

24-Hr HAZWOPER Module 4

Safety and Health Program

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Section 4.1 Components of the Safety and Health Program

The HAZWOPER standard mandates that every employer formulates and executes a written Safety and Health Program for each category of hazardous waste sites before work commences. The Safety and Health Program is pivotal in identifying, evaluating, and managing safety and health hazards while providing emergency response procedures for every hazardous waste site. A comprehensive and robust Safety and Health Program is crucial in reducing work-related injuries and illnesses and in upholding a safe and healthy work environment.

The program outlines the work policies, practices, and procedures, and encompasses the following items:

- Organizational Structure
- Detailed Work Plan
- Site Characterization and Assessment
- Site-Specific Health and Safety Plan (HASP), aka Site Safety Plan
- Safety and Health Training Program
- Medical Surveillance Program
- Standard Operating Procedures

The written Safety and Health Program needs to be updated periodically and accessible to all impacted employees, contractors, and subcontractors.

A vital dimension of planning is coordination with the existing response community. A nationwide response system was conceived through a National Contingency Plan sanctioned by Congress to initiate procedures for coordinating reactions to hazardous substance releases into the environment. This National Contingency Plan sets up response teams comprised of representatives from federal agencies as well as state and local governments. An especially crucial point of contact for hazardous waste site activities is the EPA-appointed official in charge of synchronizing federal activities related to site cleanup.

This module delves into five critical aspects of the program: Organizational Framework, Work Plan, Site Characterization, HASP, and Medical Monitoring.

Section 4.2 Organizational Layout

The foundational step in planning is developing an organizational layout that underpins the overarching goals of the project. This layout should:

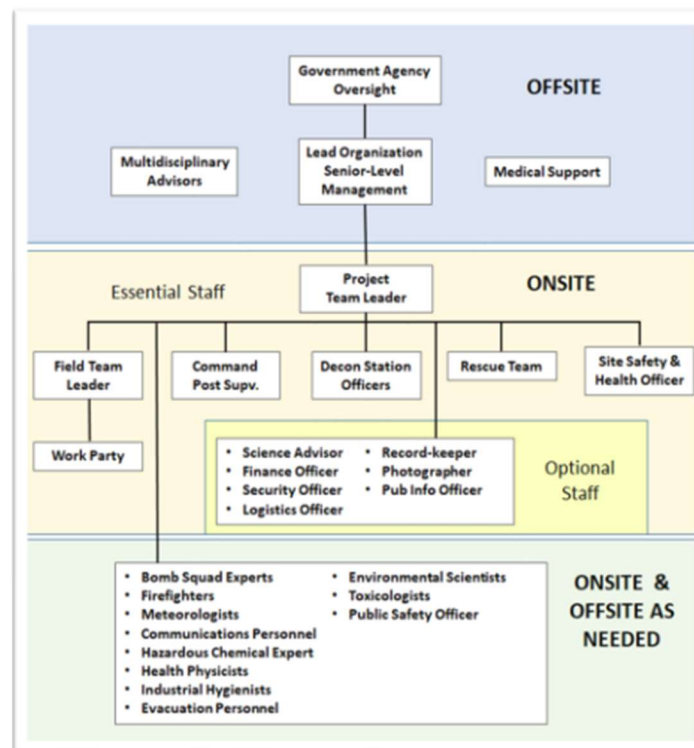
- Appoint a leader endowed with the authority to guide all activities
- Define the additional personnel required for the project and delineate their broad roles and responsibilities

- Illustrate chains of command, responsibility and communication
- Identify interaction points with the response community

As the project unfolds, it might become necessary to tweak certain organizational elements, such as the responsibilities and authorities of personnel, to ensure that individual tasks are executed as safely and efficiently as possible. Any modifications to the overall organizational layout should be documented in the relevant sections of the Work or Site Safety Plans designed for specific phases or tasks. These changes should be communicated to all involved parties.

The diagram below offers an illustration of a potential organizational structure for a hazardous waste site response team. It outlines the chains of command for 24 types of personnel who are either off-site or on-site. The on-site categories are split into personnel that are indispensable for a safe and efficient response, and additional personnel who might be beneficial in a large operation where duties can be assigned to a larger group. As-needed personnel are specialists who are summoned for particular tasks, whether off-site or on-site.

