected to protect employees against site-specific hazards.
- Employees maintain and store the equipment properly.
- Equipment is decontaminated and disposed of properly.
- Employees are trained to use, wear, and inspect equipment.

- Equipment fits employees who use it.

To ensure employee safety, medical surveillance may be necessary for those who are exposed to hazardous substances during their work. This involves regular medical exams and consultations for individuals who may be at risk of overexposure to such substances. Refer to Table 1.3 that outlines which employees are required to undergo medical surveillance.

New Equipment/Technology

New technology refers to the latest products and equipment that manufacturers develop to ensure the safety of workers who perform hazardous waste cleanup operations. Your written program should instruct employees to assess these new products and equipment when replacing current ones or acquiring new ones.

Air Monitoring

Air monitoring is an important practice to determine the level of air contamination in areas where employees are potentially exposed to hazardous substances. It is mandatory to conduct monitoring during the site's initial entry and clean-up. Two types of air monitoring are personal sampling/monitoring and area sampling/monitoring. Personal sampling/monitoring measures individual employee exposures by sampling the air they breathe. Area sampling/monitoring, on the other hand, estimates exposures affecting groups of employees by testing the air for contaminants in specific locations or areas.

Employers are responsible for establishing a monitoring policy that applies to the site's conditions. This policy should describe what will be monitored, the monitoring equipment to be used, and the frequency of monitoring. Additionally, employers must specify the concentrations of airborne contaminants that will trigger the reevaluation of the site's engineering controls, safe work practices, and PPE to ensure their effectiveness.

To ensure the safety of employees, air monitoring should be conducted at the beginning of the work and whenever hazardous conditions, or atmosphere are suspected. This is to immediately identify any condition that may pose an immediate danger to life and health or expose employees to hazardous levels of substances. During the cleanup phase of the hazardous waste operation, personal sampling should be used to monitor employees who are at higher risk of exposure to hazardous substances.

Lighting

To ensure employee safety, it is important to provide adequate lighting for their work. The following table provides the minimum illumination intensities in foot-candles for different areas in hazardous waste operations. Note that foot-candles (the standard unit for measuring illumination) is the amount of light produced by one candle at a distance of one foot. A light meter is typically used to measure illumination.

Table 1.4 Summary of Lighting Recommendations

Foot-candles	Work area
5	General work areas
3	Excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas
5	Indoors
5	Tunnels, shafts, and general underground work areas
10	Shop areas
30	First-aid stations, infirmaries, and offices

1.2.6 Handling Hazardous Materials

If there are drums or containers on the hazardous waste site that need to be moved, inspect them first for leaks or signs of weakness. Even unlabeled containers should be considered to contain hazardous materials. Do not move containers that show signs of weakness, bulging, swelling, or contain radioactive waste until exposure risks have been assessed.

Containers should be stored in a way that minimizes the need to move them, and they should never be used as work platforms or stood upon. When handling containers in flammable atmospheres, only use explosion-resistant equipment.

To control leaks and spills, establish a procedure to contain them and ensure that employees are trained and have the appropriate containment equipment. Salvage containers and absorbents should be readily available at the site.

When opening hazardous waste containers, use caution with pressurized contents, and open them from a remote location or use appropriate shielding. Only specially trained employees should open laboratory waste packs. Consider unidentified laboratory waste or any laboratory waste pack with crystallized material on the outside as shock-sensitive.

For shock-sensitive waste, evacuate all nonessential employees from the area, sound an alarm to warn others, and use handling equipment with explosion-resistant shields or barriers. Handlers must also ensure continuous communication with the site's Safety and Health Officer.

For work operations where employees handle chemicals in sealed containers that are not opened under normal conditions (e.g., in warehousing or retail sales), employers must:

- Ensure labels on incoming containers are not removed or defaced.
- Keep copies of Safety Data Sheets received with incoming shipments.
- Obtain Safety Data Sheets for sealed containers that lack them.
- Make Safety Data Sheets readily accessible during each work shift.
- Provide information and training on the hazards of the chemicals used.
- Protect employees in the event of spills or leaks from sealed containers.

