

Chapter 4

Site Entry Activities

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Chapter 4

Site Entry Activities

4.1 Introduction

Personnel performing sampling activities may encounter known and/or unknown hazards. When it is anticipated that potentially hazardous activities are to be conducted, or where there is a potential for contact with hazardous materials or contaminants, a health and safety program must be established, and a site-specific health and safety plan (HASP) must be developed prior to any hazardous site work. For site planning details see Chapter 1. Both the health and safety program and the site-specific HASP shall comply with 29 CFR 1910.120 (b)(1)(iv) and (1)(v) of the OSHA Standard for Hazardous Waste Operations. For additional information not discussed in this Chapter please contact your Health and Safety Officer.

The NJDEP maintains a library of guidance documents on its website at <https://www.nj.gov/dep/srp/guidance/>. It is recommended the reader access the website and review the guidance manuals pertinent to the respective task. Additional guidance may also be found at websites of the EPA and the American Society for Testing and Materials (ASTM). Examples of some of the relevant guidance manuals and websites pertaining to this chapter are:

Soil Investigation Technical Guidance: https://www.nj.gov/dep/srp/guidance/#si_ri_ra_soils;

Ground Water Technical Guidance: https://www.nj.gov/dep/srp/guidance/#pa_si_ri_gw;

Ecological Evaluation Technical Guidance: https://www.nj.gov/dep/srp/guidance/#eco_eval;

Quality Assurance Project Plan Technical Guidance: https://www.nj.gov/dep/srp/guidance/#analytic_methods;

Vapor Intrusion Technical Guidance: <https://www.nj.gov/dep/srp/guidance/#vi>;

USEPA On Scene Coordinators Toolbox: <https://response.epa.gov/main/healthsafety.aspx>; and

OSHA: <https://www.osha.gov>.

4.2 Health and Safety Program Plans

Below is a summary of the information that shall be provided in a written health and safety program and/or a site-specific health and safety plan:

4.2.1 Organizational Structure

Pursuant to 29 CFR 1910.120(b)(2), a list, or organizational chart, of key personnel involved in all phases of on-site operations shall be provided. It should include the functions and overall responsibilities of each person identified. In accordance with 29 CFR 1910.120(b)(2)(i)(B), a Health and Safety Supervisor shall have the responsibility and authority to develop and implement the health and safety program and/or site-specific HASP and verify compliance with applicable safety and health requirements.

4.2.2 Hazard Analysis and/or Site Risk

Risks to consider for each location and the associated tasks to be performed shall be reviewed in advance by site personnel and available onsite in accordance with 29 CFR 1910.120(c)7. This should include, but not be limited to, the following:

- The site's historical use
- A preliminary evaluation of the site's existing characteristics
- An evaluation of the known or suspected contaminants and conditions on the entire site that may pose inhalation, skin absorption/contact, exposure, or ingestion hazards
- An evaluation of known or potential safety hazards associated with each task and area of concern (AOC)
- Size, location, and surroundings of the site
- Site topography, accessibility, and special features (e.g., structures, vessels, tanks, etc.)
- Description of the operation and tasks to be performed
- Approximate duration of each operation and task
- Known or suspected pathways of contaminant dispersion pertinent to the operations and tasks performed
- Safety and health hazards expected on the site (e.g., trip and fall hazards, natural hazards)
- Status and capabilities of emergency response teams that will be providing assistance during site emergencies, including those providing emergency medical treatment and transport of any contaminated injured persons.

4.2.3 Training Requirements for On-Site Personnel

Pursuant to 29 CFR 1910.120, et al, all workers that are engaged in on-site activities must have met one of the following requirements prior to the start of operations at the site:

1. General site workers (such as regulators, subcontractors, contractors, equipment operators, general laborers, and supervisory personnel) engaged in hazardous substance removal, or other activities that expose or potentially expose workers to hazardous substances and health hazards, shall receive a minimum of 40 hours of instruction off the site, and a minimum of three (3) days actual field experience under the direct supervision of a trained, experienced supervisor.
2. Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and a minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.
3. Workers regularly on site, who work in areas that have been monitored and are fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site and a minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.
4. Workers with 24 hours of training who are covered by items 2 and 3 of this section, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and 2 days of field experience to gain the training specified in item 1.

In addition, pursuant to 29.cfr.1910.120(e)8, an annual 8-hour refresher course after the initial training shall be provided, to all site personnel in order to maintain field work employment eligibility.

On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations, including the on-site HSO, shall meet the requirements of a general site work and have also received 8 hours additional training in managing such site operations prior to the start of

site activities as stipulated in 29 CFR 1910.120.

Employees who have been designated as responsible for responding to on-site emergencies shall have received additional training in how to respond to such emergencies prior to the start of site operations as stipulated in 29 CFR 1910.120.

Employees who have not received the required training prior to the start of site operations are not to engage in on-site operations until such training has been completed.

