



**ENVIRONMENTAL
RESTORATION, LLC**

**ERRS REGION 2, CONTRACT EP-S2-10-03
SITE HEALTH AND SAFETY PLAN
LAWRENCE AVIATION INDUSTRIES SITE – FEBRUARY 2011**

**SITE HEALTH AND SAFETY PLAN
EMERGENCY AND RAPID RESPONSE SERVICES**

**Lawrence Aviation Industries Site
Port Jefferson, NY**

Prepared for

**U.S. Environmental Protection Agency - Region 2
2890 Woodbridge Avenue
Edison, NJ 08837**

**Contract No.: EP-S2-10-03
Task Order: 12
Project No: LA2-12**

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 ATTACHMENT B SITE MAPS
 ATTACHMENT C MATERIAL SAFETY DATA SHEETS (MSDS)
 ATTACHMENT Z SITE SPECIFIC TRAINING RECORD



Glossary of Acronyms

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
COC	contaminant of concern
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CSP	Certified Safety Professional
dBA	decibel A-weighted
DEET	N, N-diethyl-m-toluamide
EMR	experience modification rate
EMT	emergency medical technician
ERRS	Emergency and Rapid Response Services
USEPA	United States Environmental Protection Agency
EZ	Exclusion Zone
HAZWOPER	Hazardous Waste Operation and Emergency Response
HIPO	high loss potential
HMIS	Hazardous Materials Identification System
HTRW	hazardous, toxic and radioactive waste
IDLH	immediately dangerous to life and health
kV	kilovolt
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
MSDS	Material Safety Data Sheet
NFPA	National Fire Prevention Association
NIOSH	National Institute of Occupational, Safety and Health
NPL	National Priority List
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PM	Project Manager
POL	petroleum, oils, and lubricants
PPE	personal protective equipment
RIR	recordable incident rate
SCBA	self-contained breathing apparatus
SOP	Standard Operating Procedure
SOW	Scope of Work
START	Superfund Technical Assistance and Response Team
HASP	Site Health and Safety Plan
SHSO	Site Health and Safety Officer
WNV	West Nile Virus



1.0 Introduction and Site Entry Requirements

This document describes the health and safety guidelines developed for the Lawrence Aviation Industries (LAI) Site, to protect on-site personnel, visitors, and the public from all activities associated with the construction, engineering, and remedial activities. The procedures and guidelines contained herein were based upon the best available information at the time of the plan's preparation. Specific requirements will be revised when new information is received or conditions change. A written amendment will document all changes made to the plan. Any amendments to this plan will be included in Attachment A. Where appropriate, specific OSHA standards or other guidance will be cited and applied.

1.1 DAILY SAFETY MEETINGS

Daily safety meetings will be held at the start of each shift to ensure that all personnel understand site conditions and operating procedures, to ensure that personal protective equipment is being used correctly and to address worker health and safety concerns.

1.2 REFERENCES

During development of this HASP consideration was given to current safety and health standards as defined by the USEPA, Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH). Specifically, the following reference sources have been utilized in the development of this HASP:

- OSHA Regulations: 29 CFR 1910 and 1926
- USEPA Standard Operating Safety Guides, June 1992
- NIOSH/OSHA/Coast Guard (USCG)/USEPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities"
- NIOSH Pocket Guide to Chemical Hazards, Publication 2005-149, September 2005
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Chemical Substances and Chemical Agents, 2009
- Hazardous Waste Handbook for Health & Safety, Martin, Lappets, Prather, 1987
- Handbook of Toxic and Hazardous Chemicals and Carcinogens, Sitting, 1985
- ATSDR ToxFAQs

1.3 KEY PERSONNEL

Project/Task Order: – Lawrence Aviation Industries Site	
Key Personnel	
Names and Titles	Contact Information
Keith Glenn – USEPA Region 2, OSC	908-420-4486 (Office) Email: glenn.keith@epa.gov
Tom Williams – Response Manager	607-727-3316 (Mobile) Email: t.williams@erllc.com
Frank Mahalski – Site Health and Safety Officer	516-642-8555 (Mobile) Email: f.mahalski@erllc.com
Lonnie R. Wright – Project HS Manager	636-680-2422 (Office) 636-262-0862 (Mobile) Email: l.wright@erllc.com
Subcontractors	
Company	Scope of Services
TBD	TBD



2.0 Roles and Responsibilities

2.1 RESPONSE MANAGER (RM):

The Response Manager, as the field representative for ER and its subcontractors, has the responsibility for fulfilling the terms of the contract. The RM must oversee the project and ensure that all technical, regulatory and safety requirements are met. The Response Manager is the onsite Health and Safety Officer (HSO) when the HSO is not on site. The Response Manager is responsible for the duties listed in Section 2.2.

