

Chapter 4

Site Entry Activities

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Chapter 4 Site Entry Activities

4.1 Introduction

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Personnel performing site investigative activities may encounter known and/or unknown hazards associated with those efforts. 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. 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.

4.2 Health and Safety Program Plans

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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

A list, or organizational chart, of key personnel involved in all phases of on-site operations must be provided. It should include the functions and responsibilities of each person identified. A Health and Safety Supervisor shall have the authority and knowledge necessary 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

A hazard analysis for each location and the associated tasks to be performed must be submitted. This shall include a description of the site conditions, be based upon the best information available regarding the contaminants and conditions present as well as the practices, tools and other equipment to be applied in the operation and shall 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 that may pose inhalation, skin absorption/contact, exposure or ingestion hazards
- An evaluation of known or potential safety hazards associated with each task

In summary:

- Size and location 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

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- Status and capabilities of emergency response teams that shall provide assistance during site emergencies, including those providing medical treatment and transport of any contaminated injured persons.

4.2.3 Training Requirements for On-Site Personnel

4.2.3.1 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:

4.2.3.1.1 General site workers (such as 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.

4.2.3.1.2 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.

4.2.3.1.3 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.

4.2.3.1.4 Workers with 24 hours of training who are covered by paragraphs 4.2.3.1.2 and 4.2.3.1.3 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 training necessary to total the training specified in paragraph 4.2.3.1.1.

4.2.3.1.5 In addition, an annual 8-hour minimum refresher course after the initial training shall be provided to all field (site) personnel in order to continue on site employment eligibility.

4.2.3.2 On-site management and supervisors directly responsible for or who supervise employees engaged in site operations, including the on-site HSO, shall 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.

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

4.2.3.4 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.

4.2.3.5 The employer must maintain a summary list of the health and safety topics and elements administered to each employee.

4.2.3.6 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 top-level management, a corporate officer, or the health and safety program manager shall endorse such certification.

4.2.3.7 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 shall be conducted.

4.2.4 Engineering Controls and Personnel Protection

4.2.4.1 The need to apply engineering and/or work practice controls as a means of protecting personnel in the performance of site-specific tasks must be considered. When practicable, engineering controls shall be implemented to reduce and maintain employee exposures to or below safe levels for those tasks demonstrating known or suspected hazards. Work practice controls shall next be applied when engineering controls are impractical and shall be incorporated as site-specific standard operating procedures (SOPs) for personnel precautions and routine operations.

4.2.4.2 Personnel Protective Equipment (PPE) and Levels of Protection

4.2.4.2.1 The use of personnel protective equipment (PPE) should be considered only when engineering and/or work practice controls have been deemed impractical or insufficient to protect employees during site operations.

4.2.4.2.2 The selection of PPE shall be based on an evaluation of performance characteristics, site-specific tasks and known, or suspected hazards, and shall assemble the PPE into Levels of Protection (LOPs), or ensembles appropriate for the site.

4.2.4.2.3 HASPs shall 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 LOP decision making.

4.2.4.2.4 If the site-specific HASP provides for respiratory protection, it shall include a description of the respiratory protection program and the method of respirator fit testing employed.

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

4.2.4.2.6 A PPE program must address the following elements:

- Site hazards
- PPE selection
- PPE use and limitations
- Duration of site operations
- PPE maintenance and storage
- PPE decontamination and NJDEP approved 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

For further information regarding PPE see Chapter 14.

4.2.5 Medical Surveillance Program

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

4.2.5.1.1 All employees who 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.

4.2.5.1.2 All employees who wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134/139

4.2.5.1.3 All employees who are injured due to overexposure from an emergency incident involving hazardous substances or health hazards.

4.2.5.1.4 Members of HAZMAT teams.

4.2.5.2 The employer shall retain all medical surveillance records and personnel exposure monitoring data for 30 years as described in Subpart C of 29 CFR 1910.120.

4.2.5.3 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 shall endorse such certification, or the health and safety program manager and shall be incorporated into the site HASP.

4.2.5.4 As dictated by seasonal conditions, heat and/or, cold stress monitoring shall be incorporated the health and safety program and into the site-specific HASP. The program shall 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 shall maintain a daily heat and/or cold stress log on all employees wearing protective ensembles on-site and shall describe the log in the site HASP.

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.

