

80-Hour Hazardous Waste Worker Syllabus

Time: 80 hours

Maximum Class Size: 12

Prerequisites: None

Course Description: This 80-hour course prepares the participant to recognize and prepare for hazards on the jobsite. When hazardous chemicals or materials are present on the jobsite it is essential to protect yourself from illness or injury. This course covers the health and physical hazards that may be encountered on the jobsite. Personal Protective Equipment (PPE) is critical to the safe performance of environmental work and participants will develop an understanding of the types of PPE that should be worn, how to wear it and when to wear it, as well as its limitations. Protecting yourself from contaminated chemicals is essential and the course will cover removing PPE without transferring contaminants or exposing yourself to the hazardous substances. Formal decontamination sequences to remove or neutralized these substances from PPE, tools or equipment is addressed. Other topics included are OSHA-mandated Site Safety and Health plan required for hazardous waste site cleanup, safe materials handling and sampling, various sampling techniques, workplace monitoring fundamentals, permit-required confined space entry, the legal rights of workers, and soil and groundwater remediation technologies.

Goals/Objectives/Student Learning Outcomes:

- List and explain the three general hazard categories on a hazardous waste site, and how to recognize them.
- Describe and give examples of the following four types of chemical hazards:
 - Toxic
 - Corrosive
 - Carcinogen
 - Reactive
- Illustrate the fire triangle and explain its elements.
- Illustrate the pH scale and explain how corrosive strength is measured.
- Illustrate the flammable/explosive range and explain the importance of lower explosive limit (LEL) and upper explosive limit (UEL).
- Explain oxygen deficiency and describe two ways it can be caused.
- List, explain, and give examples of the physical states in which chemicals are commonly found.
- Describe the two types of radiation, explain their differences, and give examples of both.
- List and describe three biological hazards that can be found on hazardous waste sites.

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Goals/Objectives/Student Learning Outcomes continued:

- Explain how safety meetings contribute to safety on a hazardous waste site.
- Define engineering controls and give four examples of engineering controls that might be used on a hazardous waste site.
- List, explain, and give examples of the two main approaches used to reduce or prevent accidents, injuries, and illnesses on hazardous waste site.
- List and explain the three routes of entry for chemicals into the body.
- Explain the differences between a local health effect and a systemic health effect and give three examples of each.
- Explain the difference between a prompt health effect and a delayed health effect and give three examples of each.
- List and explain the respiratory system's three natural defenses.
- List the six physical warning signs of chemical exposure.
- Demonstrate how to properly self-monitor for heat stress and evaluate the results.
- Describe at least two conditions that indicate occupational noise has reached a hazardous level; describe at least two signs of symptoms of temporary hearing loss.
- Given the PPE, demonstrate how to properly wear and/or insert hearing protection.
- List the steps for and be able to demonstrate the proper lifting procedures.
- Explain 'oxygen deficiency' and describe the two main causes for its occurrence.
- List four main body systems and explain how chemical and physical hazards may affect them.
- List and describe the signs and symptoms of the four stages of heat stress.
- Explain the liver's role in the body's defense system.
- Describe the following three air-purifying respirators and list the assigned protection factor (APF) for each: $\frac{1}{2}$ face APR, FFAPR, PAPR.
- List and explain at least six limitations of APRs.
- List and explain the three filter series and three filter efficiency levels for particulate filters.
- Explain the term 'breakthrough' and 'warning properties' and list four steps that should be taken if breakthrough occurs.
- Explain the term 'assigned protection factor (APF) for a respirator and, given five different respirators, state the correct APF of the five examples.
- Explain the abbreviation 'MUC' for a respirator and, given five different respirators, calculate the correct MUC in the five different respirators.
- Explain the differences between an air-purifying respirator and an atmosphere-supplying respirator.
- Explain the differences between the three delivery systems for breathing air: Continuous flow, Demand and Pressure demand
- Explain how a supplied air respirator (SAR) works. List three limitations of the SAR and the APFs for both the SAR and the SAR with escape.
- Explain how an SCBA works, its limitations and APF.
- Given the proper equipment, demonstrate the proper procedures for refilling an SCBA cylinder (hands-on).
- List and explain the nine requirements of a respiratory protection program.
- Explain the differences between a qualitative and quantitative fit test, and give two examples of each.

