U.S. Department of Energy

WORKING SAFELY



DURING

DOE HAZARDOUS WASTE ACTIVITIES

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U.S. Department of Energy
Assistant Secretary for Environment, Safety and Health
Washington, DC 20585

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"The hallmark and highest priority of all our activities is daily excellence in the protection of the worker, the public, and the environment."

— Secretary of Energy

Environment, Safety, and Health Policy June 1993

PURPOSE

This document (hereafter referred to as a guide) was developed by the U.S. Department of Energy (DOE) in recognition of the need to enhance worker health and safety by providing occupational safety and health information to workers engaged in hazardous waste activities.

The guide is intended to improve worker protection by indicating ways to minimize radiological, physical, chemical, and biological hazards and to reinforce the health, safety, and radiological training completed by hazardous waste workers. This guide is for workers who have completed training as required in 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (the HAZWOPER Standard) and who are about to begin or have begun work at hazardous waste activities sites.

Each worker's rights and responsibilities are addressed in association with requirements set forth in the HAZWOPER Standard, promulgated by the Occupational Safety and Health Administration (OSHA), and other DOE and DOE-adopted nuclear and nonnuclear rules and requirements.

ACRONYMS

CERCLA Comprehensive Environmental

Response, Compensation, and

Liability Act

D&D Decontamination and dismantlement

ECMS Employee Concerns Management

System

HASP Health and Safety Plan

HAZWOPER Hazardous Waste Operations and

Emergency Response

HAZCOM Hazard Communication

JSA Job Safety Analysis

JTHA Job, Task, and Hazard Analysis

MSDS Material Safety Data Sheet

OSHA Occupational Safety and Health

Administration

PPE Personal Protective Equipment

RCRA Resource Conservation and Recovery

Act

RWP Radiological Work Permit

SOP Standard Operating Procedure

SSHO Site Safety and Health Officer

SWP Safe Work Permit

TSD Treatment, Storage, and Disposal

INTRODUCTION

The guide is meant to help protect your health and safety by supplementing your training and field experience with information in the following areas:

- Explanations of your rights to a safe and healthful workplace and your responsibilities for using safe work practices and following procedures;
- 2. Where to take your work-related health and safety concerns and how to get help;
- 3. Important aspects of the HAZWOPER Standard;
- 4. Integrating the *Draft DOE Radiological Control Technical Standard* into hazardous waste activities;
- 5. Reminders of the health and safety programs and procedures already in place for your protection;
- 6. Ways to recognize hazards and minimize your exposure to them;
- 7. How to stay safe when working with hazardous chemical and radiological substances; and
- 8. Emergency preparedness activities such as emergency response plans in your work area.

For additional detail on topics discussed in this guide, refer to the *Handbook for Occupational Health and Safety During DOE Hazardous Waste Activities*.

The HAZWOPER Standard covers the following DOE activities —

- Cleanup operations at uncontrolled hazardous waste sites;
- Resource Conservation and Recovery Act (RCRA) Corrective Actions;
- Voluntary government cleanup operations at hazardous waste sites;
- Treatment, storage, and disposal (TSD) operations;
- Certain decontamination and dismantlement (D&D) activities; and
- Emergency response operations.

DOE may apply the HAZWOPER Standard worker protection program elements or framework (e.g., Health and Safety Plan or HASP) to the following activities —

- Deactivation;
- Certain decontamination and dismantlement activities that do not fall under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA);
- Surveillance and maintenance activities;
- Non-RCRA-permitted TSDs;
- · Construction;
- Laboratory activities;
- · Research and development activities; and
- · Satellite accumulation sites.

EMPLOYEE INFORMATION

YOUR RIGHTS AND RESPONSIBILITIES

Your rights as a hazardous waste worker include —

- The right to freely express concerns regarding health and safety issues, including personal safety;
- The right to refuse unsafe work without reprisal, harassment, or retaliation;
- The right to expect quick resolution of disputes about unsafe work;
- The right to gain timely knowledge of hazards;
- · The right to report concerns or violations;
- The right to receive appropriate personal protective equipment (PPE) without charge;
- The right to access health and safety information;
- The right to talk with inspectors, attorneys, physicians, or the media without retaliation;
- The right to fully participate with government agencies in all health and safety investigations and inspections; and
- The right to expect a commitment to safety excellence.

