Raytheon Company

Health & Safety Plan

Former Raytheon Facility
430 Boston Post Road
Wayland, Massachusetts

26 November 2002

143.65

Environmental Resources Management
399 Boylston Street, 6th Floor
Boston, Massachusetts 02116

1.0 INTRODUCTION

1.1 OVERVIEW

This Health and Safety Plan (HASP) has been developed to establish the procedures necessary for protecting personnel, the general public and off-site receptors from potential hazards resulting from activities associated with Phase IV activities at the former Raytheon facility located at 430 Boston Post Road, in Wayland, Massachusetts.

1.2 PURPOSE AND SCOPE

The purpose of this HASP is to address the hazards associated with the presence of hazardous materials in wetland soil/sediment and groundwater, as well as related remedial activities. This plan was intended to address activities, which will consist of disturbance, movement, handling of remedial wastes, or similar site-invasive activities, which may result in the potential contact with Oil and/or Hazardous Material (OHM). This HASP is intended for use by ERM employees only. Other subcontractors and parties entering the Site will be required to read and acknowledge this HASP, but must follow their own health and safety protocols and procedures.

The following activities will be carried out as part of the Comprehensive Remedial Action:

- Excavation of impacted wetland soil/sediment and restoration of disturbed areas.
- Implementation of chemical oxidation to treat impacted groundwater.

1.3 PROJECT TEAM

A list of key project personnel and site personnel is provided below:

Company	**Name**	**Project Title /Assigned Role**	**Phone Numbers**
Raytheon	Ron Slager	PRP Manager	(508) 490-1707 (617) 675-0377 pager
	Edwin Madera	Sr. Environmental Technologist	(508) 490-1351 (508) 727-6593 pager
ERM	John Drobinski	LSP	617-646-7850 617-719-5866 cell
	Rachel Leary	Task Supervisor Competent Person	617-646-7841 617-719-5876 cell
	Joe Fiacco	Task Supervisor Competent Person	617-646-7840 617-719-5877 cell
Woodlot Alternatives	Mark Christopher	Wetlands Specialist	(207) 729-1199 (207) 841-3167 cell
		General Contractor To be named	
	To be named	First Aid	

The control of site hazards is dependent upon the degree to which management enforces compliance and employees cooperate with the specified health and safety requirements. Therefore, personnel at all levels of the organization must recognize their individual responsibility to comply. All activities covered by this HASP must be conducted in compliance with this HASP and with applicable federal, state and local health and safety regulations, including 29 CFR 1910.120 and 29 CFR 1926. Personnel covered by this HASP who cannot or will not comply must be excluded from site activities.

1.3.1 Site Managers and Task Supervisors

Site Managers and Task Supervisors are responsible for compliance with company health and safety programs, policies, procedures and applicable laws and regulations. This includes the need for effective oversight and supervision of project staff necessary to control the health and safety aspects of daily operations.

1.3.2 Site Safety and Health Supervisor (SSHS)

SSHS are appointed on a per-project basis, by the Project Manager and/or other management representatives. The SSHS is defined by the Occupational Health and Safety Administration (OSHA) 1910.120 as "...the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements."

The SSHS is responsible to both project management and the designated local/regional health and safety representative with regard to the completion of these assigned duties.

1.3.3 Competent Person

A "Competent Person", as defined by OSHA1926.20(b)-Accident Prevention Responsibilities, is the individual "who is capable of identifying existing and predictable hazards in surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." The competent person may also be the site safety and health supervisor. A competent person must be designated on a site-by-site basis based on the site conditions, scope-of-work, and the individual's ability to recognize site-specific hazards and take appropriate corrective actions.

1.3.4 First Aid Personnel

At least one individual must be present during all on-site activities who has a current (Red Cross or equivalent) training and certification in basic first aid and cardiopulmonary resuscitation (CPR). This person must also have received training and information regarding the company's bloodborne pathogen control program including the required use of "universal precautions" and the availability of Hepatitis B vaccinations (HBV) during yearly physicals.

1.3.5 Staff

Ultimate control of health safety is in the hands of each individual employee. Therefore, each employee must become familiar with and comply with all health and safety requirements associated with their position and daily operations. Employees also have the responsibility to notify the appropriate management and/or health and safety representative of unsafe conditions and accidents/injuries immediately.

When employees are issued respirators or any other personal protective equipment (PPE), they are responsible for ensuring that said items are used properly, cleaned as required and maintained in good working order.

1.3.6 (Sub) contractors

(Sub) contractors must develop their own HASP related to their specific on-site activities. This HASP has been developed with the intent that all individual contractors/subcontractors will review the contents of this plan, and agree incorporate the basic practices as a minimum for site operations in their own HASP.

The former Raytheon facility is located at 430 Boston Post Road in Wayland, Massachusetts. The Phase II included a series of field investigations through August 2001 to assess the source(s), nature and extent of impact from historic releases of OHM to the environment. Phase II field sampling included soil, groundwater and wetland sediment, surface water and biota. All potential source areas have been abated.