Figure 4.1 General Strategy for Structuring Personnel for Site Investigation and Response



No matter the scale of the operation, every response team must incorporate a Site Safety and Health Officer (SSHO), whose duty is to execute health and safety regulations. The SSHO should be able to readily consult with other professionals in the field of occupational health and safety,

especially an industrial hygienist. Following the establishment of the organizational structure, it is essential to pinpoint individuals tasked with instituting and upholding health and safety standards. It is crucial to clarify their respective roles and powers to all team members.

Detailed in the following two sections are the roles and responsibilities for off-site and on-site positions.

4.2.1 Off-Site Personnel Positions

Senior-Level Management lays out project goals, apportions resources, establishes the chain-of-command, and assesses the program's outcome. Specific responsibilities encompass:

- Providing the necessary facilities, equipment, funding, personnel, time, and resources to conduct activities safely
- Supporting the efforts of on-site management and administering disciplinary action

Multi-Disciplinary Advisors comprise of upper management representatives, field team members, and experts from various fields like chemistry, engineering, law, industrial hygiene, information/public relations, medicine, pharmacology, physiology, radiation health, physics, and toxicology. Their specific responsibilities involve advising on the design of the Work Plan and Site Safety Plan.

Medical Support Staff includes consulting physicians, medical personnel at local hospitals and clinics, and ambulance personnel. Specific responsibilities include:

- Familiarizing themselves with the types of materials on-site, the potential for worker exposure, and recommending the medical program for the site
- Providing emergency treatment and decontamination procedures for specific exposures
- Procuring drugs, equipment, and supplies to treat exposures
- Offering emergency procedures relevant to the hazards

4.2.2 Core On-Site Personnel Roles

The *Project Team Leader*, reporting to senior management, holds the authority to orchestrate response operations. They exercise complete control over site activities with responsibilities such as:

- Crafting and arranging the situation background review, the Work Plan, the Site Safety Plan, and the field team
- Securing permissions for site access and coordinating activities with relevant officials
- Ensuring timely completion of the Work Plan
- Delivering briefings to the field teams on specific tasks

- Collaborating with the Site Safety and Health Officer to meet safety and health requirements
- Preparing the final report and support files on response activities
- Acting as the point of contact with public officials

The *Site Safety and Health Officer (SSHO)*, commonly referred to as the Site Safety Officer, counsels the Project Team Leader on all aspects of health and safety at the site. They can recommend work stoppage if any operation endangers worker or public health or safety. Their specific duties include:

- Choosing protective clothing and equipment
- Regularly inspecting protective clothing and equipment
- Assuring proper storage and maintenance of protective clothing and equipment
- Supervising access control points
- Coordinating safety and health program activities with the Scientific Advisor
- Validating each team member's fitness for work based on physician's recommendation
- Monitoring work teams for signs of stress, such as cold exposure, heat stress, and fatigue
- Observing on-site hazards and conditions
- Participating in and executing the Site Safety Plan
- Conducting routine inspections to verify adherence to the Site Safety Plan
- Enforcing the buddy system
- Familiarizing themselves with emergency procedures, evacuation routes, and emergency contact numbers
- If necessary, alerting local public emergency officials
- Orchestrating emergency medical care

The *Field Team Leader* could be the same person as the Project Team Leader and may be part of the work party. They are responsible for the operations and safety of the field team. Their specific duties include:

- Overseeing field operations
- Implementing the Work Plan and schedule
- Enforcing safety procedures
- Collaborating with the Site Safety Officer in determining the protection level
- Implementing site control
- Documenting field activities and sample collection
- Serving as a liaison with public officials

The *Command Post Supervisor* could be the same individual as the Field Team Leader. Their responsibilities revolve around communication and emergency assistance, such as:

- Alerting emergency response personnel in the event of an emergency

- Assisting the Site Safety Officer in rescue operations, if needed
- Keeping a record of communication and site activities
- Supporting other field team members in clean areas, as required
- Maintaining visual and communication contact with the work parties

Decontamination Station Officer(s) manage decontamination procedures, equipment, and supplies. Their responsibilities include:

- Establishing decontamination lines and the appropriate decontamination solutions for the chemical contamination present on-site
- Overseeing decontamination of all equipment, personnel, and samples from contaminated areas
- Assisting in the disposal of contaminated clothing and materials
- Ensuring availability of all required equipment
- Advising medical personnel about potential exposures and consequences