In addition to these rights, you have the following responsibilities —

- The responsibility to know and comply with the health and safety regulations established by your employer;
- The responsibility to attend required training and, through use, practice, and retraining, to remain current in the skills and knowledge obtained;
- The responsibility to properly use, maintain, and care for the PPE assigned to you;
- The responsibility to report and remove from service any damaged PPE; and
- The responsibility to report to your supervisor serious hazards in the workplace.

REPORTING YOUR HEALTH AND SAFETY CONCERNS

Methods for reporting health and safety concerns will be established by your employer and may vary for different work areas.

- Learn how to report health and safety concerns at your worksite. You should know your employer's procedures for reporting health and safety concerns and what to do if you're not satisfied with the response you get. Talking to your immediate supervisor should always be the first step.
- Your site safety and health officer (SSHO) and radiological control manager can also provide you with answers to your health and safety questions. Know who these people are, know how to contact them, and keep that information with you.
- The DOE Employee Concerns Management System (ECMS) is set up to protect your privacy and to evaluate your concern and any actions needed. You can usually contact the ECMS by calling the nearest DOE Operations Office Hotline. (Your SSHO can provide you with the telephone number.) The Occupational Safety and Health Protection and ECMS posters in your work area provide additional information on reporting your concerns.
- Fill in the names and telephone numbers in the table on page 12 for your future reference.

HEALTH AND SAFETY CONTACTS

	SITE SAFETY AND HEALTH OFFICER
Name:_	
Telephoi	ne:
Beeper:	
	RADIOLOGICAL CONTROL MANAGER
Name:_	
Telephoi	ne:
	INDUSTRIAL HYGIENIST
Name:_	
Telepho	ne:
	OCCUPATIONAL MEDICINE PHYSICIAN
Name:_	
Telepho	ne <u>:</u>
	REST DOE OPERATIONS OFFICE HOTLINE
1-800	
	EMPLOYEE CONCERNS HOTLINE
Telepho	ne:

HAZARDOUS WASTE ACTIVITIES AND OPERATIONS

SITE HEALTH AND SAFETY PROGRAM

Do you have questions about what radiological, physical, chemical, or biological hazards you might face on the job — what kind of work was conducted there in the past? what kind of work is planned? what you need to do to protect yourself? who's in charge, and who does what? if there's an accident, what you would do and where you can get help?

Beyond your original training, you have several sources for this information.

- 1. **Briefings.** Your supervisor or your SSHO or both should brief you often on safe work practices and site hazards, especially when site conditions or processes change. This is probably your best source.
- 2. Worksite HASP, Radiological Work Permit (RWP), or Safe Work Permit (SWP). Know where these documents are at your job site. These documents will tell you what tasks and what part of the job site might contain hazards and what control measures should be in place. Work conditions may change which would require changes in levels of protection, site boundaries, and so on. If you have questions concerning changes in the plans or site conditions, ask your supervisor or SSHO.
- 3. *The hazard communication (HAZCOM) program.* This includes labels, signs, material safety data sheets (MSDSs), and other written materials.

- 4. *The HAZWOPER Standard.* This Standard lists items that are to be included in a written health and safety program maintained at a hazardous waste worksite, including
 - · An organizational structure;
 - A comprehensive work plan;
 - An emergency response plan (if not in HASP);
 - A site-specific HASP;
 - Health and safety training requirements for the jobs being done;
 - · Medical surveillance requirements; and
 - Standard operating procedures (SOPs) for protecting your health and safety.

COMMONLY FACED HAZARDS

At DOE sites, radiological hazards are widespread, and their controls are highly visible. However, there may also be physical, chemical, and biological hazards at your worksite.

RADIOLOGICAL HAZARDS

Unlike chemical hazards, radiological hazards are relatively easy to detect with highly sensitive, direct-reading instruments. Radiological control personnel conduct surveys and post warning signs.

Know how to control or limit your exposure to radiological hazards —

- **TIME**—limit the time you are exposed to a hazard.
- DISTANCE—use robotics or tools to increase your distance from the hazard.
- SHIELDING—use dense materials as shielding or place enclosures around the source.