Groundwater is impacted primarily by trichloroethene (TCE) and associated degradation products, associated with a release from former manhole W-4 located adjacent to the north side of former Building 4 (Figure 2). Tetrachloroethene (PCE) has also been detected sporadically in groundwater and may be associated with previous historical uses. The main plume extends southwest from manhole W-4 and appears limited to depths of up to approximately 80 feet by underlying unconsolidated deposits. Based on the results of the Phase III feasibility study, Chemical Oxidation is the preferred remedy for abatement of groundwater since.

Wetland soil/sediment is impacted by polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and metals associated with historic inadvertent, incidental releases to the stormwater conveyance system and discharge at outfall OF-01 (Figures 8 & 9). The extent of impact appears limited to between 250 and 450 feet from OF-01 (Figures 8 & 9). OHM in wetland soil/sediment and groundwater pose a condition of "Significant Risk." Based on the results of the Phase III Remedial Action Plan, Excavation & Off-Site Disposal is selected as the preferred remedy for abatement of wetland soil/sediment.

3.0 HAZARD ASSESSMENT

3. 1 CHEMICAL HAZARDS

This chemical hazard assessment is based on site-specific data from previous investigations (*Phase II Comprehensive Site Assessment*).

Anticipated soil and/or groundwater contaminants include VOCs, PAHs, and heavy metals. It is not anticipated that inhalation hazards will be present. It is unlikely that wetland soil/sediment will be dry enough to generate any impacted dust. Skin contact hazards may result from the presence of PCBs, PAHs, and metals.

Finally, any chemicals brought onto the site by contractors are subject to the contractor's own safety procedures, including Hazard Communication requirements, as discussed below.

3.1.1 Chemicals Subject to OSHA Hazard Communication

All chemicals brought on site such as solvents, reagents, and decontamination solutions, or any other hazardous chemical must be accompanied by the required labels, Material Safety Data Sheets (MSDSs), and employee training documentation as required by OSHA 1910.1200.

3.1.2 VOC Compounds

Exposure to the VOC vapors above their respective permissible exposure limits (PELs), as defined by OSHA, may produce irritation of the mucous membranes of the upper respiratory tract, nose and mouth. Overexposure may also result in the depression of the central nervous system. Symptoms of such exposure include drowsiness, headache, fatigue and drunken-like behavior. TCE and PCE have been determined to be carcinogenic, targeting eyes, skin, liver, kidneys and respiratory system.

The vapor pressures of these compounds are high enough to generate significant quantities of airborne vapor. On sites where low concentrations of these compounds are present in groundwater, the potential inhalation hazard to the field team during chemical oxidation activites is low. It is not anticipated that groundwater will be pumped to the surface to be treated.

3.1.3 PAHs

Due to the relatively low vapor pressure of PAH compounds, vapor hazards at ambient temperatures are not expected to occur. Repeated contact with certain PAH compounds have been associated with the development of skin cancer. Contact of PAH compounds with the skin may cause photosensitization of the skin, producing skin burns after subsequent exposure to ultraviolet radiation.

It is unlikely that site conditions will be dry enough in the wetland that the generation of contaminated dusts will pose a potential inhalation hazard. However if elevated dust levels are an issue, they will be controlled with wetting. Protective measures, such as the wearing of chemically resistant gloves, are addressed elsewhere in this plan.

3.1.4 Metals

Overexposure to metals has been associated with a variety of local and systemic health hazards, both acute and chronic in nature, with chronic effects being most significant. Direct contact with the dusts of some metal compounds can result in contact or allergic dermatitis.

The most significant route of exposure to metals is skin contact with contaminated soils. Protective measures, such as the wearing of chemically resistant gloves to minimize contact, are addressed elsewhere in this plan.

We anticipate that inhalation will not be a significant route of exposure to metals within the scope of this HASP. Avoiding dry, dusty conditions will control inhalation exposure to metals. If necessary, dusty conditions will be controlled by the application of a water spray.

Incidental ingestion of metals may occur through hand-to-mouth contact. Following good personal hygiene habits will minimize incidental ingestion.

3.2 PHYSICAL HAZARDS

Potential physical hazards include injury from the operation of heavy equipment, confined space entry, excavation hazards, fire and explosion, vehicle traffic and noise exposure. No significant biological hazards are expected other than those associated with indigenous plants and insects.

A "Competent Person" must perform frequent and regular inspections of the Site, materials and equipment in accordance with 29 CFR 1926.20 to identify site hazards. All personnel on site should be provided with the information and training necessary to avoid accidental injury, including assuring that the site is maintained in such a way that slip, trip and fall hazards are recognized and eliminated or controlled. Basic PPE (steel-toed boots, hardhats and safety eyewear) must be available and its use enforced.