2.2 SITE HEALTH AND SAFETY OFFICER (HSO):

The ER Site Safety Officer will be assigned to the site on a full-time basis with functional responsibility for implementing the Site Health and Safety Plan as ER applies to ER personnel.

Specific Duties Include:

- a. Assist RM in providing a safe and healthful work environment.
- b. Assist RM in reporting and investigating all incidents.
- c. Ensure proper decontamination of personnel and equipment is accomplished.
- d. Ensure that air monitoring equipment is calibrated and operational.
- e. Conduct personal air monitoring as required.
- f. Ensure proper personal protective equipment is being utilized.
- g. Assist RM in obtaining required personnel training and medical records.
- h. Inspect first aid kits, eye wash stations and fire extinguishers.
- i. Assist RM in site organization and control.
- j. Assist in Hazard Awareness Training.
- k. Conduct regular safety inspections.

2.3 OTHER:

Any persons who observe safety problems should immediately report observations/concerns to appropriate key personnel listed in Section 2.1 or 2.2 above.

Subcontractors

Company Name	TBD		
Contact Name			
Phone			
Address			
Scope of Work			
Training Required? (check one)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Describe:
Contractor Prequalified?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	



3.0 Site Background and Scope of Work

3.1 SITE BACKGROUND

The Lawrence Aviation Industries (LAI) Superfund site was listed on the National Priorities List in 2000 due to their potential responsibility for contaminating groundwater and private drinking water wells. LAI's corporate predecessor was Ledkote Products Co. of New York. In Port Jefferson Station since 1952, Ledkote produced items including lead gutters and spouts for roof drains. Since 1959, the 42-acre LAI facility has manufactured products from titanium sheet metal, including golf clubs and products for the aeronautics industry, under LAI name.

Past disposal practices have resulted in a variety of contaminant releases including trichloroethene (TCE), tetrachloroethene (PCE), acid wastes, oils, sludge, metals, and other plant wastes. In an effort to clean up the facility in 1980, LAI reportedly crushed more than 1600 drums, allowing their liquid contents including TCE, PCE, and other chemicals to spill onto unprotected soil. Previous investigations in the site vicinity suggest that releases of hazardous substances from the facility have affected site soils, groundwater, surface water and sediment down gradient of the site.

A human health risk assessment was prepared to assess the potential human health risk in the absence of any remedial action. Human health risks associated with using groundwater for future LAI and Outlying Parcels residents are above the EPA acceptable range.

Under a work assignment received by the EPA, a remedial investigation/feasibility study (RI/FS) of the Site soils and groundwater was performed by CDM from August 2003 to May 2005. The RI included soil and groundwater screening, surface water and sediment sampling, soil sampling, and multi-port monitoring well installation and sampling. The results of these investigations are presented in the Outlying Parcels Technical Memorandum (CDM 2004a), Final Technical Memorandum (CDM 2004b), and RI Report (CDM 2006a). The RI documented a volatile organic compound (CVOC) contaminated plume originating at the LAI site. The predominant VOCs, or contaminants of concern (COC), in the groundwater plume originating from the LAI site are TCE and PCE. To a lesser extent, other VOCs such as: chloromethane (CM), 1,1-dichloroethene, methyl tert-butyl ether (MTBE), 1,1-dichloroethane (DCA), cis-dichloroethene (DCE), chloroform and 1,1,1-trichloroethane (TCA) are also known to be present. Report (CDM 2006b), which presented remedial alternatives, was completed in July 2006. The Record of Decision (ROD) was signed on September 29, 2006. CDM conducted a pre-design investigation from November 2007 to June 2008 to collect additional information required for the Remedial Design (RD). The pre-design investigation effort included:

- Monitoring well installation including groundwater screening samples at selected screening depths to further refine information on groundwater contamination.
- Collection of two rounds of groundwater samples and synoptic water level measurements from monitoring wells
- Aquifer testing
- Subsurface soil sampling at the LAI facility.