Decontamination

The written Hazard Communication Program should have procedures that ensure employees exposed to hazardous substances decontaminate themselves and contaminated equipment, including PPE, or dispose of them properly. Decontamination must be done in designated areas to reduce the exposure of uncontaminated employees or equipment. If employee clothing is sent to a commercial laundry facility, the laundry facility should be informed about the hazardous substances that may be on the clothing.

Section 1.3 HAZWOPER for TSD Facilities

TSD facilities are facilities that handle hazardous waste, either by treating, storing, or disposing of it, and are required to have a permit or interim status from the EPA under the RCRA regulations. If a TSD facility has obtained such a permit or interim status, it must implement several programs to ensure safety, health, and proper handling of hazardous waste, including a Safety and Health Program, medical surveillance program, decontamination program, new technology program, material handling program, training program, and emergency response program.

Any area of a facility that is not covered by the permit or interim status but could potentially have uncontrolled releases of hazardous substances must develop a formal Emergency Response Plan. However, employers who will evacuate their employees from the danger area during an emergency and who do not allow any employees to assist in handling the emergency are exempt from the requirements of an Emergency Response Plan if they provide an Emergency Action Plan in accordance with 29 CFR 1910.38.

1.3.1 Safety and Health Program

Employers are obliged to create a written Safety and Health Program designed to safeguard employees who might be exposed to hazardous substances at the TSD facility. The objective of this program is to ensure that the employer recognizes, assesses, and manages safety and health risks while also providing a prompt response to emergencies.

1.3.2 Facility Evaluations

In situations where employees start working at a location other than the usual facility, a suitably qualified individual should conduct an initial site evaluation. This evaluation aims to identify the specific hazards that employees may encounter and determine the necessary engineering controls, work practices, and personal protective equipment that will ensure their safety. This evaluation should highlight areas that pose an IDLH, areas where exposure levels exceed the published limits, and zones where exposure is above radioactive dose thresholds.

Once employees have begun working on the site, a comprehensive site evaluation should be conducted by the qualified individual. Criteria for this evaluation include:

- The site's hazards, including hazardous substances' physical or chemical properties and potential exposure routes.
- Health and safety risks employees face due to exposure to hazardous substances.
- Areas where hazardous substances could potentially leak.
- The site's location, size, topography, and accessibility.
- The tasks employees perform on the site and the time it takes to complete those tasks.
- The qualifications of emergency responders and their estimated response times.
- The PPE necessary for employees to perform their tasks safely.

Before employees commence work at the site, the employer should educate them about the chemical, physical, and toxic properties of any hazardous substances they may encounter.

1.3.3 Controlling the Hazards

The most effective way to control hazards is through engineering controls, which involve physically modifying the work environment to reduce exposure levels. If engineering controls alone aren't enough, they should be combined with safe work practices. If this combination still doesn't suffice, the final option is to provide appropriate PPE to lower worker exposure to safe levels.

In the event that employees use PPE (including respirators) during hazardous waste operations, your written program should ensure the following:

- The chosen equipment is designed to protect employees against the specific hazards of the site.
- Employees properly maintain and store the equipment.
- Employees are aware of the limitations of the equipment.
- The equipment is correctly decontaminated and disposed of.
- Employees receive training on how to use, wear, and inspect the equipment.
- The equipment fits the employees who will be using it.

1.3.4 Decontamination

Decontamination procedures at hazardous waste sites are an integral part of the unique Safety and Health Plan for each site. Therefore, these procedures need to be designed, shared with employees, and put into action prior to workers stepping onto a hazardous waste site. The designated Site Safety and Health Officer (SSHO) must ensure and oversee the decontamination of workers, or the cleaning and disposal of their clothing and equipment, along with any solvents used for the decontamination, before they depart from the work area.

- Should a worker's absorbent clothing be significantly contaminated with hazardous substances, they must promptly remove such clothing and shower immediately.

- Water-resistant protective clothing must undergo decontamination before a worker takes it off.
- To ensure its continued effectiveness, protective clothing and equipment must undergo decontamination, cleaning, maintenance, or replacement when necessary. Anyone tasked with laundering or cleaning such items should be informed by the employer about the potential risks associated with exposure to hazardous substances.
- Workers who are mandated to shower after their shift must be provided with suitable shower facilities and changing rooms.