Rescue Teams, primarily deployed at large sites with multiple work parties in the contaminated area, have responsibilities including:

- Standing by, partially dressed in protective gear, near hazardous work areas
- Rescuing any worker whose health or safety is in danger

The *Work Party*, comprising at least two people, is responsible for:

- Safely carrying out the on-site tasks required by the Work Plan
- Abiding by the Site Safety Plan
- Alerting the Site Safety Officer or supervisor of any unsafe conditions

Section 4.3 Work Plan

Before initiating on-site response actions, a Work Plan outlining anticipated cleanup activities should be formulated. This Work Plan should be reviewed and updated regularly as new information about site conditions is gathered.

The Work Plan preparation necessitates a multidisciplinary approach, requiring contributions from all levels of on-site and off-site management. Consultants, such as chemists, occupational health and safety professionals, and statisticians, may be beneficial in developing parts of the Work Plan, like the sampling plan.

Section 4.4 Site Characterization

4.4.1 Preliminary Off-Site Evaluation

According to 29 CFR 1910.120 (c)(2), a preliminary off-site evaluation of a site's characteristics must be conducted by a Qualified Person before entering the site. The purpose is to assist in selecting appropriate employee protection methods prior to site entry. The off-site

characterization should be used to develop a HASP that addresses the work to be done and outlines procedures to protect the health and safety of the entry team. It is typically led by the Project Team Leader, often involving external experts for accurate hazard interpretation.

Perimeter reconnaissance can be used to aid in the preliminary evaluation although this data may not supply definitive indicators of on-site conditions. Perimeter reconnaissance should involve the following actions:

- Develop a preliminary site map.
- Review historical and current aerial photographs.
- Note labels and conditions on containers or vehicles.
- Monitor ambient air for various hazardous substances.
- Collect off-site samples for analysis.

To effectively characterize a hazardous site, various sources should be consulted, including:

- Company records, receipts, logbooks, or ledgers for clues about past site usage and hazards
- Records from state and federal pollution control regulatory and enforcement agencies, state Attorney General's office, state occupational safety and health agencies, and state Fire Marshal's office
- Waste storage inventories, manifests, or shipping papers
- Interviews with personnel and their families (all information should be verified)
- Generator and transporter records
- Water department and sewage district records
- Interviews with nearby residents (noting possible site-related medical problems and verifying information)
- Local fire and police department records
- Court records
- Media reports (verifying information from the media)
- Previous surveying, sampling, and monitoring data, including soil, ground-penetrating radar, and magnetometer surveys

During the off-site evaluation, the Qualified Person will observe indicators that provide insights into the nature of on-site hazards. These indicators are further evaluated during the detailed on-site survey (which will be discussed later) and include:

- Large containers or tanks that require entry
- Enclosed spaces like buildings or trenches that need to be accessed
- Situations that may be potentially explosive or flammable, indicated by bulging drums, effervescence, gas generation, or abnormal instrument readings
- Presence of highly hazardous materials such as cyanide, phosgene, or radiation sources

- Visible vapor clouds
- Areas with biological indicators like dead animals or vegetation

4.4.2 Required Information Prior to Site Entry

Before allowing employees to enter a hazardous site, employers must gather the following information to the extent possible:

- **Site Location and Size:** Determine the specific location and approximate size of the site.
- **Response Activity Description:** Describe the nature of the work and tasks to be performed.
- **Duration of Activities:** Estimate how long the planned employee activities will take.
- **Site Topography and Accessibility:** Consider factors like current weather, wind direction, terrain features, and accessibility by various modes of transportation.
- **Population Considerations:** Identify nearby population centers and populations at risk.
- **Chemical Hazards:** Understand the chemical and physical properties of hazardous substances present, and their health hazards.
- **Dispersion Pathways:** Assess how hazardous substances could potentially spread in the environment.
- **Emergency Response Capabilities:** Evaluate the present status and capabilities of on-site emergency response teams.
- **Hazards and Health Risks:** Gather detailed information on hazardous substances involved or expected at the site.

Following the findings of the preliminary off-site evaluation, the appropriate PPE ensemble must be selected and used during initial entry. This is essential to protect against both known and suspected hazards.