The employer must maintain an up-to-date summary list of the health and safety topics and elements administered to each employee.

A written certification statement of completed training and/or acquired experience for all employees designated to engage in on-site activities shall be provided. A member of senior management, a corporate officer, or the health and safety program manager shall endorse such certification.

It is recommended that site specific training and performance of daily safety briefings regarding planned operations, the site-specific HASP, the form and warning properties of potential hazards, work zones, locations of emergency/safety equipment, local emergency response procedures and any changes in site characteristics, levels of protection, communications, decontamination procedures, emergency facilities and signals, and evacuation procedures be conducted.

4.2.4 Engineering Controls and Personnel Protection

The need to apply engineering and/or work practice controls as a means of protecting personnel in the performance of site-specific tasks should be considered. When feasible and practicable, it is recommended that engineering controls be implemented to reduce and maintain employee exposures to or below OSHA permissible exposure limits (PELs) for those tasks demonstrating known or suspected hazards. Work practice controls should next be applied when engineering controls are impractical and should be incorporated as site-specific standard operating procedures (SOPs) for personnel precautions and routine operations.

4.2.4.1 Personal Protective Equipment (PPE) and Levels of Protection

Personal protective equipment (PPE) that will protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis should be selected and used.

The selection of PPE should be based on an evaluation of performance characteristics, site-specific tasks and known, or suspected hazards. PPE should be assembled into Levels of Protection (LOPs), or ensembles appropriate for the site. Guidance related to the selection of respiratory equipment and appropriate PPE and a detailed description of ensembles by LOP (Level A through Level D) is provided in Chapter 13 - Personal Protection, this description is available at 29 CFR 1910.120 appendix B.

HASPs should include a list of components for each protective ensemble, the LOP selected for each task, the rationale for each task-specific selection, and any contaminant action levels to be followed in LOPs decision making.

If the site-specific HASP requires respiratory protection, per OSHA requirements, it should include a description of the respiratory protection program and the method of respirator fit testing employed.

Only NIOSH/MSHA approved respiratory protective equipment shall be used in accordance with 29 CFR 1910.134. Any other PPE selected shall be in conformance with appropriate ANSI standards for that equipment.

The PPE program shall follow the OSHA requirements at 29 CFR 1910.120(g)5 and address the following elements:

- Site hazards
- PPE selection
- PPE use and limitations
- Duration of site operations
- PPE maintenance and storage
- PPE decontamination and disposal
- PPE training and proper fit
- Donning and doffing procedures
- PPE inspection prior to, during, and after use
- Evaluation of program effectiveness
- Heat stress and temperature limitations, other medical considerations

For further information regarding PPE selection, use, replacement, donning, and doffing see Chapters 13 and 14.

4.2.5 Medical Surveillance Program

Per 29 CFR 1910.120(b) a medical surveillance program (MSP) for employees engaged in on-site operations must be implemented if any of the following criteria are met:

- Employees are, or may be, exposed to hazardous substances, or health hazards, at or above the permissible exposure limits, or if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
- Employees wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134.
- Employees are injured due to overexposure from an emergency incident involving hazardous substances or health hazards.
- Employees are members of HAZMAT teams.

The employer shall retain all medical surveillance records and personnel exposure monitoring data for 30 years plus employment as described in 29 CFR 1910.1020(d)(1)(I).

The employer shall provide written certification of the medical fitness for work of all employees designated to engage in on-site operations prior to the start of those operations. A member of senior management, a corporate officer, or the health and safety program manager shall endorse such certification, and the certification shall be incorporated into the site HASP.

As dictated by seasonal conditions, it is recommended that heat and/or cold stress monitoring be incorporated into the health and safety program and into the site-specific HASP. The program should include employee awareness of the signs and symptoms of heat and/or cold stress, preventive measures, and employee and/or environmental parameters that will be measured. The employer should maintain a daily heat and/or cold stress log on all employees wearing protective ensembles onsite and should describe the log in the site HASP. Specific work/rest schedules with consideration for workers fatigue should be maintained. In addition, adequate fluids and a sheltered area for breaks should be designated. For additional information on protective ensembles please see Chapter 13 of the FSPM.

4.2.6 Air Monitoring

4.2.6.1 Site Specific Monitoring

An air monitoring program must be implemented to identify areas of elevated airborne contaminant concentrations and to determine the level of the concentrations relative to background. The employer shall provide the personnel, instruments, and materials necessary to perform such air monitoring and identify the individual responsible for administering the program. The air monitoring program shall be included in the HASP and contain the following information:

- Type, make, and model of instrument(s) selected for use
- All instrument settings for each instrument used
- Method of instrument calibration, including calibrant and sample calibration data sheet
- Method of field checks, including field check materials and record of checks
- Manner and frequency of calibration and pre- and post- (or greater) field checks
- For all types of air sampling and monitoring the limitations and cross reactivities of the instruments or sampling media should be identified to understand the limitations of the methods being used
- All alarm setting should be verified to be at the appropriate action level

4.2.6.2 Area and Personnel Air Sampling

The need to develop and implement area and personnel air sampling programs during the project should be evaluated and included in the site HASP. Special considerations should be given to intrusive or high-risk tasks, indoor or outdoor tasks and the potential for exposure to those performing such tasks.