Know the different types of radioactive materials, and know the conditions under which they may be present —

- In contaminated soils;
- As loose, fixed, surface, subsurface, or airborne contamination;
- In drums or containers of contaminated liquids and solids;
- In equipment or system components generating radiation or contaminated by radioactive materials;
- In activated materials;
- As sealed and unsealed sources;
- In areas near operating nuclear reactors; and
- As fissile materials.

PHYSICAL HAZARDS

According to the National Safety Council, there were 9,100 work-related fatalities in 1993; one of the leading causes of work-related fatalities was falls. You should always be on the lookout for hazards like unstable drums; holes and ditches; sharp objects like nails and broken glass; slippery surfaces; steep grades; and potentially unstable surfaces like walls, floors, or roofs that could cause falls, give way, or collapse. Other common physical hazards may result from

- Material handling;
- Operating machines and heavy equipment;
- Excavations;
- Electrical sources;
- Confined spaces;
- Fire and explosions;
- Heat and cold stress; and
- Noise.



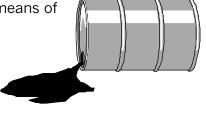
These poorly stacked drums, if disturbed, could fall and crush a worker.

CHEMICAL HAZARDS

Most hazardous waste sites have a variety of chemical substances and hazards which may take the form of a solid, liquid, or gas. The effects of exposure to toxic chemicals may either be immediate (e.g., acid burns) or delayed (e.g., lung damage from inhaling asbestos). Four routes of chemical exposure exist for hazardous waste workers. They are —

Inhalation – most common means of entry;

Skin or Membrane Absorption – chemicals can be absorbed through intact skin or the eyes;



Ingestion – chemicals can be ingested on the worksite by eating, drinking, or smoking; and

Unintentional Injection – chemicals can enter the body through open wounds or accidental punctures.

Specific hazards include —

- The presence of toxic or corrosive chemicals in soil, waste, or confined spaces; and
- Lead, asbestos, and beryllium contamination.

The hazards from any chemicals that affect the kidneys or liver are made worse when alcohol is consumed. Alcohol not only impairs judgment, alcohol also increases the cumulative exposure of the worker.

BIOLOGICAL HAZARDS

Biological hazards may result from exposure to insects, animals, plants, bacteria, and viruses. You may encounter a variety of biological hazards at a DOE hazardous waste site, including —

- Bites and stings from insects, snakes, and other wildlife;
- Skin rashes and allergic reactions from contact with poisonous plants or animals; and
- Infections from contact with or exposure to bloodborne pathogens or other biological agents in contaminated soil, waste, dust, bird and animal droppings or transmitted by insect bites or stings.

HAZARD CHARACTERIZATION AND EXPOSURE ASSESSMENT

Critical to hazard characterization is the identification of hazards and the assessment of the possibility for worker exposure. This is accomplished by conducting assessment techniques such as job, task, and hazard analysis (JTHA) with multidisciplinary teams that include the worker. This information is then used by the SSHO and the radiation control manager to develop the right hazard controls and protection. Hazard controls include engineering controls, administrative controls, and use of PPE. Hazard characterization, then, is a tool for developing hazard controls and safe work practices and procedures and to make sure that the appropriate PPE is selected for each job.

How are potential health and safety hazards in your work area located, identified, and measured?

You, the worker are the first line of defense between safe work and accidents. Because you are closest to the action, you have the responsibility to report hazards and work with your supervisor to identify and control those hazards. In addition to your continuous vigilance, the following other techniques are used —

Inspections and walkthroughs conducted by designated individuals help you, your supervisors, and members of your multidisciplinary team to locate and identify occupational safety and health hazards at your worksite. JTHAs of individual work operations or tasks and their associated hazards are performed in order to develop effective controls. Job hazard analyses, Safety Analysis Reports, RWPs, and SWPs are also tools used to identify hazards.

Monitoring uses various kinds of instruments to identify and measure levels of different types of hazards that may be present at your worksite. You should be aware of what instruments and

alarms (if any) may be operating in your work area, and you should know what to do if they are activated. The site-specific HASP identifies appropriate monitoring and sampling instruments for the worksite.

Exposure assessment uses monitoring data to determine possible worker exposures to identify controls for worker protection and provide data to physicians for proper medical assessment, treatment, and followup care.