Use the following guidelines to select the appropriate PPE:

Reference to Studies in Absence of Exposure Limits:

- If there's no Permissible Exposure Limit (PEL) or published exposure level, employers may refer to other studies and information to determine suitable PPE.

Respiratory Protection Requirements:

- In cases where respiratory protection is needed, and if positive-pressure Self-Contained Breathing Apparatus (SCBA) is not part of the entry ensemble, employees must carry an escape SCBA providing at least five minutes of protection.

Minimum Protection Standards:

- If the preliminary evaluation does not provide enough information to identify hazards, the minimum protection provided should be equivalent to Level B PPE (refer to Module 3).
- Direct reading instruments should be employed to identify IDLH conditions.

If IDLH Conditions are present, then one of the following respirators should be used:

- A full facepiece pressure demand SCBA certified by NIOSH with a minimum service life of thirty minutes
- A combination full facepiece pressure demand Supplied-Air Respirator (SAR) with an auxiliary self-contained air supply

4.4.3 Initial On-Site Survey

Following the preliminary off-site evaluation and the initial site entry, a more detailed survey of the site's specific characteristics is conducted. The survey verifies and supplements information from the preliminary off-site characterization and aims to identify existing hazards and assist in selecting appropriate engineering controls and PPE for employees. The entry team typically includes two workers entering the site and two outside support personnel, equipped with PPE and ready for emergency response.

The survey will include:

- **Air Quality Monitoring:** Perform additional air monitoring as necessary to gather more information about air quality and potential hazards.
- **Container and Storage System Assessment:**
 - Note the types of containers, impoundments, or storage systems at the site, including their materials and configurations.
 - Assess the condition of waste containers and storage systems, checking for damage, rust, corrosion, leaks, or bulging.
 - Pay attention to labels on containers indicating hazardous materials like corrosives, explosives, flammables, radioactives, or toxics.
- **Material Condition Observation:**
 - Observe the physical state of materials (gas, liquid, solid) and their characteristics (color, turbidity, behaviors like corroding, foaming, vaporizing).
 - Identify any conditions that may lead to splashes or direct contact.
- **Natural Wind Barrier Identification:** Look for natural wind barriers such as buildings, hills, and tanks that might affect dispersion.
- **Pathways of Dispersion:** Determine potential dispersion pathways, including air, biological routes, ground or surface water, and land surface.
- **Remote Sensing and Subsurface Investigation:** If necessary, use methods like electromagnetic resistivity, seismic refraction, magnetometry, metal detection, and ground-penetrating radar for locating buried waste or contaminant plumes.
- **Indicators of Hazardous Substance Exposure:**
 - Look for indicators like dead wildlife, unusual odors, visible cracks or fissures, pools of liquid, foams, oils, gas generation, and deteriorating containers.
 - Identify cleared or landfilled areas.
- **Safety Hazard Assessment:**

- Assess site structures and obstacles, terrain stability, and the stability of stacked materials.
- Identify reactive, incompatible, flammable, or highly corrosive wastes.
- **Naturally Occurring Skin Irritants:** Note the presence of agents like poison ivy, poison oak, or poison sumac.
- **Tag and Label Observation:** Observe and record any tags, labels, markings, or other identifiers at the site.
- **Sample Collection:**
 - Collect samples from various sources like air, drainage ditches, soil, standing pools, storage containers, water bodies, and groundwater.
- **Biologic and Pathologic Hazard Sampling:** Sample for or identify any biological, pathological, and radiological hazards as necessary.

These monitoring activities are crucial for gathering data to assess the hazards and risks at the site, allowing for the implementation of appropriate safety measures for personnel and the environment.

4.4.4 Ongoing Monitoring for Site Characterization

Monitoring is essential when potential for ionizing radiation or IDLH conditions exists, or when available site information is insufficient.

The monitoring activities include:

- Using appropriate direct reading test equipment, such as combustible gas meters and detector tubes, to monitor the air for IDLH conditions and other hazards that may cause death or serious harm (e.g., combustible or explosive atmospheres, oxygen deficiency, toxic substances).
- Conducting monitoring for hazardous levels of ionizing radiation using direct reading instruments. Gamma and beta radiation can be surveyed using a Geiger-Mueller detection tube or a gamma scintillation tube. If alpha radiation is expected, a proportional counter should be used.
- Observing signs or indications of actual or potential IDLH hazards or other dangerous conditions. Any indication of such hazards should be taken as a signal to proceed with caution and careful consideration.