All necessary sampling devices, pumps, collection media, and support equipment to perform the air sampling should be provided and identified in the HASP. The sampling devices and pumps should bear all approvals necessary for use in combustible or flammable atmospheres. In addition, the sampling devices, pumps, collection media, and any necessary support equipment shall be appropriately calibrated according to the manufacture's specifications and field checked on a regular basis to ensure it is functioning properly.

A daily sampling record should be established as part of the air sampling program. Depending on the contamination present and the complexity of the sampling event, the record shall include the following:

- Collection date
- Sample identification number
- Location and/or task monitored
- Wind speed and direction during each sample collection period
- Duration of each sample collected, including the start/stop times of each sample
- Ambient temperature and humidity of sampling period
- Pre-and post-sampling train flow-rate checks
- Instrument readings, calibration, and field checks
- Any pertinent comments

When required, the laboratory selected for sample analysis should be accredited by the AIHA for the

analysis required. Sampling and analytical methods of NIOSH then alternatively OSHA, should be used preferentially when such methods are available for the samples collected. All appropriate QA and QC provisions regarding sample collection, transport, and holding times should be followed.

4.2.6.3 Records Retention and Data Reporting

The employer shall retain all personnel exposure sampling results and monitoring data in accordance with the requirements set forth in OSHA, 29 CFR 1910.120(c).

A daily air monitoring log shall include, as a minimum, the following information:

- Monitoring date
- Location and/or task monitored
- Wind speed, direction, ambient temperature, and humidity
- Instruments used, including make and model and all instrument settings
- Instrument readings and units
- Pertinent comments or information
- Results of instrument calibration checks, including date and time of each check, the calibration agent used, and its concentration, for each instrument employed

4.2.7 Site Control

For additional information on establishing work zones please see applicable OSHA guidance. It is recommended that work zones be divided into areas where specific operations, or tasks will occur. This is done to minimize cross-contamination and/or to keep impacted materials from leaving the site. Site entry and decontamination procedures are completed at separate designated control points. Three work zones should be established to perform this work: an exclusion (contaminated) zone, a contamination reduction (decon) zone and a support (clean) zone. A map or diagram showing the specific work zones and a description of the site control plan should be included in the HASP. Each of the zones should be clearly demarcated using fencing, flags, cones, or similar devices. An access control point should be maintained to ensure that personnel are directed through the contamination reduction zone when entering or leaving the exclusion zone. For additional information on establishing work zones please see applicable OSHA guidance available at: https://www.osha.gov/sites/default/files/enforcement/directives/CPL_02-02-071.pdf.

A daily site entry control log shall be kept. The log shall include:

- Personnel visiting the site
- Affiliation
- Date
- Arrival time
- Departure time
- Purpose of visit and locations visited

All unauthorized personnel must be prevented from entering exclusion zones of the site.

4.2.8 Decontamination

All contaminated personnel and equipment exiting the exclusion zone, or other potentially contaminated areas, must be decontaminated prior to entering the support zone, or leaving the site. This will be done in

the contamination reduction zone which should be set up for the proper removal of PPE and properly staffed prior to any exclusion zone activities. This decontamination must be performed in order to prevent contamination from being transferred into clean areas and contaminating or exposing unprotected personnel. Refer to Chapter 14, *Personnel Contamination Reduction*, for measures for workers to take when leaving contaminated areas at hazardous waste sites and on properly doffing PPE.

Personnel and equipment decontamination procedures appropriate for the site shall be included in the site HASP. The procedures shall include the necessary equipment and number of steps to achieve the objective, provisions for any personnel protection, and a diagram outlining the steps or stations in the procedures. Example diagrams summarizing the contamination reduction zone extents and the order of PPE removal based on the selected LOP are provided Chapter 14. The procedures must ensure adequate containment and removal of any decontamination solutions and spent disposable protective apparel.

Provisions should be made to facilitate personal hygiene at breaks and following daily operations. Where decontamination procedures include shower usage and change rooms away from the exclusion zone, they shall meet the requirements of 29 CFR 1910.141 and 1926.51.

4.2.9 Emergency Contingency Planning

Emergency Response Plan, (ERP) to handle anticipated on-site emergencies, must be developed prior to the start of site operations.

The ERP shall be incorporated into the site HASP as a separate section of that document and shall be periodically reviewed and amended, as necessary, to keep it current with new or changing site conditions or information.