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Goals/Objectives/Student Learning Outcomes continued:

- Demonstrate and explain the proper procedure for performing a positive and negative user seal check on an APR; given a variety of respirators, demonstrate donning, use, doffing, and maintenance of each respirator according to the guidelines of Chapter 3 (hands-on).
- List and explain the three different types of leakage that can occur with chemical protective clothing.
- List and explain five factors that can affect your work-mission duration on an environmental project.
- Describe the four 'levels of protection' that may be used when doing hazardous waste work.
- Given a variety of protective clothing and specific instructions for donning and doffing of various work ensembles, demonstrate the correct procedures according to the guidelines of Chapter 3 (hands-on).
- Explain the purpose of decontamination of hazardous waste sites and list three pathways of exposure.
- Explain the terms 'contamination', 'avoidance', and 'contamination transfer' and list three safe work procedures associate with each.
- Describe the difference between physical removal and chemical removal as methods of decontamination.
- Given three emergency scenarios, describe when decontamination should take place and a possible decontamination procedure for each scenario.
- Given mock scenarios, perform decontamination appropriately, according to the guidelines of Chapter 4.
- List and explain the 10 topics of information that are required in a Site Safety and Health Plan (SSHP).
- Describe five scenarios on a hazardous waste site where additional site-specific training is required.
- List and explain five different elements of a site control program.
- Explain the purpose of the 'buddy system' and describe three activities that 'buddies' perform on a hazardous waste site.
- List and explain the two types of communication systems that must be used on hazardous waste sites.
- List four examples of waste-related emergencies and four examples of non-waste-related emergencies.
- Explain the importance of training and drills in an emergency response plan.
- Explain the importance of standard operating procedures (SOP) and why they need to be followed on hazardous waste sites.
- Given a mock unidentified hazardous materials container, list and identify the 'clues' to look for when performing a preliminary visual inspection. We will also learn about different sampling techniques used to identify hazardous materials.
- Describe the appropriate response and handling procedures for the following site-specific hazards:
 - Radioactive materials
 - Explosive or shock-sensitive waste
 - Bulging drums

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Goals/Objectives/Student Learning Outcomes continued:

- Laboratory packs
- Leaking, open or deteriorated drums
- Buried drums
- Given an empty over pack drum and a mock damaged drum, demonstrate three methods of manually over packing the drum.
- Define the term 'characterization' and explain how and why it is done on a hazardous waste site.
- Given the proper equipment, containers, and personal protective equipment (PPE), explain and demonstrate methods for collecting bulk samples on a mock hazardous waste site using the following devices:
 - Auger and thin-walled tube sampler
 - Drum thief and COLIWASA
- List and explain the three safe work practices that should be used when storing hazardous materials.
- Given the proper materials, equipment, and several mock hazardous waste containers, construct and organize a container staging area according to the guidelines in Chapter 6.
- Explain and compare the differences, advantages, and disadvantages of direct-reading instruments (DRIs) versus laboratory analysis of workplace samples.
- Describe five situations on a hazardous waste site where workplace monitoring would usually be required.
- Given the proper equipment, conduct the required workplace monitoring for a mock (practice) permit-required confined space entry.
- Using various sample chemicals and the proper equipment, demonstrate how to use and interpret the reading of the colorimetric detector tubes and photoionization detector (PID).
- List and explain the appropriate responses if a personal monitoring device or sampling pump fails.
- Define a confined space, giving three characteristics.
- List two categories of confined spaces and give examples of each.
- List two factors that lead to fatal injuries in confined spaces.
- Describe the four characteristics of a permit-required confined space.
- List the components of a permit-required confined space entry program.
- Explain the purposes of an entry permit.
- List at least 5 of the 15 required elements of an entry permit.
- List the required elements of a pre-entry atmospheric testing.
- Identify the members of a confined space entry team and describe the duties of each.
- Describe at least two instances when training is required for confined space entry.
- Locate the titles of the 17 paragraphs of the OSHA Hazardous Waste Operations and Emergency Response Standard and describe the contents of each paragraph.
- Explain the employees responsibilities contained in the Occupational Safety and Health Act (OSH Act).
- Describe the 11 rights of an employee has under Section 11(c) of the OSH Act.
- Describe three conditions found in 29 CFR 1977.12 that must be present for OSHA's 'right to refuse hazardous work' to apply.