1.3.5 Handling Drums or Containers

When dealing with drums or containers at the facility requiring relocation — whether they're buried or above ground — a preliminary inspection is necessary to detect any leaks or structural weaknesses. Treat all unlabeled containers as if they contain hazardous materials. Organize the storage of these containers in such a way that minimizes frequent movements, and refrain from using them as stepping stools or work surfaces. The machinery employed for shifting containers should be carefully chosen and operated to limit the risk of igniting vapors from compromised containers.

- **Managing leaks and spills:** Develop a protocol for handling leaks or spills, ensuring that all employees are well-trained and have access to necessary containment equipment. Salvage containers and absorbents should always be readily available on site. Avoid moving containers that exhibit signs of structural weakness, like bulging or swelling, and refrain from relocating radioactive waste until potential exposure risks have been evaluated.
- **Sending and moving containers:** Prior to shipping, all containers should be properly identified and categorized. Limit the number of container holding areas and ensure that these areas are easily accessible. Only place hazardous wastes into large-scale containers once it's confirmed to be safe to proceed.

1.3.6 Emergency Response Plan and Emergency Action Plan

Your emergency strategy needs to incorporate a framework that provides the necessary knowledge for workers to respond effectively to an emergency situation at the facility. The specifications of your emergency response framework depend on whether the employees are expected to evacuate the premises or participate in managing the crisis. If the protocol is to evacuate the employees during a crisis without involving them in the response procedure, you should refer to the stipulations in 29 CFR 1910.38, Emergency Action Plans. Otherwise, refer to the stipulations in 29 CFR 1910.120(q), Emergency Response Plans.

Table 1.5 Summary of Emergency Response Requirements

Type of Emergency Response	Emergency Response Requirement
Employees are evacuated during an emergency and do not assist in responding to the emergency.	Emergency Action Plans in 29 CFR 1910.38
Employees remain on site during an emergency or assist in responding to an emergency.	Emergency Response Plans 29 CFR 1910.120(q)

In the event that your employees stay on site or assist in managing an emergency, your Emergency Response Plan should encompass the following aspects:

- Collaborative planning and coordination with external responders.
- Determination of staff roles, authority chains, and communication processes.
- Identification of potential emergencies and their prevention measures.
- Safe distances and refuge points.
- Control and security of the site.
- Routes and protocols for evacuation.
- Procedures for emergency decontamination.
- Emergency medical assistance and first aid.
- Procedures for emergency communication.
- Essential emergency gear, including PPE.
- Criteria for evaluating the Emergency Response Plan.

Section 1.4 HAZWOPER for Emergency Response Operations

As mentioned earlier, HAZWOPER is also applicable to incidents involving the release, or considerable threat of release, of hazardous substances, regardless of the location. Those employees encompassed within the remit of HAZWOPER include initial responders such as members of the HAZMAT team, firefighting and rescue staff, law enforcement officers, and medical personnel who may be called upon during emergency releases.

Emergency response operations are designed to deal with situations where hazardous substances are released in an uncontrolled manner. This can be done by trained employees from outside an immediate release area at a production facility, trained responders from a fire department, or contracted HAZMAT responders. If employees are expected to respond to emergencies involving hazardous substances, regardless of where they occur, then the HAZWOPER for Emergency Response Operations guidelines in CFR 1910.120(q) must be followed.

It's worth noting that situations where hazardous substances are already controlled at the time of release by those in the immediate area or by maintenance personnel, as well as responses to

incidental releases of hazardous substances that can be absorbed, neutralized, or otherwise controlled by those in the immediate release area, are not considered emergency response operations.

Specific mandates under the HAZWOPER standard for response operations include:

- The assignment of a leader, known as the Incident Commander, to assess site conditions, determine appropriate hazard control strategies, and decide on the suitable use of PPE.
- The designation of a Safety Officer whose role is to guide and support in safeguarding the operations of the response team.
- Restricting personnel in the incident zone and related hazardous areas to those who are actively involved in emergency response operations.
- Backup personnel equipped with necessary tools be on standby to assist or perform rescue operations if required.