3.2.1 Heavy Equipment/Construction Hazards

The use of backhoes, front-end loaders, dump trucks, cranes and other heavy equipment represent potentially serious construction hazards. Whenever such equipment is used, personnel in the vicinity should be limited to those who must be there to complete their assigned duties. All personnel must avoid standing, within the turning radius of the equipment or below any suspended load. Job sites must be kept as clean, orderly and sanitary as possible. When water is used, care must be taken to avoid creating muddy or slippery conditions. If slippery conditions are unavoidable, barriers and warning signs must be used to warn of these dangers.

Never turn your back to operating machinery. Never wear loose clothing jewelry, hair or other personal items around rotating equipment or other equipment that could may catch or ensnare. Always stand far enough away from operating machinery to prevent accidental contact resulting from mechanical or human error.

Additionally, the following basic personal protective measures must be observed: hard-hats must be worn to protect against bumps or falling objects. Goggles, face shields or other forms of eye protection must be worn when necessary to protect against chemicals or other hazards. Steel-toed safety shoes or boots are also required. The shoes must be chemically resistant or protected with appropriately selected boots/coverings where necessary. Unless otherwise specified, normal work clothes must be worn. Long sleeves and gloves are also required whenever necessary to protect against hazardous contact, cuts, abrasions or other possible skin hazards.

3.2.2 Excavations

All provisions of the OSHA trenching and excavation standard (29 CFR 1926.650-52) must be followed during excavation activities. The estimated location of utility installations, such as sewer, telephone, electric, water lines and other underground installations that may reasonably be

expected to be encountered during excavation work, must be determined prior to opening an excavation.

Excavations in contaminated or potentially contaminated areas must be tested for confined spaces atmospheric hazards prior to entry. Excavations should not be entered if other means are available to perform the task requiring entry. If entry into an excavation is required, the atmosphere within the space must be monitored by a trained person to assure that oxygen concentrations are greater than 19.5 percent and less than 23 percent, that combustible gas levels are less than 10 percent of the lower explosive limit (LEL), and that vapor levels are within applicable safe exposure (PEL) and Threshold Limit Values [TLV]) limits.

A ladder or similar means of egress must be located in excavations greater than 4 feet in depth so as to require no more than 25 feet of lateral travel for employees. No person should be allowed to enter an excavation greater than 5 feet in depth unless the following conditions have been met:

- the walls of the excavation have been protected using an approved shield (trench box), an approved shoring system, or the walls have been sloped back to an angle of 34 degrees;
- the excavation is free of accumulated water;
- the excavation has been tested for hazardous atmospheres as noted previously.

At all times the spoils pile and all materials must be placed at least 2 feet from the edge of the excavation to prevent the materials from rolling into the excavation. Personnel must remain at least 2 feet away from the edge of the excavation at all times. Upon completion of a test pit exploration, the excavation should be backfilled and graded. Excavations should never be left open unless absolutely necessary, and then only with proper barricading and controls to prevent accidental injury.

3.2.3 Confined Space Entry

Confined spaces may be encountered during the utility survey. If a confined space is encountered and entry is absolutely necessary, appropriate safety precautions must be taken in accordance with the company's safety and health program. Only confined space entry trained personnel will be allowed to perform such activities. Confined space entries should be avoided whenever possible. Trenches (greater than 4 feet in depth) and other excavations will require the air monitoring specified elsewhere in this plan.

Confined space entry means the potentially hazardous entry into any space which, by design, has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, storage vessels, sewers, tunnels, underground utility vaults, and pipelines. Other environments, which must be treated as confined spaces, include pits, basements, garages, warehouses and other indoor areas where mechanical (i.e. diesel, propane, gasoline or similarly powered) equipment must be operated for construction purposes. Excavations are considered confined spaces.

3.2.4 Underground Utilities and Hazards

The identification of underground storage tanks (USTs), pipes, utilities and other underground hazards is critically important prior to all excavating and other intrusive activities. In accordance with OSHA 29 CFR 1926.650, the estimated location of utility installations, such as sewer, telephone, electric, water lines and other underground installations that may reasonably be expected to be encountered during excavation work, must be determined prior to opening an excavation. Where public utilities may exist, the utility agencies or operators must be contacted directly or through a utility-sponsored service such as Dig Safe. Where other underground hazards may exist, reasonable attempts must be made to identify their locations as well. Failure to identify underground hazards can lead to fire, explosion, flooding, electrocution or other life threatening accidents.

3.2.5 Overhead-Utilities and Hazards

Overhead hazards can include low hanging structures, which can cause injury due to bumping into them. Other overhead hazards include falling objects, suspended loads, swinging loads and rotating equipment. Hard-hats must be worn by personnel in areas where these types of physical hazards are encountered. Barriers or other methods must also be used to exclude personnel from these areas where appropriate. Electrical wires are another significant overhead hazard. According to OSHA (29 CFR 1926.550), the minimum clearance, which must be maintained from overhead electrical wires, is 10 feet from an electrical source rated less than 50 kilovolts (kV). Sources rated greater than 50 kV require a minimum clearance of 10 feet plus 0.4 inches per kV above 50 kV.