4.2.6.1.1 Type, make, and model of instrument(s) selected for use

4.2.6.1.2 All instrument settings for each instrument used

4.2.6.1.3 Method of instrument calibration, including calibrant and sample calibration data sheet

4.2.6.1.4 Method of field checks, including field check materials and record of checks

4.2.6.1.5 Manner and frequency of calibration and pre and post (or greater) field checks

4.2.6.2 Areal and Personnel Air Sampling

4.2.6.2.1 The need, or lack thereof, to develop and implement areal and personnel air sampling programs during the project must be evaluated and shall be included in the site HASP.

4.2.6.2.2 Special considerations shall be given to intrusive or high-risk tasks and the potential for exposure to those performing such tasks.

4.2.6.2.3 All necessary sampling devices, pumps, collection media, and support equipment to perform the air sampling must be provided and identified in the HASP. The sampling devices and pumps must bear all approvals necessary for use in combustible or flammable atmospheres.

4.2.6.2.4 The sampling devices, pumps, collection media, and any necessary support equipment shall be appropriately calibrated according to the manufacturer's specifications and field checked on a regular basis to insure it is functioning properly.

4.2.6.2.5 A daily sampling record must 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

4.2.6.2.6 When required, the laboratory selected for sample analysis must be accredited by the AIHA for the analysis required. Sampling and analytical methods of first NIOSH, then OSHA, must be used preferentially when such methods are available for the samples collected and all appropriate QA and QC provisions regarding sample collection, transport, and holding times must be followed.

4.2.6.3 Records Retention and Data Reporting

4.2.6.3.1 The employer shall retain all personnel exposure sampling results and monitoring data in accordance with the requirements set forth in OSHA, Subpart C of 29 CFR 1910.120. The employer shall follow all other pertinent provisions of that regulation.

4.2.6.3.2 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

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- 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

4.2.7.1 Personnel or equipment leaving the site shall conduct operations at the site in such a controlled fashion as to reduce the possibility of contact with any contaminants present and to prevent the removal of contaminants. Work zones will be delineated in which specific operations, or tasks, will occur and site entry and decontamination procedures at designated control points will be identified.

4.2.7.2 Three work zones shall be established to perform this work: an exclusion (contaminated) zone, a contamination reduction zone and a support (clean) zone. A map or diagram showing the specific work zones and a description of the site control plan shall be included in the HASP.

4.2.7.3 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

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

4.2.8 Decontamination

4.2.8.1 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 decontamination must be performed in order to prevent contamination from being transferred into clean areas and contaminating or exposing unprotected personnel.

4.2.8.2 Personnel and equipment decontamination procedures appropriate for the site shall be included 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.

4.2.8.3 The procedures must ensure adequate containment and removal of any decontamination solutions and spent disposable protective apparel.

4.2.8.4 Provisions shall be made to facilitate personal hygiene at breaks and following daily operations. Where decontamination procedures indicate 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

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

4.2.9.2 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.

4.2.9.1.1 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.

4.2.9.1.2 Prior to start up of site operations, 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
- Gas company

4.2.9.1.3 Special First Aid/CPR Training – At least one person holding up-to-date certifications (American Red Cross or equivalent) in basic first aid and CPR is present at the site during all site operations.

4.2.9.1.4 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. Material Safety Data Sheets (MSDS), 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

4.2.10.1 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.

4.2.10.1.1 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
- 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

4.2.10.1.2 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.

4.2.10.2 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

4.2.10.3 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.

4.2.10.4 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.

4.2.10.5 Federal OSHA training requirements for all personnel involved in confined space entry must be complied with. 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 spill containment program shall be developed and written, when required, 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:

4.2.11.2.1 Detailed methods of preparing the trench or excavation including descriptions of sloping, shoring and guarding.

4.2.11.2.2 Observation of proper equipment spacing, use of barriers, means of exit, and placing of machinery and spoils.

4.2.11.2.3 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.

4.2.11.2.4 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.

4.2.11.2.5 No ground intrusive work (including excavation, trenching, digging, probing, boring and drilling) is to commence without a **current** under ground utility mark out as per N.J.S.A. 48:2-73 and in compliance with OSHA Regulation 1926.651. This includes, but is not limited to all gas, water, sewer, cable, phone and electric or process related utilities. The One-Call system (1-800-727-1000) must be notified not less than 3 full business days before digging. Other means of locating underground utilities must be identified for utilities not covered by One-Call system. The One Call Markout Ticket Confirmation Number(s) will 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.

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.

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

4.2.11.3.2 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.

4.2.11.3.3 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.

4.3 General Safety Measures

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4.3.1 Personal Practices

4.3.1.1 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 only when the level of site specific information improves sufficiently to warrant any change. 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 Level B protection, as a minimum, until the knowledge on site-specific hazards has improved.