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Goals/Objectives/Student Learning Outcomes continued:

- Describe the purpose of the following environmental laws:
 - RCRA
 - CERCLA
 - SARA
 - Clean Air Act
 - NESHAPS
 - Clean Water Act
 - Hazardous Material Transportation Act
- Explain CERCLA and what the Superfund Act did for the nation.
- Explain SARA and the changes that it made.
- List and explain the nine steps of the Superfund process and the corresponding guidelines for community relations at each step.
- Explain the worker's role in the community relations process.
- List and explain the guidelines that should be followed when answering questions or discussing hazardous waste site operations.
- List the meaning of the term 'groundwater' and describe its importance.
- List and explain the four phases of the hydrologic cycle.
- Explain the meaning of and the differences between 'point sources' and 'nonpoint sources' of contamination.
- Given the proper equipment and working with a partner, prepare a flip chart diagram of a selected remediation technology and deliver a 5-minute presentation about this technology.

Standards Addressed:

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response

Classroom Rules and Procedures

- All classes begin at 6:30 am and end at 3:00 pm
- Upon entering classroom, all participants must sign in and be seated by 6:30 am
- Class will consist of a combination of lecture, video, demonstration, coached group exercises, individual exercises and assessment.
- Students are required to report to class ready to work and maintain the provided PPE

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Textbooks/Readings/Materials

- LIUNA: *Hazardous Waste Worker IG*
- LIUNA: *Hazardous Waste Worker PG*
- Hazardous Waste Worker Student Workbook
- LIUNA: Hazardous Waste Worker PowerPoint
- LIUNA DVDs: *Health Effects, Heat Stress, Hazardous Waste Decontamination, Permit Required Confined Space, Legal Rights, OSHA Workplace Rights*

Tools/Equipment/Other Materials:

- Computer
- LCD Projector
- Flipchart/markers
- Whiteboard/expo markers
- Highlighters
- Copies of *NIOSH Pocket Guide of Chemical Hazards*
- Litmus tape
- Two small jars/water glasses
- Vinegar
- Baking soda
- 3-1 gal buckets
- 1 lb. dry ice
- 1 candle
- 1 can of Coke
- 1 can of Diet Coke
- 3" x 5" note cards
- Earplugs for each participant
- Splash suits
- Thermometers
- Probe covers
- Alcohol swabs for each participant
- Filtering face-pieces
- ½ face APRs
- FFAPRs
- PAPRs
- Air Line (SAR)
- SAR with Escape Bottle
- SCBA
- 2-P-100 filter cartridges per team
- (One probed FFAPR QNFT)

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Tools/Equipment/Other Materials continued:

- Porta count or Stannic Chlorine (Irritant smoke)
- Site with decontamination stations set up
- Drum Samples (approximately 10)
- Drums with stenciled shipping numbers & labels
- Drums with fully removable head
- Drum labeled as radioactive
- Drum that is rusted or damaged
- PVC drum or PVC-lined drum
- Gas cylinder (empty)
- Laboratory pack with small containers and vermiculite
- Bulging drum
- Box
- Carboys (similar to 5-gallon water bottle)
- Mock sampling demonstration area
- Site Sampling Plan (HSIPs or SDSs)
- Level A, B, or C PPE
- See IG for specific site set-up requirements

Personal Protective Equipment

- 12 pairs of gloves
- 12 pairs of safety glasses
- 12 pairs of ear plugs
- 12 hard hats

Course Requirements

In order to receive credit for the course, participants must:

- Be present for full eighty hours
- Participate in all classroom exercises
- Pass a written exam

Course Policies

- Participants must be on-time and ready to work.
- Participants must return from breaks on-time.
- Participants must participate in each exercise and assignment

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Course Policies continued:

- Participants who are on “light duty” are not allowed to take this course due to the physically demanding requirements.

Assessment and Grading

Participants will be assessed on the following:

- All written exams must be passed with a score of 80% or above.
- All hands-on activities and exercises are graded on performance and participation. They are pass/fail and must be passed with a score of 80% or above.

Safety

Failure to maintain and use PPE may result in dismissal from the course.