3.2.6 Pedestrian Traffic

The uncontrolled presence of pedestrians on a drilling or excavation site can be hazardous to both pedestrians and site workers. Prior to the initiation of site activities, the site should be surveyed to determine if, when and where pedestrian may gain access. This includes walkways, parking lots, gates and doorways. Barriers or caution tape should be used to exclude all pedestrian traffic.

3.2.7 Vehicle Traffic

All vehicular traffic routes, which could impact worker safety, must be identified and communicated. Barriers will be established to prevent injury from moving vehicles and all workers will be reminded daily and must be aware of on-site vehicular traffic. OSHA (29 CFR 1926.201) specifies that when signs, signals or barricades do not provide adequate protection from highway or street traffic, flag persons must be utilized. Flag persons must wear red or orange garments. Garments worn at night must be reflective. Provisions must be made for pedestrian and traffic control.

3.2.8 Noise

Noise exposure can be affected by many factors, including the number and types of noise sources (continuous versus intermittent or impact), and the proximity to noise intensifying structures such as walls or building which cause noise to bounce back or echo. The single most important factor effecting total noise exposure is distance from the source. The closer one is to the source the louder the noise will be. The operation of a drill rig, backhoe or other mechanical equipment can be sources of significant noise exposure. In order to reduce the exposure to this noise, personnel working in areas of excessive noise must use hearing protection (earplugs or earmuffs).

3.2.9 Heat and Cold Stress

Overexposure to temperature extremes can present significant risks to personnel if simple precautions are not observed. Typical control measures designed to prevent heat stress include dressing properly, drinking plenty of the correct types of fluids, and establishing an appropriate work/break regimen. Typical control measures designed to prevent cold stress also include dressing properly, and establishing an appropriate work/break regimen. The SSHS and Site Superintendent must assure that the appropriate heat and cold stress control measures are implemented.

3.2.10 Fire and Explosion

The possibility of flammable materials being encountered during field activities must be recognized and the appropriate steps necessary to minimize fire and explosion must be observed. This includes situations where excessive organic vapors or free product are encountered. When this occurs, monitoring with a combustible gas indicator (CGI) is required.

Excessive organic vapors, for the purposes of initiating the use of a CGI, are defined as sustained readings (i.e., continuous for at least 5 minutes) at or above 250 units or as an instantaneous reading at or above 1,000 units on the PID, in close proximity (within 1 foot or less) of the excavation or other area of potential exposure.

In situations where flammable materials (gasoline, acetylene cylinders, hexane, and methanol) are used on site, the following precautions must be observed:

- keep flammable and combustible materials away from heat, sparks and open flames;
- do not smoke around flammable or combustible materials;
- keep all flammable and combustible liquids in approved and properly labeled safety containers and segregate all flammable materials from other incompatible materials such as oxidizers.

3.2.11 Fire Protection

Contractors must comply with the following requirements as applicable:

- Fire Prevention, 29 CFR 1926.15 1: Electrical wiring and equipment for light, heat or power purposes are to be installed in compliance with the National Electrical Code. Portable battery-powered lighting equipment used in connection with the storage, handling or use of flammable gases or liquids are to be the type approved for the hazardous location.
- Fire Extinguishers, 29 CFR 1926.150(c): Contractors are to ensure that at least one ten-pound-capacity type ABC fire extinguisher is provided within 100 feet of each work areas. Fire fighting equipment is to be periodically inspected and maintained in operating condition. Extinguishers subject to freezing are to be protected from freezing.

- Fuel Cans, 29 CFR 1926.351: Approved self-closing safety cans with flame arrest protection are to be used when necessary for dispensing small quantities of fuel.

3.3 BIOLOGICAL HAZARDS

Potential biological hazards for all sites include poisonous plants, insects or other animals that carry disease (i.e. lyme disease, rabies) or venom (i.e. bees, snakes, spiders).

3.3.1 Insects

Insects represent significant sources (vectors) of disease transmission. Therefore, precautions to avoid or minimize potential contact should be considered prior to all field activities. Disease or harmful effects can be transmitted through bites, stings or through direct contact with insects or through ingestion of foods contaminated by certain insects. Examples of disease transmitted by insect bites include encephalitis and malaria from contaminated mosquitoes, Lyme disease and spotted fever from contaminated ticks. Stinging insects, such as bees and wasps, are prevalent throughout the country, particularly during the warmer months. The stings of these insects can be painful, and cause serious allergic reactions to some individuals.