Throughout the year of 2009 and into 2010, the EPA had several meetings with town officials in Port Jefferson, NY to determine the location of the off-site treatment facility for Lawrence Aviation. Two locations were proposed, one near Old Mill Pond and the other close by on a parcel of property owned by the high school and used as a practice field. After much discussion, EPA and town agreed upon the Old Mill Pond location for the treatment building. The EPA met and procured the services of the local architect to ensure the building conformed to the town's historical appeal.

During the spring of 2010, the EPA and its contractors performed a cleanup of the Old Mill Pond and the upstream creek. Over 120 cubic yards of debris was removed from this area in order to prevent flooding of streets during heavy rains and to ensure the stream will be able to accept the discharge from the offsite treatment building.



The summer, fall, and winter of 2010 saw installation of a discharge line, geo-technical drilling and breaking ground and construction of the treatment building. By the close of 2010, a framed weatherproof structure was erected.

3.2 SCOPE OF WORK FOR ER

- 1) Mobilize necessary personnel and equipment
- 2) Establish a secure work zone area.
- 3) Finish building the Groundwater Pump and Treat (GWP&T) building and offices.
- 4) Construct the GWP&T system and all necessary components.
- 5) Upon startup of system, perform all necessary sampling and monitoring of the system.

4.0 Hazard Assessment

This section is to be addressed in the daily tool box safety meeting as each task is to be initiated. Each Task-Specific Safety Assessment is designed to develop awareness to chemical and physical hazards specific to each task. It would be impractical to repeat in complete detail each control measure and SOP for each job task. Sources, Hazards and Control Measures will be addressed for each job task.

Specific work tasks with unique hazards and/or PPE requirements must be evaluated or reevaluated prior to beginning work. This task review will be led by the Project Health and Safety Manager and the SHSO, and will include knowledgeable individuals such as the worker(s) and the supervisor. PPE requirements, based on this assessment, will be included in Section 6 of the HASP or in the AHA for the specific task. All workers must be trained in the requirements of the HASP and the applicable AHAs prior to beginning work. The required PPE may be changed by the SHSO, based on the results of additional air monitoring, or on task-specific needs. Downgrades will require the approval of the Project Health and Safety Manager unless otherwise permissible by the HASP.

The following section outlines the AHAs, Referenced Standard Operations Procedures (SOPs) and Chemical Hazards associated with this project. Applicable SOPs are available from ER's Health and Safety Database. AHAs will be developed for each of the SOW activities listed in Section 3.2 and submitted prior to the start of field work. The AHAs should be revised for site-specific activities and review with the work crew before commencing any activity.

4.1 HAZARD CONTROL PROGRAM

Due to the nature of this project, there is a potential for physical and chemical hazards. Potential physical safety hazards and chemical hazards associated with the project are further outlined below.

4.1.1 SAFETY/PHYSICAL HAZARDS

Potential physical safety hazards that may be encountered during the execution of this project are presented below.

4.1.1.1 HEAVY EQUIPMENT OPERATIONS

Considerations for controlling the movement of personnel and equipment in a construction area are vitally important to any project, as injuries may occur while working with or adjacent to such equipment. This category includes all operations that utilize moving heavy equipment: backhoes, excavators, loaders, graders, dozers, roll off boxes, and trucks. ER will take every precaution necessary to ensure the safety of the residents and the on-site personnel during traffic movement operations.



All workers will adhere to all applicable standards and regulations while operating heavy equipment at the site. Operators will be trained and experienced in the use and maintenance of the equipment they are operating. Equipment will be inspected on a daily basis to identify any worn parts, and/or unsafe conditions. Any unsafe equipment will be removed from service until safety defects can be corrected. Equipment operators will not leave their machine unattended while it is running. All equipment will have electronic backup alarms. Each piece of equipment will be equipped with a 5 lb ABC fire extinguisher. No vehicles or equipment will be operated in a careless or unsafe manner. Personnel will wear high visibility reflective vests when working around equipment/vehicles. All personnel will stay a minimum of 4 ft clear of the operational area of the equipment.