ACCESS AND HAZARD CONTROLS

After potential hazards have been identified, access and hazard controls need to be developed and put in place before work begins. This process of recognizing and evaluating new hazards and putting controls in place goes on until the task or job is complete.

An ounce of prevention is worth a pound of cure!

ENGINEERING CONTROLS

An engineering control physically keeps a hazard away from a person. Examples include machine guards on equipment,



Use of signage and locked doors to control access to hazards are effective administrative controls.

ground fault circuit interrupters, local exhaust ventilation that "grabs" contaminated air at the source, and remote systems (like robotics) used to handle dangerous materials.

ADMINISTRATIVE CONTROLS

Administrative controls include limiting the time spent in a hazardous area, RWPs, SWPs, SOPs, proper designation and posting of areas, or changes to work practices. Other examples are identifying and limiting entry into confined spaces and using lockout/tagout procedures.

Access and hazard controls are

designed to protect you, your co-workers, and the public from the health and safety hazards associated with hazardous waste activities, and they also protect the environment from further damage. Controls should be selected for radiological, physical, chemical, and biological hazards or a combination thereof, depending on what is expected at the worksite. A full description of the controls at your worksite is to be included in the HASP, SWP, and RWP. Administrative controls include, but are not limited to, the following —

- Site maps
- Site preparation postings
- Site work zones
- · Stav times

- Buddy system
- · Security, barriers, and
- Communication systems
- SWPs and SOPs

Work zones are established to prevent the spread of hazardous substances from contaminated to clean areas. Radiological work zones are compatible with hazardous waste work zones, differing only in terminology (see Table 1). The names, number, and types of zones vary according to the activities at the worksite (see Figure 1). The important thing is that the zones are established and that you know the hazards and controls necessary for each.

Table 1. HAZWOPER and Radiological Work Zones

HAZWOPER TERM	RADIOLOGICAL TERM	
Contamination Control Line	Controlled Area Boundary	
Exclusion Zone	Radiologically Controlled Area	
Nonradiological (Chemical) Hazard Areas Within Exclusion Zone	Contamination Area or Radiation Area	
Contamination Reduction Zone	Radiological Buffer Area	

The Buddy System. No one should enter a contaminated area or an exclusion zone without a "buddy" who is capable of —

Providing the partner with assistance;

"One of the most important tenets for any type of work around hazardous materials is NEVER WORK ALONE."

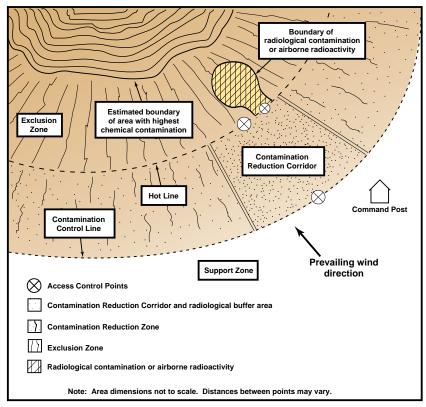


Figure 1. Use of Work Zones as Administrative Controls.

- Observing the partner for signs of adverse exposure to chemical, physical, or radiological hazards and notifying the appropriate persons if emergency help is needed; and
- Periodically checking the integrity of safety systems and the partner's PPE and other safety equipment.

PERSONAL PROTECTIVE EQUIPMENT

All health and safety regulations (e.g., DOE Orders and OSHA standards) require the use of engineering and administrative controls, where feasible. Their use takes priority over other hazard control methods such as PPF.

When engineering and administrative controls are not feasible or adequate to fully control hazards at a HAZWOPER site, the use of PPE will be required. You should ask, and be able to answer the following questions before using PPE in your workplace.

- Is the PPE you're using designated by the SSHO in the HASP?
- Have you been trained in its proper use and limitations?
- · Has your PPE been properly maintained and inspected?
- Has the operation been monitored and evaluated? Have the results been explained to you?
- If you need a respirator, have you been medically certified, fit-tested, and trained in its use?
- · Do you check your mask's seal before each use?

Note: If the hazards at your worksite are well understood and if chemical exposures are low, you probably do not need a respirator. Wearing a respirator can increase stress on the body and reduce visibility and dexterity. Therefore, respirators should be used only when necessary for you to protect yourself from potential hazards and not otherwise.