The ERP shall address, as a minimum, the following:

- Preplanning of site operations to prevent emergencies
- Personnel roles and lines of authority
- Key personnel at the site authorized and responsible for implementing the plan
- Emergency recognition and control measures
- Evacuation routes and procedures, and the frequency of emergency drills
- Safe distances and places of refuge
- Emergency security and site control measures
- Decontamination measures not previously listed in the HASP and specific for all anticipated emergencies
- Emergency medical treatment and first aid
- Emergency alerting and response procedures
- Site communications
- Site diagrams showing general layout, work zones, and prevailing weather conditions
- Procedures for reporting incidents to pertinent local, state, and Federal agencies
- A list of emergency telephone contacts including the name, location, telephone number, written directions and a route map to the nearest medical facility that will provide emergency medical services
- Measures to review and follow up on site responses
- Emergency and personal protective equipment kept at the site for emergencies, with an

equipment list and a drawing indicating their on-site location

Prior to startup of site operations, it is recommended that local officials and/or those responsible for local emergency management and public safety shall be notified. These agencies include but are not limited to:

- Fire
- Ambulance
- Police
- Local/County health officials
- Utility company

First Aid/CPR/AED Training – At least one person holding valid certifications in basic first aid and CPR/AED is present at the site during all site operations pursuant to 29 CFR 1910.151 and 29 CFR 1926.50(c).

Verification of Medical Facility Preparedness – A local medical facility shall be selected for inclusion into the ERP to ensure that said facility is willing and is capable of providing that medical support necessary to satisfy those anticipated hazards and emergencies detailed in the ERP. Safety Data Sheets (SDS), product information, or any technical information on hazard, exposure and treatment of anticipated/known hazards should be provided to the medical facility.

4.2.10 Confined Space Operations

Should site operations include activities within confined spaces, a confined space entry program and relevant SOPs shall be incorporated into the HASP pursuant to 29 CFR 1910.146.

If the confined space entry meets the OSHA definition of a permit required confined space entry, then a section addressing such entries shall be included in the HASP.

An Entry Permit System must be developed to ensure that the following are addressed and complied with:

- A confined space entry training program
- Identification of all confined spaces to all employees to limit unauthorized access
- Identification of hazards in the confined space
- A system of monitoring for atmospheric hazards
- A system of calibration of monitoring equipment
- A system of barricades, to prevent unauthorized entry
- A system of identifying authorized entrants, attendants, rescuers and those authorized to sign the entry permit
- A procedure for emergency evacuation
- Emergency rescue procedures
- Procedures to test the program to ensure effectiveness

Pre-entry briefings shall be held prior to initiating any confined space entries and at other times as necessary to ensure that employees are aware of the HASP provisions governing such activities and that the special provisions are being followed. The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the point of entry or by any other equally effective means, for assurance that the pre-entry preparations have been completed.

Inspections shall be conducted by a Health and Safety Officer or, in the absence of that individual, another qualified individual acting on behalf of the HSO as necessary to determine the effectiveness of the confined space SOP with regard to those confined spaces identified on site.

A qualified individual shall test the atmosphere of the confined space prior to entry and during work to ensure that all measures necessary to protect the health and safety of employees entering have been taken. Monitoring shall be appropriate for the contaminant(s) that are known or suspected of being present in the space.

The employer shall provide appropriate protective and entry equipment for all entrant personnel necessary for the Permit Required entry. On site rescue personnel must be present or off site rescue must be able to respond to the site within 3 minutes of notification. Equipment necessary for a rescue must be identified and present at the point of entry.

Federal OSHA training requirements at 29 CFR 1926 subpart AA for all personnel involved in confined space entry must be met. A training program must be administered to all personnel involved in confined space entry before entrance can be initiated. Rescue teams shall practice at least annually at the confined space or at representative openings having the same size, configuration, and accessibility as the confined space from which an actual rescue would be performed. A record of training and authorized personnel shall be kept on-site and listed in the HASP.

4.2.11 Other Special Operations

4.2.11.1 Spill Containment

A written spill containment program shall be developed to handle the possibility of a spill or leakage of drummed or containerized hazardous materials. The contractor shall identify the following on-site and off-site personnel and equipment or services necessary to isolate, contain and mitigate the spill:

- Clean up contractor or personnel
- Estimate of response time of off-site contractors
- Spill containment procedures (diking, over pack, etc.)
- Special safety precautions (fire, corrosive, radioactivity, etc.)
- Equipment and supplies on hand at site or readily available to respond to contain and clean up the spill

4.2.11.2 Excavations and Trenching

All excavation work shall comply with 29 CFR 1926, Subpart P and other state and federal regulations governing excavations and trenching. The need to perform any excavations or trenching as part of the site operations must be described in the HASP. Information shall include, but not be limited to:

- detailed methods of preparing the trench or excavation including descriptions of sloping, shoring, and guarding;
- observation of proper equipment spacing, use of barriers, means of exit, and placing of machinery and spoils;
- training of personnel working around and in trenches and excavations in such operations to assure knowledge of hazards, safe operations, and procedures to be followed in the event of an emergency; and

- measures to be taken to avoid overhead electric lines, underground utilities, storage structures, and service passageways and include in the HASP drawings, measurements, and descriptions. All pertinent sections of 29 CFR 1910, Subpart S and 29 CFR 1926, Subpart K for electrical safety must be complied with and identified in the HASP.