The table below provides some basic guidelines for decision-making based on atmospheric hazards.

Table 4.1 Guidelines for Some Atmospheric Hazards

Hazard	Monitoring Equipment	Measured Level	Action
Explosive atmosphere	Combustible gas indicator	<10% LEL	Continue investigation.

		10%-25% LEL >25% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered. Explosive hazard. Withdraw from area immediately.
Oxygen	Oxygen concentration meter	<19.5% 19.5%-25% >25%	Monitor wearing self-contained breathing apparatus. NOTE: Combustible gas readings are not valid in atmospheres with <19.5% oxygen. Deviation from normal level may be due to the presence of other substances. Fire hazard potential. Discontinue investigation. Consult a fire safety specialist.
Radiation	Radiation survey equipment	<2 mrem/hr >2 mrem/hr	Radiation above background levels (normally 0.01-0.02 mrem/hr) signifies the possible presence of radiation sources. Continue investigation with caution. Perform through monitoring. Consult with a health physicist. Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of a health physicist.
Inorganic and organic gases and vapors	Colorimetric tubes Chemical-specific instruments, including halide meter, hydrogen sulfide detector, carbon monoxide monitor, and mercury meter.	Depends on chemical	Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/REL/TLV.
Organic gases and vapors	Portable photoionizer Organic vapor analyzer (1) Operated in gas chromatography mode (2) Operated in survey mode	Depends on chemical	Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/REL/TLV.

Section 4.5 Health and Safety Plan

4.5.1 Components of the HASP

The Site Safety Plan's development should involve both the off-site and on-site management and be reviewed by occupational and industrial health and safety experts, physicians, chemists, or other relevant personnel. The plan should, at the very least:

- Assign key personnel and alternates responsible for site safety
- Describe the hazards associated with each operation performed
- Ensure personnel are adequately trained to fulfill their job responsibilities and to manage the specific hazardous situations they might encounter
- Outline the protective clothing and equipment to be worn by personnel during various site operations
- Define any site-specific medical surveillance requirements
- Outline the program for periodic air monitoring, personnel monitoring, and environmental sampling, if needed

- Define the actions to be undertaken to mitigate existing hazards (e.g., containment of contaminated materials) to create a safer work environment
- Define site control measures and include a site map
- Establish decontamination procedures for personnel and equipment
- Outline a Contingency Plan for safe and effective response to emergencies
- Outline the site's Standard Operating Procedures (SOPs)

SOPs are standardizable activities (like decontamination and respirator fit testing), for which a checklist can be used. These procedures should be:

- Pre-formulated
- Based on the best available information, operational principles, and technical guidance
- Field-tested by qualified health and safety professionals (and revised as necessary)
- Relevant to the types of risk at that site
- Easy to understand and apply
- Provided in writing to all site personnel (who should be briefed on their usage)
- Included in training programs for site personnel

4.5.2 Adherence to the HASP

To ensure adherence to the Site Safety Plan, the Site Safety Officer should conduct a safety meeting before initiating any site activity and before and after each workday. These safety meetings aim to describe the assigned tasks and their potential hazards, coordinate activities, identify methods and precautions to prevent injuries, plan for emergencies, describe any changes in the Site Safety Plan, as well as obtain worker feedback on safety and health conditions and the Site Safety Plan's effectiveness.

The Site Safety Officer should also conduct frequent inspections of site conditions, facilities, equipment, and activities to verify the Site Safety Plan's adequacy and implementation. On a hazardous waste site, workers' risks can quickly and dramatically change with shifts in:

- Work and other site activities
- The state of degradation of containers and containment structures
- The state of equipment maintenance
- Weather conditions

The following guidelines should be adhered to for effective safety inspections:

- Develop a checklist for each site, listing the items that require inspection
- Discuss inspection results with supervisors and workers
- Re-inspect any identified problems to ensure they have been rectified
- Document all inspections and subsequent follow-up actions
- Maintain records until site activities are completed and as mandated by regulatory agencies

The minimum frequency for inspections depends on the site's characteristics and the equipment used on-site. Factors to consider include:

- The severity of risk on-site
- Regulatory requirements
- Operation and maintenance requirements
- The expected effective lifetime of clothing, equipment, vehicles, and other items
- Recommendations based on professional judgment, laboratory test results, and field experience

4.5.3 Availability and Use of the HASP

The written HASP should be readily accessible at the site for employees, contractors, or subcontractors to review. Pre-entry briefings should be held before site access and as needed to ensure employees comprehend the HASP and its execution. The employer also must carry out regular safety and health inspections at the site, and all identified deficiencies must be corrected before work continues on the site.