During removal action, it is often necessary to have a worker direct the operator. In these cases, close communication between the operator and the laborer is of critical importance. One designated person will give signals to the operator of both equipment and vehicles in the work area. Workers should not take any action unless they have made eye contact with the operator and clearly communicated their intentions. In addition, all machines are equipped with back-up alarms, which are checked daily and repaired immediately. Truck traffic will be controlled by a flagger/spotter, as required.

Maintenance and inspection of vehicles and heavy equipment is a vital part of the overall safety program. As part of the preventative maintenance, all equipment is checked for properly functioning safety devices (e.g., backup alarms, brakes, lights, fire extinguishers, etc.) Before each piece of equipment leaves the shop it must pass a safety checklist. All rental equipment is subjected to a similar inspection when delivered to the job site. Any piece of rental equipment that fails the inspection must be repaired by the vendor before it is accepted for use. In addition, all equipment is inspected in the field prior to the start of each day's activities. If a superintendent, operator, or safety officer detects a defect, the equipment is taken out of service and a properly qualified mechanic is dispatched from the shop to make the repairs on-site.

4.1.1.2 VEHICLE TRAFFIC

Due to the nature of work associated with activities near the Old Mill Creek, personnel will be required to wear safety vests meeting ANSI standards. Considerations for controlling the movement of personnel and equipment are vitally important to any project, as injuries may occur while working with or adjacent to such equipment. All workers will adhere to all applicable standards and regulations while operating vehicles at the hospitals or clinics. Operators will be trained and experienced in the use. Equipment will be inspected on a daily basis to identify any worn parts, and/or unsafe conditions. Any unsafe equipment will be removed from service until safety defects can be corrected.

4.1.1.3 GROUND PERSONNEL CONTACT

Movement of mobile equipment and motor vehicles, particularly in tight or congested areas, poses a potential safety hazard to field personnel as well as the operator. Whenever ground personnel must work in the vicinity of heavy equipment or multiple small vehicles, ground personnel will wear brightly colored, high visibility safety vests. Heavy equipment should have backup lights and alarms, and appropriate safety equipment (rollover protective structures, emergency shutoff in case of rollover, seat belts, etc.). In addition, the field team member on the ground is to guide the operator when backing up or entering the treatment system work area, when the operator does not have full view of the area, and when the terrain is hazardous. It is essential that the operator is aware of the location of all field personnel whenever equipment is being moved in work areas. Ground personnel working near mobile equipment who are unable to leave the area are to make eye contact with the operator, alert him to their presence, and move cautiously at all times. Operators should lower booms or buckets before ground personnel approach the equipment. The field team will be responsible for controlling access of heavy equipment onto the work site and informing all personnel where and when equipment will be moved.

4.1.1.4 ROLL-OVERS

Roll-overs are primarily a result of operating mobile equipment, such as the aerial lift, or vehicles on steep slopes and unstable surfaces, such as those which may be encountered at the Site, or when making sharp turns at unsafe speeds. Injuries from roll-overs can be fatal, particularly when the operator is thrown from the vehicle or equipment.



Each operator will carefully survey the route to be traveled checking for overhead obstructions, holes, slopes, ditches or other potential hazards prior to moving the equipment. Seat belts are to be used by all operators. At no time will vehicles or other heavy equipment be operated at speeds that directly disregard existing conditions at the Site or access roads (e.g., weather, traffic, intersections, roadway width, grade). Heavy equipment that is left unattended shall be made immobile by grounding of buckets or by insertion of chock blocks under wheels or tracks.

4.1.1.5 CRANES

ER will only use cranes and other hoisting equipment that is in safe working order. All crane equipment brought onto the project site will be inspected for structural integrity, smooth operational performance, and proper functioning of all critical safety devices in accordance with the crane manufacturer's specifications. This inspection will be performed by the site supervisor and site safety officer, and the crane operator.