Emergency responders can efficiently handle and control an incident by carrying out six key activities, summed up using the mnemonic "HAZMAT" as follows:

Table 1.6 "HAZMAT" Mnemonic Device

Hazard Identification	Preliminary evaluation prior to entry
Action Plan	Steps to respond to or control the release
Zoning	Controlling the risk and securing the scene.
Managing the incident	Implementing the Incident Command System.
Assistance	Reporting and determining additional resources needed.
Termination	Decontamination, post-incident analysis, and medical surveillance.

1.4.1 Emergency Preparedness Plan

An Emergency Preparedness Plan (EPP) must be constructed and activated before employees are permitted to partake in the response to a hazardous substance release. This plan should encompass all potential worst-case scenarios.

If an organization necessitates its employees to participate in responding to emergencies, a detailed EPP must be curated, incorporating the following components:

- Anticipatory planning and collaboration with external entities
- Clear definition of personnel roles, lines of authority, and communication channels
- Specifications for PPE and emergency apparatus
- Procedures for recognizing and avoiding emergencies
- Guidelines for safe zones and shelter areas
- Measures for site security and regulation
- Evacuation procedures and routes

- Decontamination procedures
- Emergency medical care and first aid provisions
- Protocols for emergency alerting and response
- A review of the response and follow-up procedures
- An Incident Command System
- Medical monitoring provisions
- Guidelines for using chemical-protective clothing
- Procedures for post-emergency response operations
- Training on all the aforementioned aspects

1.4.2 Emergency Action Plan

As previously referenced, in circumstances where an employer elects to evacuate all personnel during an emergency and does not allow their staff to participate in emergency response actions, it's the responsibility of the employer to formulate an Emergency Action Plan (EAP), also called Emergency Evacuation Plan (EEP). This plan aims at ensuring the safe evacuation of the workforce and mandates that the training provided to employees is in line with the regulations set forth in 29 CFR 1910.38.

1.4.3 Incident Command System

Given that local emergency response teams like police and fire departments are typically the first to respond to an incident, HAZWOPER necessitates the establishment of an Incident Command System (ICS). This is a universally applied approach to the command, control, and coordination of emergency response. It is designed to be adaptable and effective across different types of incidents and organizational structures, not limited by jurisdictional boundaries.

The main objective of implementing the ICS is to enhance safety, diminish confusion, ensure orderly and coordinated response efforts, and ultimately, efficiently manage the emergency situation.

Incident Commander

The Incident Commander (IC), or the Unified Command in situations with multiple incidents, bears the responsibility for all aspects of the response, which includes establishing incident objectives and overseeing all incident operations. Upon reaching the scene, the IC has numerous duties to attend to. Unless these responsibilities are explicitly assigned to another member of the Command or General Staff, they remain with the IC. The IC's key responsibilities include:

- Setting immediate priorities with a particular focus on ensuring the safety of responders, other emergency workers, bystanders, and individuals involved in the incident.
- Stabilizing the incident by prioritizing life safety and managing resources in an efficient and cost-effective manner.
- Defining the objectives for the incident and the strategy to accomplish these objectives.
- Establishing and supervising the incident organization.
- Approving the execution of the Incident Action Plan, whether communicated in writing or orally.
- Ensuring that sufficient health and safety measures are in place.

If the Safety Officer determines that certain activities present an IDLH or involve a condition of imminent danger, they hold the authority to modify, pause, or cease those activities. The Safety Officer is obligated to promptly notify the person leading the Incident Command System about any necessary actions to mitigate these risks at the emergency site.

General Staff

The General Staff consists of four primary departments: Operations, Planning, Logistics, and Finance/Administration. These responsibilities fall under the Incident Commander until they are delegated to another member. When these responsibilities are separated and assigned to different individuals under the Incident Commander, they are overseen by a section chief who can be supported by other functional units.

- The Operations Department holds the responsibility for all tasks directly linked to the response's primary mission.
- The Planning Department is accountable for collecting, evaluating, and distributing tactical information related to the incident. It also handles the preparation and documentation of Incident Action Plans.
- The Logistics Department is in charge of supplying the necessary facilities, services, and materials needed for responding to the incident.
- The Finance and Administration Department handles all financial, administrative, and cost analysis aspects associated with the incident.

1.4.4 Personal Safety Equipment

Specialists and team members in the HAZMAT team are mandated to be outfitted with the appropriate protective clothing and any necessary accessories. It's crucial that employers adhere to the guidelines set forth in 29 CFR 1910.120(g)(5), the Personal Protective Equipment Program. This document outlines the selection process for PPE and fully encapsulating chemical-protective suits.