3.3.2 Lyme Disease

Lyme disease is an infection caused by the bite of certain ticks, primarily deer, dog and wood ticks. The symptoms of Lyme disease usually start out as a skin rash then progress to more serious symptoms. The more serious symptoms can include lesions, headaches, arthritis and permanent damage to the neurological system. If detected early the disease can be treated successfully with antibiotics. The following steps are recommended for prevention of Lyme disease and other diseases transmitted by ticks:

- Beware of tall grass, bushes, woods and other areas where ticks may live;

- Wear good shoes, long pants tucked into socks, a shirt with a snug collar, good cuffs around the wrists and tails tucked into the pants. Insect/tick repellents may also be useful;

- Carefully monitor for the presence of ticks. Carefully inspect clothes and skin when undressing. If a tick is attached to the skin it should be

removed with fine-tipped tweezers. You should be alert for early symptoms over the next month or so. If you suspect that a tick has bitten you, you should contact a physician for medical advice.

3.3.3 Poisonous Plants

The possible presence of poisonous plants should be anticipated for field activities in wooded or heavily vegetated areas. Contact with poison ivy, poison oak and sumac result in an intensely itching skin rash and characteristic blister-like lesions. Contact with these plants should be avoided.

3.3.4 Rats, Snakes and Other Vermin

Certain animals, particularly those that feed on garbage and other wastes, can represent significant vectors of disease transmission. Therefore, precautions to aid and/or minimize potential contact with (biting) animals (such as rats) or animal waste (such as pigeon droppings) should be considered prior to all field activities. Rats, snakes and other wild animals can inflict painful bites. The bites can be poisonous (as in tile case of some snakes), or disease causing (as in the case of rabid animals). Avoidance of these animals is the best protection.

4.0 MONITORING

Air monitoring falls into two separate categories:

- direct reading/exclusion zone monitoring.
- and personal exposure monitoring.

Exclusion zone monitoring is conducted in order to evaluate potential airborne hazards on a "real time" basis so that action levels specified in this HASP can be implemented. Personal exposure monitoring is conducted as part of a company's own HASP in order to establish a database of occupational exposure for OSHA compliance purposes. This HASP addresses only exclusion zone monitoring.

4. 1 EXCLUSION ZONE MONITORING

The exclusion zone monitoring required for the site will be conducted using the direct reading instruments as indicated in the table below. The data provided by these instruments can be used to determine the appropriate control actions and personal protective equipment requirements.

Equipment calibration must be performed in accordance with the manufacturer's instructions. Field checks using the appropriate reference standards must be made on site at the minimum frequency of twice per shift (pre and post sampling). A daily log of all instrument readings, as well as all field reference checks and calibration information must be maintained.

The following table summarizes the types of environmental monitoring, the required frequencies and the appropriate response actions applicable to this site:

Chemical Identification	Instrument Type	Monitoring Frequency	Instrument Reading	Response Action
Total VOCs	PID	Continuously during intrusive activities or confined space entries.	0- 10 units 10-100 units >100 units	Level D Level C Level B
Confined Space Entry				
LEL	CGI or LEL/0_2 meter	Continuously during intrusive activities or confined space entries.	>10% LEL	Entry prohibited. Determine source of elevated LEL and implement controls prior to entry.
Oxygen	0_2 meter	Continuously during intrusive activities or confined space entries.	<20.9% (0_2 deficient) or >23% (0_2 rich)	Entry prohibited. Determine source of elevated LEL and implement controls prior to entry.

4.1.1 Total VOCs

A photoionization detector (PID), equipped with a 10.2 eV or an 11.7 eV lamp, calibrated with isobutylene and referenced to benzene in air, will be used to monitor the general area and the breathing zone of workers during intrusive activities and to assess the potential presence of organic vapors. Additionally, colorimetric indicator tubes will be used to monitor the presence of benzene.

4.1.5 Confined Space Entry

Air monitoring for excavations and confined space entries must be conducted in accordance with the information provided below. If a confined space is encountered and entry is absolutely necessary, the RHSC must be notified to coordinate the entry. Only confined space entry trained personnel will be allowed to perform such activities. Confined space entries should be avoided whenever possible. Trenches (greater than 4 feet in depth) and other excavations will require the air monitoring specified in the table in Section 4.1.

Monitoring of confined spaces must be conducted in the following order only:

1. oxygen (O_2 meter)

2. explosive/combustible atmospheres (CGI/LEL meter)

3. other toxics (VOCs, H_2S)

Confined space entry monitoring must be continuous during the entire entry. Action levels for confined space entry monitoring are provided in the table in Section 4.1.

4.2 MITIGATIVE MEASURES FOR CONTROL OF EMISSIONS

Based on odors and/or results of air monitoring, vapor emissions resulting from site operations may need to be suppressed. Appropriate mitigative measures would include ceasing operations until the cause of the emissions is identified and controlled. Vapor control measures may include immediate backfilling of the excavation, use of vapor suppression foams, and covering of exposed soil piles with polyethylene or tarps. Dust emissions control actions may consist of applying a water spray to the source area.