- All equipment not conforming to the operational and safety requirements set forth during this inspection will not be put into service until all necessary repairs are made to the satisfaction of the inspection group. If any existing job cranes are to be used, they shall be inspected by a certified inspection agency prior to use.
- Only qualified crane operators familiar with the equipment to be used will be permitted to operate the crane. Subcontractors will supply proof of their operators' capability and experience to operate the crane in a safe manner.
- All hooks, slings, and other fittings shall be of correct size for the work to be done and shall have sufficient strength to safely sustain the loads imposed on them.
- Employees shall refrain from standing or walking beneath crane booms.
- In the event of emergency repair work of hoisting equipment with a suspended load, the area below the load shall be barricaded and the load blocked up or otherwise supported.
- Employees are not to ride loads, hooks, medicine balls, or slings suspended from hoisting equipment.
- Side pulls shall be avoided in all cases. The load must be directly under the hoist.
- The safety latch on the hook of hoisting equipment must be in a closed position.
- Use of deformed or defective hooks, rings, pins, shackles, or other lifting attachments is prohibited.
- Chain or wire rope shall be free of kinks, sharp bends, or twists.

4.1.1.6 RIGGING COMPONENTS

Rigging components will be inspected daily by members of the rigging team. In addition, allowable wire breaks and wear on hoisting ropes will follow *The Handbook of Rigging for Construction and Industrial Operations*, third edition, W.E. Rossnagel.

- Each sling is to be marked or tagged with its rated capacity.
- Slings are not to be used with loads in excess of their rated capacity.
- Wire-rope slings are to be immediately removed from service if any of the following conditions are present:
 - Six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay.
 - Wear or scraping of 1/3 the original diameter of outside individual wires.
 - Kinking, crushing, bird caging, or any other damage resulting in distortion of the wire-rope structure.
 - Evidence of heat damage.
 - End attachments that are cracked, deformed, or worn.
 - Hooks that have been opened more than 15 percent of the normal throat opening, measured at the narrowest point, or twisted more than 10 degrees from the plane of the unbent hook.
 - Corrosion of the rope or end attachments.



4.1.1.7 MATERIAL HANDLING

Various materials and equipment may be handled manually during project operations. Care should be taken when lifting and handling heavy or bulky items to avoid back injuries. The following fundamentals address the proper lifting techniques that are essential in preventing back injuries:

- The size, shape, and weight of the object to be lifted must first be considered. Multiple employees or the use of mechanical lifting devices are required for heavy objects.
 - The anticipated path to be taken by the lifter should be considered for the presence of slip, trip, and fall hazards.
 - The feet will be placed far enough apart for good balance and stability (typically shoulder width).
 - The worker will get as close to the load as possible. The legs will be bent at the knees.
 - The back will be kept as straight as possible and abdominal muscles should be tightened.
 - Twisting motions should be avoided when performing manual lifts.
-
- To lift the object, the legs are straightened from their bending position.
 - A worker will never carry a load that cannot be seen over or around.

When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered. When two or more workers are required to handle the same object, workers will coordinate the effort so that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, will face the direction in which the object is being carried. In handling bulky or heavy items, the following guidelines will be followed to avoid injury to the hands and fingers:

- A firm grip on the object is essential; leather gloves will be used if necessary.
- The hands and object will be free of oil, grease, and water which might prevent a firm grip and the fingers will be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.
- The item will be inspected for metal slivers, jagged edges, burrs, and rough or slippery surfaces prior to being lifted.

4.1.1.8 ELEVATED WORK

Elevated Work during steel erection and roof installation:

Work to be conducted during steel erection and roof installation will require the use of 100% fall protection measures. A static line will be used for personnel to attach to allow free movement on the roof and ensure fall protection is used 100% of the time during all operations. Each employee will be required to wear a full-body harness and a lanyard with a deceleration device attached to the static line during all roofing operations (roof removal and replacement). The following outlines some additional precautions.

➤ **General:**

- A horizontal life line will be run across the top of the roof and shall be anchored according to specifications. It shall be designed, installed, and used under the supervision of a qualified person as part of the complete fall arrest system. The line and anchors shall be designed to hold all intended employees with a minimum safety factor of 2; and
- A separated vertical life line will be used for each employee.

➤ **Roof Bracket Scaffolds**

- Must be constructed to fit the pitch of the roof and provide a level of support to meet the minimum requirements of 29CFR1926.452(h)(1);



- Brackets must be anchored in place by nails unless it is impractical to use, when nails are not used, brackets must be secured with first-grade manila rope of at least 3/4-inch diameter or equivalent; and
- Must be used in conjunction with the fall protection system described above.