4.3.1.2 The use of respiratory protective equipment shall be in accordance with current OSHA requirements. Air purifying respirator cartridges should be changed at least once each workday on-site. Only NIOSH/MSHA approved respirators shall be used. (See Chapter 15, *Personnel Protection*.)

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

4.3.1.4 Medicine 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 physician. The intake of alcoholic or caffeine beverages should be avoided during response activities.

4.3.1.5 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.

4.3.1.6 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 and shall confirm that reading with their signature.

4.3.2 Operations Management

4.3.2.1 For sites where entry/work is to be conducted in contaminated areas, a site map designating work zones must be established prior to any initial 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:

4.3.2.1.1 **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 within the Exclusion Zone must wear the required level of protection based on those site-specific conditions.

4.3.2.1.2 **The Contamination Reduction Zone** - The buffer area provides a transition between contaminated and clean zones. This zone is to contain any decontamination activities deemed necessary and must be separated from the Exclusion Zone by the Hot Line and from the Support Zone by the Contamination Control Line.

4.3.2.1.3 **The Support Zone** - This is the outermost part of the site, which is considered to be clean or uncontaminated. This zone is the location for command posts and site support facilities. It should be positioned upwind of the Exclusion Zone.

4.3.2.2 Communications using radios or other means must be maintained between initial entry members at all times. Emergency communications should be prearranged in case of radio failure, necessity for evacuation of site or other reasons.

4.3.2.3 Before proceeding on-site, consideration must be given to the manpower 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” when wearing respiratory protective equipment. 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.

4.3.2.4 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
- 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

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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

4.4.2 Preliminary Off-Site Evaluation

4.4.2.1 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.

4.4.2.2 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 become significant, the site Health and Safety Plan must be adjusted to maintain safety.

4.4.3 Preliminary On-Site Evaluation

4.4.3.1 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, 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).

4.4.3.1.1 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.

4.4.3.1.2 Oxygen deficiency - At sea level, ambient air must contain at least 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 increase the potential for fires.

4.4.3.1.3 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.

4.4.3.1.3.1 When the presence, or identity of organic vapors/gases are unknown, instruments such as a portable photoionization detector and or, a portable hydrocarbon gas/vapor analyzer, operated in the general survey, or total readout mode, should be used. The readings obtained in this mode indicate total atmospheric concentrations to which the instrument is responding. Identification of the individual components may permit some instruments to be specifically calibrated and used as analytical tools.

4.4.3.1.3.2 Sufficient data should be obtained during the initial entry to map or screen the site for various levels of organic vapors. These gross 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. For the purpose of “Levels of Protection” decision-making, the following scheme should be used when only gross concentration data are available:

- **Level C** - 0 to 5 ppm above background when measured in the breathing zone and when sustained for a 15-minute period or longer.
- **Level B** - greater than 5 ppm up to 500 ppm above background when measured in the breathing zone.
- **Level A** - greater than 500 ppm up to 1000 ppm above background, general ambient concentration.

4.4.3.1.3.3 Readings in excess of 1000 ppm above background shall result in withdrawal from the site of all on-site personnel and shall trigger reassessment of site conditions and further on-site activities.

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

4.4.3.1.4 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.

4.4.3.1.5 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.

4.4.3.1.5.1 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 Bureau of Emergency Response and the Radiation Protection Programs within NJDEP have radiation specialists on staff for assistance.

4.4.3.1.5.2 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.

4.4.3.1.6 Direct Reading Instruments - A complex variety of toxic air pollutants (including organic and inorganic vapors, gases, or particulates) can be produced at abandoned 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.

- 4.4.3.1.7 Visual Observations - While on-site, the entry team should make visual observations to help evaluate site hazards, for example: 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.
- 4.4.3.2 Although the initial entry is considered a rapid activity, its duration can be quite variable. The time actually 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 following conditions must be considered when developing those priorities.
 - 4.4.3.2.1 The immediate concern to initial entry personnel is atmospheric conditions, which 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.
 - 4.4.3.2.2 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.
- 4.4.3.3 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.
 - 4.4.3.3.1 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.
 - 4.4.3.3.2 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		Review text, Section 3.v. "Radiation materials". Consult Radiation Protection Program for information regarding hazard levels.

4.4.4 Other Considerations

4.4.4.1 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. Negative 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.

4.4.4.2 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.

4.4.4.3 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 misinter-

preted, 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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