4.5.4 The eHASP2 Tool

OSHA has developed an interactive software program, named eHASP2, to assist employers in constructing an appropriate HASP. This eTool incorporates decision-making logic and a comprehensive chemical database to support users in determining appropriate safety measures for site health and safety hazards. After entering site-specific information, the program generates reports containing “model” language that is compliant with OSHA standards, thereby assisting in the creation of a site-specific HASP.

Section 4.6 Medical Monitoring

4.6.1 Employee Requirements

Under the umbrella of the general Safety and Health Program, as well as the site-specific HASP, a Medical Monitoring Program is necessary. This program is designed to evaluate and track the health status and physical fitness of employees working with hazardous materials. The employer has the responsibility to institute a Medical Monitoring/Surveillance Program for the following categories of employees:

- Employees who are or could potentially be exposed to hazardous substances or health threats above PELs (or above stated exposure levels if no PEL is available) for over 30 days per year
- Employees who must wear a respirator for 30 days or more per year on-site or as mandated by 1910.134
- Employees who have experienced unanticipated or emergency releases of hazardous wastes above exposure limits (without the appropriate protective gear) or exhibit signs or symptoms of potential illness resulting from exposure to hazardous substances

- Employees tasked with responding to on-site hazardous materials (HAZMAT) releases, such as the on-site HAZMAT team.

The following table summarizes the categories of employees who are required to participate in the Medical Monitoring Program and when the exam is required.

Table 4.2 Categories of Employees in the Medical Monitoring Program

Employee Category	When a Medical Exam is Required
Employees who may be exposed to hazardous substances at or above PELs or published exposure levels for those substances 30 or more days a year	Before assignment Every 12 months unless the physician recommends a longer interval (not to exceed 24 months)
Employees who wear a respirator for 30 or more days a year or who are required by 1910.134, Subdivision 2/1 to wear a respirator	At termination of employment and reassignment
Members of HAZMAT teams	Immediately after reporting symptoms indicating overexposure
Employees who show symptoms of overexposure to hazardous substances	As soon as possible after an employee reports symptoms When a physician determines an examination is necessary

4.6.2 Examination Requirements

All examinations must be conducted by or under the direct supervision of a licensed physician, without any financial burden on the employee, without wage loss, and at a suitable time and place. These examinations must encompass a comprehensive medical and employment history, with a particular focus on symptoms related to the management of hazardous substances and health hazards, as well as fitness for duty, which includes the ability to wear any necessary PPE under potential worksite conditions.

These examinations are required as follows:

- Prior to job assignment and annually thereafter (or every 2 years if deemed appropriate by a physician)
- Upon termination of employment or reassignment to an area where medical examinations are not necessary
- Immediately for employees who are injured or become ill from exposure to hazardous substances during an emergency, or who display signs or symptoms of hazardous substance overexposure
- At more frequent intervals if the examining physician deems it medically necessary

The employer must provide the examining physician with:

- A copy of the standard and its appendices
- A detailed description of the employee's duties relating to their exposures

- The exposure levels or anticipated exposure levels
- A description of any personal protective and respiratory equipment in use or intended for use
- Information from previous medical examinations

The employer must procure a written opinion from the physician containing the medical examination results and:

- Any identified medical conditions that may increase the employee's risk from exposure
- Any suggested limitations on the employee or on the use of PPE
- A declaration that the employee has been informed by the physician of the medical examination result

The physician should not disclose specific findings or diagnoses unrelated to employment.

Essential Aspects of the Medical Examination:

- The examination should be conducted under the guidance of a licensed physician.
- The physician must have access to information about the employee's roles, exposure levels, and personal protective gear.
- The employee should be given a copy of the physician's written conclusions.