➤ **Crawling Boards (Chicken Ladders)**

- Crawling boards must be extended from the roof peak to the eaves when used in roof construction, repair or maintenance;
- Crawling boards must be secured to the roof by: ridge hooks, or means that provide equivalent strength and durability that minimally meet 29CFR1926.452(m)(2);
- Crawling boards must be not less than 10 inches wide and 1-inch thick;
- Cleats must be equal in length to the width of the board, be spaced at equal intervals not to exceed 24-inches, and have a minimum cross sectional area of 1x1-1/2 inches; and
- Crawling boards shall be used with a fall protection system.

Vehicle-Mounted Elevated and Rotating Work Platforms:

Elevated work on vehicle-mounted elevated and rotating work platforms pose numerous safety risks. The following outlines the safety precautions to be undertaken to prevent work injury during use.

➤ **General:**

- Vehicle-mounted elevating and rotating work platforms shall be designed and constructed in accordance with ANSI/SIA A92.2 standards;
- Vehicle-mounted elevated and rotating work platforms shall be operated, inspected, tested and maintained as specified by the operators manual;
- Records of inspection conducted shall be maintained at the work site;
- Only personnel trained in the use of the vehicle-mounted elevated and rotating work platform shall be authorized to operate the equipment;
- This training shall consist of reading and understanding the manufacturer's operating manual and associated rule and instructions, or trained by a qualified person on the content; and
- The training shall also include understanding all decals, warnings, restrictions, and instructions.

➤ **Transporting:**

- An aerial lift truck shall not be moved when the boom is elevated in a working position with personnel in the basket except for equipment that is specifically designed for this type of operation; and
- Before moving an aerial lift, the boom shall be inspected to see that it is properly cradled and outriggers are in stowed position.

➤ **Operating Practices:**

- When outriggers are used, they shall be positioned on pads or a solid surface and brakes are to be set; and
- Wheel chocks shall be in place before use.

➤ **Fall Protection:**

- Employees shall ALWAYS stand firmly on the floor of the basket and shall NOT sit or climb on the edge of the basket or use planks, ladders or other devices to obtain a work position;
- A full-body harness with a lanyard with a deceleration device shall be worn; and
- The lanyard shall be anchored to the device at only designed anchor points provide on the equipment. Anchoring to the railing or chocking the lanyard IS PROHIBITED.



4.1.1.9 LADDER SAFETY

Work conducted from use of ladders pose numerous safety risks. The following outlines the safety precautions to be undertaken to prevent work injury during use.

➤ **Use:**

- No work requiring lifting of heavy materials or substantial exertion shall be done from ladders;
- Ladders shall have slip-resistant feet;
- Ladders shall not be moved, shifted, or extended while occupied;
- The top or top step of a step-ladder shall not be used as a step;
- Ladders shall be inspected for visible defects on a daily basis and before each use. Broken or damaged ladders are to be tagged and taken out of service;

- Ladders shall be restricted for their intended use;
- Ladders shall not be climbed by more than one person at a time.
- When ladders are used for access, they shall be extended a minimum of three (3) feet above the access area and shall be secured at top and bottom.

4.1.1.10 SCAFFOLDS

Scaffolds and their components shall meet the requirements contained in ANSI A10.8 and be capable of supporting without failure at least 4 times the maximum anticipated load. Scaffold systems components that are subject to bending moment shall be capable of providing a resisting moment of at least 4 times the tipping moment.

➤ **General:**

- Scaffolds shall be plumb and level;
- Scaffolds shall bear on base plates upon mudsills or other adequate foundation;

➤ **Stair towers:**

- Stair tower shall be positioned such that their bottom step is not more than 24 inches (61 cm) above the scaffold supporting level.
- A stair rail consisting of a top-rail and a mid-rail shall be provided on each side of each scaffold stairway.
- The top-rail of each stair-rail system shall also be capable of serving as a handrail, unless a separate handrail is provided.
- Handrails, and top-rails that serve as handrails, shall provide an adequate handhold for employees grasping them to avoid falling.
- Stair rail systems and handrails shall be surfaced to prevent injury to employees from punctures or lacerations, and to prevent snagging of clothing.
- The ends of stair rail systems and handrails shall be constructed so that they do not constitute a projection hazard.
- Handrails and top-rails that are used as hand rails, shall be at least 3 inches (7.6 cm) from other objects.
- Stair rails shall be not less than 28 inches (71 cm) nor more than 37 inches (94 cm) from the upper surface of the stair rail to the surface of the tread, in line with the face of the riser at the forward edge of the tread.
- A landing platform at least 18 inches (45.7 cm) wide by at least 18 inches (45.7 cm) long shall be provided at each level.
- Each scaffold stairway shall be at least 18 inches (45.7 cm) wide between stair rails.
- Treads and landings shall have slip-resistant surfaces.