4.3 PERSONAL EXPOSURE MONITORING

Personal exposure monitoring for the purpose of determining individual time-weighted average exposures may be required for specific operations or activities. Although the data provided by the real-time instruments specified above can be used to determine the appropriate control actions and personal protective equipment requirements, the data may be inappropriate for use in determining employee time-weighted average exposures as required by specific OSHA regulations.

According to 29 CFR 1910.120 personal exposure monitoring for the purpose of determining individual time-weighted average exposures is required only during site cleanup or other remedial activities. However, there are other compound-specific OSHA regulations requiring personal exposure monitoring. Contractors must assess the need for conducting personal exposure monitoring based specifically for their individual employees operations and anticipated exposures.

The following table specifies the initial level of protection required for each task. The table is arranged according to major project tasks. The personal protection requirements are based on the anticipated chemical and physical hazards, past uses of the site and potential exposure routes (i.e., inhalation, skin contact, and ingestion). **Personnel will be required to upgrade levels of protection based on the air monitoring results.** The SSHS and the Site Manager will determine the level of protection and will inform all other personnel.

Task	**Initial Level of Protection**
General site work - **No contact hazards** (utility survey, contractor oversight, traffic/pedestrian control).	Level D
General site work - **Contact hazards** (all intrusive activities, dewatering activities, soil and groundwater sampling and all other tasks involving potential contact with soil or groundwater).	Modified Level D
Chemical Oxidation Activities – Personnel Protective Equipment will be donned to address hazards associated with the injection of oxidant.	Modified Level D
Excavation Activities - Equipment Operators (provided that the operators remain inside of the equipment). Operators would be required to don Level C PPE if required based on air monitoring results.	Modified Level D

Personal protective equipment will be donned as described below for the activities described in the table above. Based on available analytical data and anticipated activities, it is assumed that most activities will require Level D or Modified Level D PPE with contingencies for Level C PPE. Levels of protection for the tasks not included in the table above will be determined by the SSHS in consultation company safety and health officials.

5.1 LEVEL D

Level D PPE is defined as the following, or similar, equipment:

- Hard-hat;

- Work clothes;
- Steeled-toed work boots;
- Hearing protection (if necessary);
- Eye protection;
- Reflective orange vest if working on or near public roadways.

5.2 MODIFIED LEVEL D

Modified Level D is specified where there is a contact hazard but not an inhalation hazard. Modified Level D PPE is defined as the following, or similar:

- Hard-hat;
- **Tyvek coveralls** over work clothes;
- Steel-toed work boots;
- **Nitrile gloves (or equivalent);**
- Hearing protection (if necessary);
- Eye protection;
- Reflective orange vest if working on or near public roadways.

If the potential exists for contact with liquids, personnel will be required to wear a coated chemical protective suit (e.g., polycoated tyvek, Saranex, etc.).

5.3 LEVEL C

Based on specific activities, air monitoring results and/or the presence of unanticipated dusty conditions, Level C respiratory protection may be required. Level C PPE is defined as the following, or similar:

- Hard-hat;
- Tyvek coveralls over work clothes;

- Steel-toed work boots with **disposable boot covers**;
- Nitrile gloves (or equivalent);
- Hearing protection (if necessary);
- Eye protection;
- Reflective orange vest if working on or near public roadways; and
- **Full-face air purifying respirator with combination High Efficiency Particulate (HEPA)/organic vapor/acid gas cartridges.**

If the potential exists for contact with liquids, personnel will be required to wear a coated chemical protective suit (e.g., polycoated tyvek, Saranex, etc.).

All personnel who will be required to wear air-purifying respirators must have been qualitatively or quantitatively fit-tested for the particular brand and size respirator he/she will be wearing on-site. Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the face seal. As a result, special spectacle inserts designed for use with respirators must be available for workers requiring corrective lenses. Each contractor required to wear respirators must have procedures for selecting, using and maintaining said respirators.

5.4 LEVEL B

If air monitoring results indicate the need to go to Level B protection, the Site Safety Officer must be notified in order to evaluate the situation. Engineering controls may be implemented in lieu of Level B PPE; however, additional air monitoring must be conducted after the implementation of the engineering control and prior to the re-entry of site personnel to determine the effectiveness of the control.

Site-specific training in the use and limitations of Level B protection must be conducted prior to the use of Level B on site. Training will also include a review of the revised emergency procedures. Level B PPE will consist of the Modified Level D PPE, plus:

- A full-face, positive-pressure, demand-mode, supplied air breathing apparatus or equivalent

5.5 LEVEL A

In situations where the type of chemical, concentration and potential exposure route are not known, the Site Safety Officer must be notified in order to evaluate the situation for upgrade for Level A PPE. Engineering controls may be implemented in lieu of Level A PPE; however, additional air monitoring must be conducted after the implementation of the engineering control and prior to the re-entry of site personnel to determine the effectiveness of the control.