4.2.11.2.1 Underground Utilities

No ground intrusive work (including excavation, trenching, digging, probing, boring and drilling) is to commence without a current underground utility mark out as per N.J.S.A. 48:2-73, in compliance with OSHA Regulation 1926.651 and in compliance with N.J.A.C. 14:2. This includes all private utilities lines which would not normally be marked out.

NJ One Call is a free service and can be contacted at 1-800-272-1000 (out of State call 908-232-1232), dial 811 or <https://www.nj1-call.org>. They will contact all utility companies that may have services in the area of investigation. Calls must not be made less than 3 full working days and not more than 10 working days prior to the planned work. If work is delayed past the 10 days, you are required to renew your ticket. “One Call” legislation mandates that all owners of underground infrastructures become New Jersey One Call members. The “One Call” will require the following information:

- County
- Municipality
- Street address
- Nearest cross street
- Type of work being performed
- Extent of work
- Name of caller and title
- Start date of work

The caller will receive a “ticket” number for the mark-out locations. If you must contact the “One Call” system regarding a mark-out, you must supply them with your ticket number.

The mark-out methods used by the utilities will include flags, stakes and color-coded paint. In many cases these are not permanent. It is requested the mark-outs be refreshed if work is completed past the 10 business days. Utilities are marked by the uniform color code recommended by the American Public Works Association. The mark-out color and associated utility are as follows:

RED	– electric
YELLOW	– gas, oil, petroleum products
ORANGE	– telephone, cable TV, communications
BLUE	– water
GREEN	– sewer
PINK	– temporary survey marking
WHITE	– proposed excavation

This is by no means an all-encompassing list of utilities that may be present at a site targeted for a soil gas investigation. Historical and/or current commercial process may include unlisted buried utilities. Therefore, such underground utilities should be thoroughly identified and located.

It is also important to contact the municipal utility authority in the town in which you will be performing work. There may be “road-opening” permits that must be obtained prior to the start of

the investigation. Police departments and emergency services often wish to know if a roadway is going to be partially blocked or detoured, and may require that a traffic safety officer be present during any road work.

The utility companies are only obligated to mark-out the utility lines on public property. They are not required to mark out the utility lines on private property. The property owner or a private company must complete utility mark-outs on private property.

Other means of locating underground utilities must be identified for utilities not covered by NJ One-Call. The NJ One Call Markout Ticket Confirmation Number(s) should be recorded in the HASP, or at a minimum, be kept at the site for the duration of any ground intrusive work during the project. All markouts must be maintained during the course of the work.

Above all, if it is suspected that a utility line is present, move the sample location. A few feet in a soil gas survey won't have a great impact on the results in lieu of possible injury or death.

4.2.11.2.2 License Requirements

A brief overview of the license requirements for the construction of borings and monitor wells in New Jersey is available at: https://www.state.nj.us/dep/watersupply/g_boards_le.html. Consult N.J.A.C. 7:9D-Well Construction; Maintenance and Sealing of Abandoned Wells for further information. A copy is available through the Bureau of Water Allocation at 609-984-6831 or online at: <http://www.state.nj.us/dep/watersupply/>.

4.2.11.3 Hot Work

The performance of Hot Work such as welding, cutting, etc. during site operations must be addressed in the HASP. A Hot Work "Permit" procedure must be included in the HASP if hot work is performed and must comply with the sections of OSHA 1910.119(k), OSHA 1910.146, and OSHA 1926.64 (k) et al as they apply to these operations.

All hot work procedures should be outlined and shall comply with both state and local fire codes as well as with OSHA regulations.

All electrical supply wiring and distribution shall comply with the local and National Electric Codes, as well as any state and OSHA 1926.400 Subpart K, governing such installations.

Proper utilization and storage of flammable cutting gases and other compressed gases shall comply with the requirements of OSHA 1926.350 et al. All gas cylinders shall be secured to prevent falling or potential damaged.

An appropriately rated fire extinguisher should be available.

4.3 General Safety Measures

4.3.1 Personal Practices

Levels of protection shall be established for a given site and shall be based upon the best available information regarding known or suspected hazards and the type of planned activity. Activities shall then be performed in accordance with those site-specific levels of protection. Changes in levels of protection should be made based on the actual conditions at the site. When sufficient information is lacking or when the conditions of a site are unknown, or in doubt, all site entries and on-site activities will be performed in at least Level B protection, as a minimum, until the knowledge on site-specific hazards has improved.