Remember, protective clothing and respiratory protection used for radiological hazards may not protect you against nonradiological hazards and vice-versa; when combined hazards exist, consult the qualified Environment, Safety and Health team member, radiological control manager, industrial hygienist, or SSHO for guidance!

WORKER AND EQUIPMENT DECONTAMINATION

The purpose of decontamination (decon) is to remove or inactivate radiological and nonradiological contaminants on you, your PPE, or your tools and equipment. The idea is to prevent spreading contaminants from your PPE or your equipment to your body and elsewhere (like the cafeteria, your car, your home, and your family). Decon procedures will be detailed in the HASP, RWP, or SWP. Decon is always performed in either the contamination reduction zone or the (radiological) contamination buffer area at the worksite. Remember: You can't frisk for chemical contamination as you do for radiological contamination. You have to assume it's there and decon thoroughly. Follow all decon procedures carefully!

Decontamination will occasionally require that workers shower at the worksite. Emergency showers may also be positioned at the worksite as part of the emergency response plan included in the HASP or the SWP.

Sanitation has to do with promoting personal hygiene, protecting general public health, preserving the cleanliness of drinking water, and controlling sewage. All workers are to have access to toilet facilities and clean drinking water. Some employers will *require* you to wear company clothing on the job and will ask you to shower (a good idea with some HAZWOPER tasks) at the end of your work shift. (Note: Potential exposure to asbestos *requires* that the worker shower before leaving the worksite.)

Sanitation and decontamination are <u>not</u> the same thing!

HEALTH AND SAFETY PROGRAM INFORMATION

TRAINING

Hazardous waste workers complete a significant amount of core training and annual refresher training.

Requirements for each job or task at a hazardous waste worksite are specified in the site-specific HASP, RWP, or SWP and may include training in the following areas —

- Trade, craft, or professional qualifications.
- Radiological Training:
 - General Employee Radiological Training for entry into radiologically controlled areas.
 - RadWorker I training for entry into the radiological buffer area and radiation areas.
 - RadWorker II training for entry into high radiation areas, contamination or high contamination areas, and airborne radioactivity areas.
- HAZWOPER Training:

Hazardous waste workers: Depending on the type of job and the possibility for exposures, workers are to have either 40 hours of core training offsite plus 3 days of supervised field experience, or 24 hours of core training offsite plus 1 day of supervised field experience.

 You complete the 40-hour course if you may be directly exposed to hazardous substances, if you will be working inside an exclusion zone or contamination reduction zone, or if you will be required to wear a respirator. You complete the 24-hour course if your work hazards are known, you do not wear a respirator, and it is unlikely that you will be exposed to hazardous substances or to health and safety hazards over permissible exposure levels and published exposure limits or if there is no possibility of an emergency developing.

Occasional workers: If you are onsite only occasionally for a specific limited task (e.g., land surveying or groundwater monitoring) and you are unlikely to be exposed over established exposure limits, you complete 24 hours of training offsite and 1 day of supervised field experience. Site-specific training is required as well.

TSD workers: A minimum of 24 hours of classroom training and 8 hours of supervised field experience.

Refresher training: All hazardous waste workers required to complete either the 40- or 24-hour course are also required to complete an 8-hour refresher course annually.

Site-specific training: Site-specific training is required for each new site to which a worker may be assigned. The purpose is to provide you with important health and safety information concerning unique site hazards and activities. The training may include review of SOPs, site controls, emergency response procedures, and health hazards of specific site contaminants.

Regular field briefings: Daily toolbox sessions, safety meetings, pre-job briefings, or special sessions which address new hazards or changing site conditions associated with the phase of work or a new technology being used at the site are just a few examples of field briefings.

Some elements of the HAZWOPER and RadWorker core training programs are essentially the same, such as

respiratory protection. You should not have to repeat these sections if you have had RadWorker training and are now taking HAZWOPER training. If you move to another site, core and refresher training certificates should transfer from one DOE site to another (this is called reciprocity). Site-specific training elements are not transferable. As your employer is responsible for maintaining the appropriate records, they should be consulted about the specific details with regard to your training. You should also keep a record of training completed to improve their ability to get access to work. Use the form below to help keep track of your past training.