Site-specific training in the use and limitations of Level A protection must be conducted prior to the use of Level A on site. Training will also include a review of the revised emergency procedures. Level A PPE will consist of the Modified Level D PPE, plus:

- A full-face, positive-pressure, demand-mode, supplied air breathing apparatus or equivalent
- Fully encapsulating chemical-resistant suit

6.0 SITE CONTROL

To minimize both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas where intrusive site activities will be conducted be clearly identified with appropriate equipment such as caution tape, fencing, or similar equipment. Work areas or zones will be established as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, November, 1985. This document recommends the area surrounding each of the work areas to be divided into three zones whenever possible and plausible:

- the exclusion zone or "Hot" zone;
- contamination reduction zone (CRZ);
- and the support zone.

6.1 EXCLUSION ZONE

Due to the scattered locations of the activities covered within the scope of this HASP, the actual exclusion zones are expected to change frequently in accordance with daily activities. Therefore, all exclusion zones are expected to be temporary or dynamic. Site personnel will be advised of the locations of temporary work zones as part of the routine site safety meetings.

Each exclusion zone will consist of the active work areas where site activities are taking place. A 15-foot radius will be established as the typical perimeter of the zone; however, this may be modified as necessary in order to protect unprotected personnel from chemical or physical hazards that may occur as a result of site operations. The perimeter of the zone will be marked with brightly colored hazard tape. All personnel entering these areas must wear the prescribed level of protective equipment.

6.2 CONTAMINATION REDUCTION ZONE

Each contamination reduction zone (CRZ) will be a passageway between the exclusion and support zones. The actual length and/or location of the corridor will also be temporary or dynamic in accordance with the

locations of the exclusion zones. The CRZ is where personnel will begin the sequential decontamination process when exiting the exclusion zone. To prevent cross contamination and for accountability purposes, all personnel must enter and leave the exclusion zone through the CRZ.

6.3 SUPPORT ZONE

The support zone will coincide with the project site trailer (if applicable) and/or equipment staging area, and will consist of an area outside the exclusion zone and CRZ where support vehicles and equipment will be staged, and other general site activities will be conducted.

6.4 OTHER SITE CONTROL AND SAFETY MEASURES

The following measures are designed to augment the specific health and safety guidelines provided in this plan:

- The "buddy system" will be used at all times by all personnel. No one is to perform exclusion zone work alone. The standby team member must be intimately familiar with the procedures for initiating an emergency response.

- Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Protect air-monitoring instruments from water by either using either the instrument in the provided case or by wrapping the instrument in plastic if a case is not provided. If the instrument is wrapped in plastic, openings are made in the bag for sample intake and exhaust.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited except in the support zone after proper decontamination.

- Beards or other facial hair that interfere with respirator fit are prohibited for anyone who is required to wear a respirator.

- The use of alcohol or drugs is prohibited during the conduct of field operations. Working under the influence of prescription drugs or over-the-counter medication that may cause drowsiness or loss of alertness is also prohibited.

- All equipment must be decontaminated or discarded, as designated by the SSHS before leaving the site.

- Safety equipment (PPE) described in Section 5.0 will be required for all field personnel unless otherwise approved by the RHSC or the SSHS.

6.5 SITE SECURITY

The Site Manager is responsible for identifying the presence of all employees on site. A Sign-in/Sign-out log will be maintained for this purpose or the information will be kept in the SSHO's field book.

Equipment left on site during off-hours must be locked, immobilized and/or otherwise secured to prevent theft or unauthorized use or access.

7.0 DECONTAMINATION

Proper decontamination is required of **all personnel and equipment** before leaving the site. All materials and equipment used for decontamination must be disposed of properly. Clothing, tools, buckets, brushes, and all other equipment that is contaminated must be secured in drums or other containers and labeled. Clothing not completely decontaminated on site should be secured in plastic bags before being removed from the site.

7.1 PERSONNEL DECONTAMINATION

Personnel decontamination will be accomplished by following a systematic procedure of cleaning and removal of PPE. Contaminated PPE such as boots and face shields will be rinsed free of gross contamination, scrubbed clean in a detergent solution and then rinsed clean. To facilitate this, a three-basin wash system will be set up on site. The wastewater will be transferred to drums, which will be labeled and left on site for disposal.

Disposable PPE, such as Tyvek coveralls, gloves, outer boots, etc. will be disposed of as general refuse. Respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. Alternative chemical decontamination procedures, such as steam-cleaning field boots, may be used if available.