Chemical-resistant clothing covers a variety of items, from face shields and gloves to fully encapsulating chemical-protective suits. There are four levels of protection offered by this clothing (details can be found in HAZWOPER 1910.120 Appendix A and B). The levels are A, B, C and D with Level A being the highest level of protection. Level A should be used when the work involves a high potential for splash, immersion, or exposure via vapors, gases, or particulates, to materials harmful to skin or capable of being absorbed through the skin. This part of the emergency response strategy ensures that employees are shielded from biological, physical, or chemical hazards during their response to emergencies. If workers use chemical-protective clothing, your emergency response strategy should guarantee that:

- The clothing is selected based on the specific hazards of the site.
- Employees are maintaining and storing the equipment correctly.
- Employees are aware of the equipment's limitations.
- The equipment is either properly decontaminated or appropriately discarded.
- Employees receive training on how to use, wear, and inspect the equipment.
- The equipment is properly fitted to the employees who wear it.

Employees at risk of exposure to substances that could lead to immediate death, serious diseases, or injuries should wear fully encapsulating chemical-protective suits. These suits should offer Level A protection, including:

- Positive-pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive-pressure supplied-air respirator with an escape SCBA, as approved by the National Institute for Occupational Safety and Health (NIOSH).
- Gloves that are resistant to chemicals.
- Boots that are resistant to chemicals and have a steel toe and shank.
- A disposable protective suit.

1.4.5 Operations Following an Emergency Response

Subsequent to an emergency release, it's frequently necessary to switch from emergency response operations to hazardous substance cleanup activities. Post-emergency cleanup is initiated once the individual in charge of the emergency response declares the site to be under control and ready for cleanup. Two primary groups of employees carry out the post-emergency cleanup:

1. **On-Site Employees:** These are employees who work at the site where the emergency release occurred. These employees typically have a better understanding of the hazardous substances present at the site, the conditions of the site, and the methods to protect themselves appropriately from associated hazards. Such employees do not need HAZWOPER-specific training. However, they must complete the training required by

various standards, including 1910.38 (Emergency Action Plans), 1910.134 (Respiratory Protection), 1910.1200 (Hazard Communication), and other appropriate safety and health training relevant to the tasks they will perform during the cleanup.

2. **Off-Site Employees:** These are employees who do not work at the facility where the release occurred and who arrive after the emergency is declared over. These employees must fulfill the requirements of HAZWOPER 1910.120(b)-(o) and undergo training as per 1910.120(e). In other words, their involvement in the post-emergency cleanup is treated like hazardous waste site cleanup operations as previously discussed in this course.

However, HAZWOPER allows emergency responders who participated in the initial emergency response and were trained as per 1910.120(q)(6), to continue working through the cleanup operation without requiring additional training.

Section 1.5 Worker's Rights and Protections

The Occupational Safety and Health Act of 1970 (OSH Act) was enacted to ensure the safety of workers and prevent workplace-related injuries and fatalities. Under this law, employers are required to provide a work environment that is free from known hazards. The OSH Act established the Occupational Safety and Health Administration (OSHA) to enforce safety and health standards in the workplace, as well as provide training and assistance to employers and workers.

1.5.1 Workers' Rights under the OSH Act

1. **Right to File a Confidential Complaint:** Workers have the right to file a confidential complaint with OSHA to request a workplace inspection if they believe there are safety hazards present.
2. **Right to Information and Training:** Employers must provide workers with information and training about workplace hazards, preventive measures, and the specific OSHA standards applicable to their job. This training should be provided in a language and manner that workers can easily understand.
3. **Right to Access Work-Related Injury and Illness Records:** Workers have the right to review records of work-related injuries and illnesses that occur in their workplace.
4. **Right to Obtain Test Results and Monitoring Data:** Workers are entitled to receive copies of the results from tests and monitoring conducted to identify and measure workplace hazards.
5. **Right to Access Medical Records:** Workers have the right to obtain copies of their workplace medical records.
6. **Right to Participate in an OSHA Inspection:** Workers can participate in an OSHA inspection of their workplace and have the opportunity to privately discuss any concerns with the inspector.