The use of respiratory protective equipment shall be in accordance with OSHA requirements. A schedule

should be developed for changing air purifying respirator cartridges in accordance with the manufacturer's instructions, based on actual concentrations, and at least once each workday on-site. Only NIOSH/MSHA approved respirators shall be used. (See Chapter 13, *Personnel Protection*.)

Eating, drinking, chewing gum or tobacco, smoking, vaping, applying cosmetics or any other practice which increases the tendency for hand-to-mouth contact shall be prohibited within the exclusion zone(s) and prior to washing hands and face within the contamination reduction corridor or decontamination line.

Medicines and alcohol can intensify the effects of exposure to toxic chemicals. Alcohol, caffeine products and certain medications can contribute to and exacerbate the effects of heat stress. Personnel during site activities should not take prescription and non-prescription drugs when the potential for absorption, inhalation, or ingestion of toxic substances exists, unless specifically approved by a qualified medical provider.

Contact with surfaces known or suspected of being contaminated should be avoided during on-site activities. Avoid walking through puddles, mud, or discolored surfaces; kneeling on ground; leaning, sitting, or placing equipment on drums.

All personnel connected with a site and engaging in field activities must be familiar with standard operating safety procedures and any additional instructions contained in the Site Safety Plan. Further, all personnel, upon their initial visit to a site, shall read the HASP before performing any site related activities, have an opportunity to ask any questions, and shall confirm that reading with their signature in accordance with 1910.120(b)(1)(v).

4.3.2 Operations Management

For sites where entry/work is to be conducted in contaminated areas, a scaled site map designating work zones must be established prior to any site entry and all individuals involved must be familiar with it. The zones are to be connected by access control points to restrict entry and exit. Work zones can be adjusted as more becomes known about the site. The designated work zones include:

- **The Exclusion or Contamination Zone**
The area suspected to contain contamination, or uncontrolled hazardous substances. This zone may be divided into subsets based upon varying levels of hazard and/or the nature of the tasks to be performed. All personnel entering the Exclusion Zone must wear the required level of protection based on the HASP and site-specific conditions and must exit through the decontamination zone.
- **The Contamination Reduction Zone**
This area serves as a buffer between the exclusion and support zones. All decontamination activities occur in this area. It should be a suitable size to efficiently decontaminate workers, instruments, and equipment. Adequate supplies of materials and decontamination fluids should be available. All materials associated with the decontamination process must be properly managed.
- **The Support Zone**
This area should be free from any hazardous materials. This zone is the location for command posts, offices, storage, and site support facilities. It should be positioned upwind of the Exclusion Zone, when possible.

Communications using radios, cellular phones or other means must be maintained between entry team members and the support zone at all times. Emergency communications should be prearranged in case of radio failure, necessity for evacuation of site or other reasons.

Consideration must be given to the staffing requirements necessary for the job. Due to the nature of

hazardous materials, especially materials of unknown concentrations, a minimum of two persons should be present. Under no circumstances should field personnel go on site alone. In extremely hazardous situations, two teams of personnel should be employed: one sampling team and one backup/rescue team. Personnel on-site must use the “buddy system” see 29 CFR 1910.120(a)3. At a minimum, a third person, suitably equipped, as a safety backup is required during initial entries. Visual contact must be maintained between “pairs” on site and safety personnel. Entry team members should remain close together to assist each other during emergencies. During continual operations, on-site workers act as safety backup to each other. Off-site personnel provide emergency assistance.

A Pre-Work Safety Meeting must be conducted among personnel present at a site prior to:

- the start of each day’s activities;
- changes in shift;
- the arrival of new or additional personnel to a site; or
- the further performance of site activities following the occurrence of any significant changes on site. Topics to be covered should include the use of necessary protective clothing and equipment, chemical and physical hazards, tasks to be performed, special equipment or procedures, and emergency contacts and procedures to be followed.

4.4 Site Entry and Reconnaissance

4.4.1 Objectives

- Characterize the hazards that exist or potentially exist and may affect the public health, the environment, and response personnel
- Verify existing information and/or obtain data about the site
- Evaluate the need for prompt mitigative action
- Collect supplemental information to determine the safety requirements for personnel initially and subsequently entering the site
- Perform simple or immediate mitigative actions when necessary
- Create maps and capture images of areas of concern, document locations of hazards and confined spaces.

4.4.2 Preliminary Off-Site Evaluation

The need to enter a site must be based on some type of preliminary hazard evaluation. Prior to performing any initial site entry, an effort should be made to collect and examine as much information (records, off-site studies, shipping manifests, transportation placards, container types, and labels, etc.) about the site as possible. The information should primarily concern real or potential hazard(s), degree(s) of severity, and the associated risk(s). Subsequent site entries should only be made after examining similar information gathered during previous entries.