PERSONAL TRAINING RECORD				
Course Title	Completion Date	Certificate Number		

MEDICAL SURVEILLANCE PROGRAM

Medical surveillance programs are intended to identify any current health condition or illness that might be made worse by the job or task conditions. Medical surveillance is also designed to detect any toxic reaction, or changes to your health. By law, all of your medical records are confidential and available for your review at any time.

A MEDICAL SURVEILLANCE PROGRAM —

- Demonstrates that workers are fit to perform their jobs safely and reliably;
- Provides ongoing assurance that access and hazard controls limit worker exposure; and
- Complies with DOE rules and requirements and OSHA regulations adopted by DOE.

INDIVIDUALS REQUIRING MEDICAL SURVEILLANCE —

- · Workers involved in voluntary cleanup operations;
- · TSD workers;
- Workers at hazardous waste activities worksites who require use of a respirator;
- Individuals exposed to a regulated chemical or radiological agent, or to a bloodborne pathogen in excess of established exposure limits;
- Individuals requiring the use of a respirator for 30 days or more a year;
- Workers with an injury, illness, or signs or symptoms of possible overexposure to hazardous substances; and
- Individuals who respond to emergencies involving hazardous wastes.

If the medical examinations are conducted offsite, copies of the examination are to be provided to the site physician to allow for proper medical care in the event of an emergency.

EMERGENCY PREPAREDNESS AND RESPONSE

Emergencies at hazardous waste sites are complex. Your employer will have either an emergency action plan or an emergency response plan in place before operations begin.

Your HASP will contain pre-incident planning information on how to respond if something goes wrong. Review it to prepare for the unexpected. If you have questions or are unsure of where to go or what you should do during an emergency, ask your supervisor.

EMERGENCY ACTION PLAN

Quick action is needed to evacuate in the event of a fire, explosion, radiological accident, or hazardous material spill. Your employer may require you to evacuate the site while outside assistance is used to handle the emergency. In this case, the written Emergency Action Plan will contain critical shutdown information and evacuation instructions.

The Emergency Action Plan contains —

- Emergency escape procedures and emergency escape route assignments;
- Procedures for workers who remain to operate critical plant equipment before they evacuate;
- Procedures to account for all employees after evacuation is completed;
- Rescue and medical duties for employees;
- Preferred means of reporting fires and other emergencies;
- Pre-incident planning, coordination, and notification procedures with outside parties; and
- Names of contacts for additional information.

EMERGENCY RESPONSE PLAN

In some cases, you may be assigned and trained to assist in the response to a hazardous-material spill. Check your emergency response plan; know your assigned actions; and be familiar with the emergency alarm signaling system.

Elements of an Emergency Response Plan address —

- Pre-incident planning and coordination with outside parties;
- Pre-emergency planning prior to operation;
- Personnel roles, lines of authority, training, and communication;
- · Emergency recognition, identification, and prevention;
- Safe distances and places of refuge;
- Site security and control;
- Evacuation routes and procedures;
- · Decontamination;

KNOW YOUR LIMITS

The first rule of response is -

"NO ONE ELSE GETS HURT!"

- · Emergency medical treatment and first aid;
- Emergency alerting and response procedures;
- Critique of response and followup;
- · Conduct of periodic drills; and
- · PPE and emergency equipment.

CIRCUMSTANCES THAT REQUIRE AN EMERGENCY RESPONSE

- When the release prompts a response from outside the immediate release area
- When employees are required to evacuate the area
- When the release requires immediate attention because of imminent danger
- When the release leads to a condition that is immediately dangerous to life or health
- When the release poses a fire or explosion hazard (exceeds or has the potential to exceed 25 percent of the lower explosive limit or lower flammability level)
- When the release may cause high levels of exposure to hazardous or radioactive materials
- When the release may be life- or injurythreatening
- When it is uncertain whether the release has caused the exposure limit to be exceeded
- When the situation is unclear, or important data are lacking

Emergency Contacts

	FIRE DEPARTMENT	
Site:		
	MEDICAL SERVICES	
Site:		
Hospital		
Site:	HAZMAT TEAM	
Local:		
<u>.</u>	SITE SECURITY FORCE	
	SITE EMERGENCY	