- Stairways shall be installed between 40 degrees and 60 degrees from the horizontal.
- Guardrails meeting the requirements of paragraph (g)(4) of this section shall be provided on the open sides and ends of each landing.
- Riser height shall be uniform, within ¼ inch (0.6 cm) for each flight of stairs. Greater variations in riser height are allowed for the top and bottom steps of the entire system, not for each flight of stairs.
- Tread depth shall be uniform, within ¼ inch, for each flight of stairs.

➤ **Load tower**

The following control measures should be implemented for tower scaffolds:

- Construct the tower with modular, frame, or tube and coupler scaffolding.
- Ensure the tower is resting on firm level ground with the wheels or feet properly supported. Do not use bricks or building blocks to take the weight of any part of the tower.
- Ensure the height of a tower scaffold, from the bottom of the scaffold to the working/load surface, is no greater than three times the minimum base dimension, unless otherwise specified by the manufacturer, supplier or designer.
- Use alternative height to base ratios or extra support if the scaffold is:
 - sheeted or likely to be exposed to strong winds;
 - loaded with heavy equipment or materials;
 - used to hoist heavy materials or support rubbish chutes;
 - used for operations involving heavy or awkward equipment (for example, grit blasting or water jetting);

➤ **Bracing:**

- Frames and panels must be connected by cross, horizontal, or diagonal braces, alone or in combination, which secure vertical members together laterally. [29CFR1926.452(c)(2)]
- As frames are stacked, cross braces must be of such length as will automatically keep the scaffold plumb, level, and square. [29CFR1926.452(c)(2)]
- All brace connections must be secured to prevent dislodging [29CFR1926.452(c)(2)].

➤ **Guys, Ties and Braces:**

- When a supported scaffold reaches a height that is more than four times its minimum base dimension (4:1), it must be restrained by guys, ties, or braces to prevent it from tipping. [29CFR1926.451(c)(1)]
- Guys, ties, and braces must be installed at locations where horizontal scaffold components support both inner and outer legs. [29CFR1926.451(c)(1)(i)]
- Guys, ties, and braces must be installed according to the scaffold manufacturer's recommendations or at the closest horizontal member to the 4:1 height ratio and be repeated every 20 vertical feet for narrow scaffolds (3 feet or less in width), and every 26 vertical feet for scaffolds greater than 3 feet in width. [29CFR1926.451(c)(1)(ii)]
- Ties, guys, braces, or outriggers shall be used to prevent tipping of supported scaffolds bearing eccentric loads, such as cantilevered work platforms. [29CFR1926.451(c)(1)(iii)]

4.1.1.11 STEEL ERECTION

All system-engineered metal buildings shall comply with the minimum OSHA requirements as outlined in 29 CFR 1926 Subpart R. All structural columns must be anchored by at least four anchor bolts. Rigid frames must have 50 percent of their bolts, or the number of bolts specified by the manufacturer (whichever is greater) installed and tightened on both sides of the web adjacent to each flange before the hoisting equipment is released.



Construction loads are prohibited from:

- being placed on any inadequately secured structural steel framework and
- being placed beyond any area 8 feet from the center-line of the primary support member.
- When girts or eave struts share common connection holes: at least one bolt must remain securely in place for the connection of the first member; a field-attached seat or similar connection device supplied by the manufacturer may be used in lieu of the bolt; and both ends of all cold-formed or steel joists must be fully bolted/welded to the support structure before:
 1. releasing the hoisting cables,
 2. allowing an employee on the joists, or
 3. allowing any construction loads on the joists.