Off-site (peripheral) atmospheric monitoring must be conducted prior to any initial site entry and must be incorporated into plans for any subsequent on-site activities. Individuals performing such monitoring should maintain upwind positions when possible and utilize proper personal protective equipment. When off-site readings exceed pre-established levels, the site Health and Safety Plan must be adjusted to maintain safety.

4.4.3 Preliminary On-Site Evaluation

The initial site entry process is to be considered a rapid site screening procedure for the collection of preliminary data on any immediate hazards. Fire, explosion, oxygen-deficient atmospheres, ionizing radiation, airborne contaminants, containerized or pooled hazardous substances could affect workers during subsequent operations. For the purpose of monitoring, on-site hazards may be placed into several groups (see Table 4.1 at the end of this Chapter).

4.4.3.1 Combustible Gases

The presence or absence of combustible vapors or gases must be determined. If readings approach or exceed 5% of the lower explosive limit (LEL), extreme caution should be exercised in continuing the investigation. If readings approach or exceed 10% LEL, personnel should be withdrawn immediately. Before resuming any on-site activities, project personnel, in consultation with experts in fire or explosion prevention, must develop procedures for continuing operations.

4.4.3.2 Oxygen Concentrations

At sea level, ambient air typically contains about 19.5% by volume of oxygen. At lower percentages, air-supplied respiratory protective equipment is needed. Oxygen measurements are of particular importance for work in confined spaces, low-lying areas, or in the vicinity of accidents that have produced heavier-than-air vapors, which could displace ambient air. These oxygen-deficient areas are also prime locations for taking organic vapor and combustible gas measurements, since other substances have displaced the air. Oxygen-enriched atmospheres (>23.5%) increase the potential for fires.

4.4.3.3 Organic gases and vapors

If the type of organic substance(s) present at a site is known and is volatile or can become airborne, air measurements should be made with one or more appropriate, properly calibrated survey instruments or established sampling techniques.

When the presence, or identity of organic vapors/gases are unknown, instruments such as a portable photoionization detector and/or, flame ionization detector should be used. The readings obtained from these devices indicate total atmospheric concentrations. Identification of the individual components may permit some instruments to be specifically calibrated and used as analytical tools.

Sufficient data should be obtained during the initial entry to evaluate the site for various levels of organic vapors. These measurements can be used on a preliminary basis to: 1) determine levels of personnel protection, 2) establish site work zones, and 3) select candidate areas for more thorough qualitative and quantitative studies. Readings in excess of background concentrations may indicate toxic levels as well as the displacement of oxygen or the presence of combustible vapors.

Additional field instruments (Miran Sapphire, GC/MS etc.) and techniques (detector tubes air sampling devices) should be used to identify the contaminants so that the proper level of protection can be developed based on actual materials present.

When the type of contaminant present is known, the Levels of Protection utilized can be based on OSHA regulated Permissible Exposure Limits (PELs).

4.4.3.4 Inorganic gases and vapors

The ability to detect and quantify nonspecific inorganic vapors and gases is extremely limited. If

specific inorganics are known, or suspected to be present, measurements should be made with appropriate instruments.

4.4.3.5 Radioactive materials

Radiation monitoring should be incorporated in the initial survey where radioactive materials may be present, for example, fires at warehouses or hazardous material storage facilities, transportation incidents involving unknown materials, or abandoned waste sites.

Normal gamma radiation background is approximately 0.01 to 0.02 milliroentgen per hour (mR/hr) on a gamma survey instrument. Work can continue with elevated radiation exposure rates, however, if the exposure rate increases to 3-5 times above gamma background, a qualified health physicist should be consulted. At no time should work continue with an exposure rate of 0.1 mR/hr or more above background without the advice of a health physicist.

The absence of gamma readings above background should not be interpreted as the complete absence of radioactivity. Radioactive materials emitting low-energy γ (gamma), α (alpha), or β (beta) radiation may be present, but for a number of reasons may not cause a response on the instrument. Unless airborne, these radioactive materials should present minimal hazard, but more thorough surveys should be conducted as site operations continue to completely investigate the presence of any radioactive material.

4.4.3.6 Direct Reading Instruments

A complex variety of toxic air pollutants (including organic and inorganic vapors, gases, or particulates) can be produced at hazardous waste sites. Direct-reading field instruments will not detect or measure all of these substances. Thus, negative readings should not be interpreted as the complete absence of airborne toxic substances. Verification of negative results can only be done by collecting air samples and analyzing them in a laboratory or in an off-site location using portable analyzers.

4.4.3.7 Visual Observations

While on-site, the entry team should make visual observations to help evaluate site hazards, for example: dead animals, stressed vegetation, wind direction, labels on containers indicating explosive, flammable, toxic or corrosive materials, conditions conducive to splash or contact with unconfined liquids, sludges, or solids, and other potentially hazardous conditions.

