

40-Hour Hazardous Waste Worker Syllabus

Time: 40 hours

Maximum Class Size: 12

Prerequisites: None

Course Description: This 40-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 the six physical warning signs of chemical exposure.
- List and describe the signs and symptoms of the four stages of heat stress.
- Describe the following three air-purifying respirators and list the assigned protection factor (APR) 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 APR 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.
- 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.
- Demonstrate and explain the proper procedure for performing a positive and negative user seal check on an APR
- List and explain the three different types of leakage that can occur with chemical protective clothing.
- 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 per the guidelines of Chapter 3 (hands-on).

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Goals/Objectives/Student Learning Outcomes continued:

- 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, per 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.
- List and identify the 'clues' to look for when performing a preliminary visual inspection of containers.
- List two 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
 - Laboratory packs
 - Leaking, open or deteriorated drums
 - Buried drums
- Define the term 'characterization' and explain how and why it is done on a hazardous waste site.
- List and explain the three safe work practices that should be used when storing hazardous materials.
- 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.
- Using various sample chemicals and the proper equipment, demonstrate how to use and interpret the reading of the colorimetric detector tubes and multi-gas meter.

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Goals/Objectives/Student Learning Outcomes continued:

- 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.
- 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 employee's responsibilities contained in the Occupational Safety and Health Act (OSH Act).
- Describe the 11 rights 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.
- Explain CERCLA and what the Superfund Act did for the nation.
- Explain SARA and the changes that it made.
- 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.

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

Textbooks/Readings/Materials:

- LIUNA: 40-Hour *Hazardous Waste Worker IG*
- LIUNA: 40-Hour *Hazardous Waste Worker PG*
- 40-Hour Hazardous Waste Worker Student Workbook
- LIUNA: Hazardous Waste Worker PowerPoint

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Textbooks/Readings/Materials continued:

- LIUNA DVDs: *Heat Stress, Permit Required Confined Space, Legal Rights, OSHA Workplace Rights*
- IT1: Station Labels

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
- 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)
- 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)

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Tools/Equipment/Other Materials continued:

- 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

Workplace Monitoring:

Station 1:

- Detector Pump
- Detector tube for ammonia
- Bottle of ammonia
- Bowl for ammonia

Station 2:

- Detector pump
- Detector tube for carbon monoxide
- Jar filled with car exhaust covered with Saran Wrap

Station 3:

- Combustible gas indicator (CGI)
- Short sampling hose for CGI
- Jar filled with car exhaust covered with Saran Wrap
- Plastic Cup
- Butane lighter

Station 4:

- PID
- Mason jar with some organic gases and vapors (rotten banana, etc. covered with Saran Wray)

Field Exercises:

Level C:

- Two blue tarps or plastic sheeting 10' x 20'
- Three tubs for sanitizing face-pieces
- 6-5-gallon bucket
- One 50-gal basin or kiddie pool
- One medium (2") handle scrub brush

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Tools/Equipment/Other Materials continued:

- One long handle scrub brush
- Four benches or stools
- Seven 33-gallon trash cans with liners
- Three tables
- One rope or clothesline to dry suits
- Two boot trees to hang boots (optional)
- One garden hose with shower nozzle or Hudson-type garden sprayer (optional)
- Decon or detergent solution
- Disposable towels
- Red Danger tape to mark hot line
- Yellow Caution tape to mark contamination control line
- Wind sock (optional)

Level B:

- All the above plus
- Extra air cylinders
- Outer gloves
- Boot covers
- Duct tape for station 9-tank change

Level A

- All the above plus
- Extra air cylinders
- Outer gloves
- Boot covers
- Duct tape for station 9-tank change
- Materials Handling and Sampling:
- Six 55-gallon drums or containers for liquid sampling
- One glass or plastic thieving tube
- One COLIWASA or well-bailer
- One liquid hand pump for bulking
- One soil-sampling auger and slotted spoon
- One stainless steel spoon
- Two-four plastic tote trays or racks with sampling bottles
- White vinegar for acid solution
- Baking Soda for base solution
- Two dozen peel-off labels
- Two marker pens
- Two clipboards

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Tools/Equipment/Other Materials continued:

- Two rolls of litmus tape
- Two-four 85 gallon over packs
- Four long-handled square shovels
- Four long-handled round-shovels
- Workplace Monitoring:
- Colorimetric pump sampler
- Assorted sampling tubes (gasoline, alcohol, CO, etc.)
- Assorted test jars with samples such as gasoline, acetone, ammonia, etc.
- One multi-gas meter (Toxi-Rae or MSA Altair 5)
- One calibration kit for multi-gas monitor including fittings, hose, cal-gas (or optional MSA Galaxy calibration dock if using the Altair 5)
- One user manual for each type of monitor

Personal Protective Equipment

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

Course Requirements

To receive credit for the course, participants must:

- Be present for full forty 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

Course Policies continued:

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

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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.