7.1.1 Decontamination Sequence

Steps required will depend on the level of protection worn in accordance with Section 5.0:

1. Remove and wipe clean hard hat
2. Rinse boots and gloves of gross contamination
3. Scrub boots and gloves clean
4. Rinse boots and gloves
5. Remove outer boots
6. Remove outer gloves

7. Remove Tyvek coveralls

8. Remove respirator, wipe clean and store

9. Remove inner gloves

10. Boots that have been decontaminated can be worn into the support zone.

7.2 EQUIPMENT DECONTAMINATION

Measures should be taken to prevent contamination of sampling and monitoring equipment. Sampling devices become contaminated, but monitoring instruments, unless they are splashed, usually do not. Once contaminated, instruments are difficult to clean without damaging them. Any delicate instrument that cannot be easily decontaminated should be protected while it is being used. Protect air-monitoring instruments from water by either using the instrument in the provided case or by wrapping the instrument in plastic if a case is not provided. If the instrument is wrapped in plastic, openings are made in the bag for sample intake and exhaust.

If solvents are used for decontamination of equipment all safety precautions specified on the manufacturer's warning label and MSDS must be observed. Solvents or rinsate generated during the decontamination process will be drummed, labeled, and disposed of with other substances from the site.

Wooden tools are difficult to decontaminate because they absorb chemicals. Wooden hand tools will be kept on site for the project duration and handled only by protected workers. At the end of the site activities, wooden tools will be discarded if they can not be decontaminated properly.

The method generally used to decontaminate heavy equipment is to wash them with water under high pressure or to scrub accessible parts with detergent/water solution under pressure. Washwater from decontamination of backhoe buckets and related equipment will be collected for disposal.

Personnel conducting the decontamination must be adequately protected contaminated mists and aerosols can be generated. PPE, as specified in Section 5.0, must be worn, including Level C respiratory protection.

8.0 MEDICAL MONITORING AND TRAINING REQUIREMENTS

8.1 MEDICAL

All personnel covered by this HASP must be active participants in a medical monitoring program that complies with 29 CFR 1910.120(f). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work on this site covered by this HASP. Each contractor is responsible for implementing and maintaining the medical monitoring program for its employees.

8.2 TRAINING

All personnel covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.1200 Hazard Communication and 29 CFR 1910.120(e). This requirement applies to individuals who may conduct work within and exclusion zone. Each individual must have completed an annual 8-hour refresher training course and/or initial 40-hour training course within the last year prior to performing any work on this site covered by this HASP. Also, at least one employee must be on site during all invasive site activities to act as the site manager and SSHS. This individual must have documentation of at least three days of supervised field experience as well as completion of the specified 8-hour training course for managers and supervisors.

8.3 SUBCONTRACTORS

Subcontractors will be required to provide specific written documentation prior to their performing any work on site that each individual assigned to this project has completed the medical monitoring and training requirements specified above.

8.4 SITE SAFETY MEETINGS

Prior to the commencement of on-site activities, a site safety meeting will be held to review the specific requirements of this HASP. Short safety refresher meetings will be conducted by the SSHS weekly or as needed throughout the duration of site activities. In addition, the SSHS will

ensure that site visitors have had the required training in accordance with 29 CFR 19 10.120 and will provide pre-entry safety briefings.

9.0 EMERGENCY ACTION PLAN

9.1 GENERAL REQUIREMENTS

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." Personnel covered by this HASP may not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). The company's response actions will be limited to evacuation and medical/first aid as described within this section below.

The basic elements of an emergency evacuation plan include employee training, alarm systems, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures, and methods to account for all employees after evacuation.

9.1.1 Employee Information

Employees must be instructed in the specific aspects of emergency evacuation applicable to the site as part of the site safety meeting prior to the commencement of all on-site activities. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

9.1.2 Emergency Signal and Alarm Systems

An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from heavy equipment, backhoes, etc.) and anytime a clear line-of-sight can not be easlily maintained between all project personnel because of distance, terrain or other obstructions.

When verbal communications must be supplemented, emergency signals (using handheld airhorns or other devices) must be implemented. All site personnel are authorized to initiate an emergency evacuation.

The SSHS and the Site Manager will be responsible for accounting for all personnel onsite after an emergency evacuation has been conducted.

9.1.3 Emergency Information

Emergency Numbers: Police: 911
Fire: 911
Ambulance: 911

Hospital: Metro West Medical Center
67 Union Street
Natick, Massachusetts
(508) 650-7000 (main number)

Directions to Hospital:

Travel time - Approximately 7.5 miles, 20 minutes.

	Total Miles	Directions
1.	0.8	Turn left onto BOSTON POST ROAD heading east.
2.	1.0	Turn right onto Cochituate Rd/MA-126/MA-27
3.	1.2	Stay on Cochituate Rd/MA-27
4.	3.7	Cochituate Rd/MA-27 turns into Main Street/MA-27
5.	0.3	Turn left onto E. Central St./MA-135
6.	0.4	Turn right onto Union Street

9.1.4 Incident Reporting Procedures

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation and report. The investigation should be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame, but to determine the pertinent facts so that repeat or similar occurrences can be avoided.

The investigation should begin while details are still fresh in the mind of anyone involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where,

and how are usually most effective to discover ways to improve job performance in terms of efficiency and quality of work, as well as safety and health concerns.