Although the initial entry is considered a rapid activity, its duration can be quite variable. The time needed to conduct the initial survey depends on the urgency of the situation, type of incident, information needed, size of site, availability of resources, level of protection required for site entry personnel, etc. Consequently, initial surveys may need hours or days to complete and consist of more than one entry. Because of this variability, priorities must be established for atmospheric monitoring during a given initial entry operation.

The immediate concern to initial entry personnel are atmospheric conditions that could affect their safety. These conditions are airborne toxic substances, combustible gases or vapors, lack of oxygen, and to a lesser extent, ionizing radiation. Priorities for monitoring these potential hazards must be established after careful evaluation of known or suspected conditions before initiating entry.

When the type of material(s) involved in an incident are identified and release into the environment is suspected or known, the material's chemical/physical properties and the prevailing weather conditions may help determine the order of monitoring. An unknown substance(s) presents a more difficult monitoring problem.

In general, for poorly ventilated spaces (e.g., buildings, sewers, boxcars, or bulk tanks) which must be entered, combustible vapors/gases and oxygen-deficient atmospheres should be monitored first with team members wearing, as minimum, Level B protective equipment. Toxic gases/vapors and radiation should be measured as the next priority. Further, such spaces may be confined spaces and, therefore, special confined space entry procedures must be followed.

For open, well-ventilated areas, combustible gases and oxygen deficiency are lesser hazards and require lower priority. However, areas of lower elevation on-site (such as excavations, ditches, and gullies) and downwind areas may have combustible gas mixtures, in addition to toxic vapors or gases, and may lack sufficient oxygen to sustain life. Entry teams, therefore, must exercise caution by approaching and monitoring from upwind areas.

Any indication of atmospheric hazards (toxic substances, combustible gases, and lack of oxygen, radiation, and other specific materials) should be viewed as a sign to proceed with care and deliberation. Readings indicating non-explosive atmospheres, low concentrations of toxic substances, or other conditions may increase or decrease suddenly thereby changing the associated risks. Extreme caution must be exercised in continuing site entry activities when atmospheric hazards are indicated. Table 4.1 provides some guidelines for use during preliminary on-site evaluations.

Table 4.1 Atmospheric Hazard Guidelines			
Monitoring Equipment	Hazard	Level	Action
Combustible Gas Indicator	Explosive atmosphere	<5% LEL	Continue investigation.
		5%-10%	Continue on-site monitoring with extreme caution as higher levels are encountered.
		>10% LEL	Explosion hazard: withdraw from area immediately.
Oxygen concentration meter	Oxygen	<19.5%	Monitor wearing SCBA. NOTE: Combustible gas readings are not valid in atmospheres with <19.5% oxygen.
		19.5-23%	Continue investigation with caution, SCBA not needed, based on oxygen content only.
		>23.0%	Discontinue inspection; fire hazard potential. Consult specialist.
Photoionization Detector	Organic vapors/gases	Depends on species	Consult standard reference manuals for air concentration/toxicity data.
		Total response mode	For unknown contaminants, use strict guidelines to determine level of protection
Flame Ionization Detector	Organic gas/vapor	Depends on species	Consult standard reference for air concentrations/ toxicity data.
		Total response mode	For unknown contaminants, use strict guidelines to determine level of protection
Radiation survey	Radiation		Consult Radiation Protection Program for information regarding hazard levels. https://www.state.nj.us/dep/rpp/rms/rad_cleanups.htm

4.4.4 Other Considerations

Atmospheric hazards in off-site areas peripheral to the on-site zone must be periodically monitored with direct-reading instruments. Peripheral monitoring should include upwind readings within any established decontamination areas as well as within and near any command post. It is suggested that no fewer than four (4) readings be taken in each designated off-site area for each eight- (8) hour workday. Non-hazardous readings off-site should not be considered a definite indication of local atmospheric conditions, but only another piece of information to assist in the preliminary evaluation. When possible, atmospheric samples should be collected before the initial site entry is begun.

Because monitoring performed during the initial site entry produces only a preliminary evaluation of atmospheric hazards; a program for periodic on-site evaluation must be established. Materials detected during the initial entry survey require a more comprehensive examination of on-site hazards and analyses for specific components. Since site activities and weather conditions change, a continuous program to monitor atmospheric changes must be implemented utilizing a combination of monitoring and sampling techniques.

It is imperative that personnel using monitoring instruments be thoroughly familiar with their use, limitations, and operating characteristics. All instruments have inherent constraints in their ability to detect and/or quantify the hazards for which they were designed. Unless trained personnel use the instruments and assess data readout, airborne hazards can be grossly misinterpreted, endangering the health and safety of response personnel. In addition, only safety tested, and approved instruments should be used until the absence of combustible gases or vapors can be confirmed.

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