7. **Right to File a Complaint against Employer Retaliation:** Workers can file a complaint with OSHA if they face retaliation from their employer for requesting an inspection or exercising any of their other rights under the OSH Act.
8. **Right to Protection as a Whistleblower:** Workers who report violations of the OSH Act or other federal statutes covered by OSHA jurisdiction are protected from retaliation by their employer.

Employers must respect and uphold these rights to ensure a safe and healthy workplace for their employees. OSHA's ultimate goal is to ensure that every worker returns home unharmed at the end of the workday, which is the most important right of all.

1.5.2 Employer Responsibilities

Employers have a crucial responsibility to ensure a safe workplace for their employees. They must comply with all OSHA safety and health standards and provide working conditions that are free from known hazards. Here are the key responsibilities of employers:

1. **Display the OSHA Poster:** Employers must prominently display the official OSHA poster that describes workers' rights and responsibilities under the OSH Act. The poster can be downloaded for free from the OSHA website.
2. **Inform Workers about Hazards:** Employers must inform their workers about workplace hazards through training, labels, alarms, color-coded systems, chemical information sheets, and other effective methods. The training should be provided in a language and vocabulary that workers can understand.
3. **Provide Training:** Employers must train workers on hazards, prevention methods, and relevant OSHA standards applicable to their job. This training must be conducted in a language and manner that workers can comprehend.
4. **Keep Records:** Employers are required to maintain accurate records of work-related injuries and illnesses. These records help identify patterns and areas that need improvement. Certain industries with more than 10 employees must also post a summary of the injury and illness log for workers to see.
5. **Perform Tests and Monitoring:** Employers must conduct workplace tests and monitoring as required by specific OSHA standards. This includes air sampling, noise monitoring, and other assessments to measure and control hazards.
6. **Provide Protective Equipment:** Employers must provide most protective equipment free of charge to employees. They are responsible for determining when such equipment is necessary to ensure worker safety.
7. **Comply with OSHA Citations:** Employers must comply with OSHA citations and correct any identified violations within the given timeframe. They should also post citations and injury/illness data in a visible location for workers to see.
8. **Notify OSHA:** Employers must notify OSHA within 8 hours of a workplace fatality or within 24 hours of work-related inpatient hospitalization, amputation, or loss of an eye.

9. Prohibit Retaliation: Employers must not retaliate against workers for exercising their rights under the OSH Act, including reporting work-related injuries or illnesses.

1.5.3 OSHA Worksite Inspections

OSHA conducts worksite inspections to enforce the law and protect workers' rights. Inspections are initiated without advance notice and are carried out by trained compliance officers. The priorities for inspections are based on various factors such as imminent danger, fatalities or hospitalizations, worker complaints, targeted inspections for specific hazards or high injury rates, and follow-up inspections.

During inspections, employers are not informed in advance, regardless of whether they are in response to a complaint or programmed inspections. Workers have the right to request an on-site OSHA inspection if they believe there are potential workplace hazards or violations. They can file a complaint with OSHA to initiate an inspection. Workers are protected from employer retaliation for exercising their rights, including filing a complaint.

Complaints can be filed through different methods, including submitting the OSHA complaint form online, mailing or faxing the form, or calling the local OSHA regional or area office. During an inspection, workers have the right to have a representative accompany the inspector, engage in private conversations with the inspector, and participate in meetings before and after the inspection.

After the inspection, if OSHA determines there are violations of standards or regulations, they issue citations and proposed penalties to the employer. Employers must post a copy of the citation in the workplace. Workers and employers have the right to contest citations, and workers can contest the time given to correct hazards.

If OSHA decides not to conduct an inspection or issue a citation, workers have the right to request a review of the decision by the OSHA regional administrator. It's essential for workers to know their rights and protections against retaliation under the whistleblower provisions of the OSH Act.

Workers have the right to refuse to work in situations that present a risk of death or serious physical harm if there is not enough time for OSHA to inspect and the condition has been brought to the employer's attention. Workers should not leave the worksite solely because they filed a complaint.

OSHA's goal is to ensure safe and healthful workplaces, protect workers' rights, and address hazardous conditions promptly. Workers are encouraged to familiarize themselves with their rights and reach out to OSHA for assistance when needed.