Purlins and girts are prohibited from:

- being used as an anchorage point for a fall-arrest system, unless written approval is obtained from a qualified person;
- being used as a walking/working surface when installing safety systems, until:
 1. all permanent bridging is installed, and
 2. fall protection is provided

4.1.1.12 HAND AND POWER TOOLS

Hand and power tools are used for various site activities. Procedures for using hand and power tools are as follows:

➤ General Safety Precautions:

- Persons using power tools will be trained in their use;
- Tools shall be inspected prior to each use;
- Ground Faults must be present on all electrical tools;
- Only tools in good condition will be used;
- Tools will be kept clean;
- Guards and shields will be kept on all tools;
- Air couplings will be secured; and
- Proper eye protection is critical when using power tools. At a minimum, safety glasses will be required during site operations. Where appropriate, full-face shields will be utilized in addition to the glasses.

➤ Pneumatic Tools:

- Safety clips or retainers shall be installed and maintained;
- Pressure shall be shut off and exhausted from the line before disconnecting the line from any tool or connection;
- Safety lashing shall be provided at connections between the hose and at all quick makeup connections; and
- Hoses shall not be used for hoisting or lowering.

➤ Power Tools

- Guards shall be kept in place;
- Reciprocating, rotating, and moving parts of equipment shall be guarded;
- All woodworking machinery shall be operated and maintained in accordance with ANSI 01.1;
- Radial arm power saws shall be equipped with an automatic brake; and
- Radial arm power saws shall be installed in such a manner that the cutting head will return to the starting position when released by the operator.

4.1.1.13 HAND TOOLS



Hand tools are used for various site activities. Procedures for using hand tools are as follows:

- Only tools in good condition will be used.
- Tools will be kept clean.
- Proper eye protection is critical when using power tools. At a minimum, safety glasses will be required during site operations. Where appropriate, full-face shields will be utilized in addition to the glasses.

4.1.1.14 ELECTRICAL

All electrical wiring and equipment shall be a type listed by a nationally recognized testing laboratory for the specific application for which it is to be used. All electrical work shall comply with applicable National Electrical

Safety Code (NEC), National Electric Code (NEC), OSHA and USCG regulations. Electrical work shall be performed by Qualified Personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and/or Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed.

Before starting work, existing conditions shall be evaluated and determined. Such conditions shall include, but not be limited to, location and voltage of energized lines and equipment, conditions of poles, and location of circuits and equipment including power and communication lines and fire alarm circuits.

- Electric equipment and lines shall be considered energized until determined to be deenergized by tests, or other means, and grounds applied.
- New lines or equipment may be considered de-energized and worked as such where the lines or equipment are grounded or where the hazard of induced voltages is not present and adequate clearances or other means are implemented to prevent contact with energized lines or equipment.
- Bare wire communication conductors on power poles or structures shall be treated as energized lines unless protected by insulating materials suitable for the highest voltage that may be accidentally applied to the line.
- The operating voltage of equipment and lines shall be determined before working on or near energized parts.

4.1.1.15 NOISE EXPOSURE

Noise is generated during source removal action in such operations as transportation of materials and operation of heavy construction equipment. Noise has been defined as unwanted sounds. The human ear can tolerate a certain amount of sound without any harmful effects. Personnel will be provided protection against the effects of hazardous noise exposure whenever sound-pressure levels exceed 85 dB(A) steady-state expressed as a time weighted average (TWA) or 140 dB(A) Sound-pressure level limits.

The standard allows 85 dB(A) for a full 8 hours and for a lesser time when the levels exceed 85 dB(A). It is usually safe to assume that if you need to shout to be heard at arms length, the noise level is at 90 dB(A) or above. Hearing protection will be utilized by personnel operating or working around construction equipment of power tools. Based on the nature of activities to be performed on site, the use of heavy equipment, power tools and other noise producing devices, ER personnel are enrolled in a Hearing Conservation Program that meets the requirements of OSHA regulation 29 CFR 1910.95 as part of our Medical Surveillance Program.

Based upon past experience, it is known that the noise levels emanating from the operation of the heavy equipment often exceed what is allowable for worker exposure. Consequently, equipment operators and personnel working near the equipment are required to wear hearing protection. Hearing protection equipment is provided by ER.

4.1.1.16 SLIP/TRIP/FALL

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but all injuries can be prevented by the following prudent practices:



- Spot-check the work area to identify hazards.
- Establish and utilize a pathway, which is most free of slip and trip hazards.
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads that you can see over.
- Keep work areas clean and free of clutter, especially in storage rooms and walkways.
- Communicate hazards to on-site personnel
- Secure all loose clothing, ties, and remove jewelry while around machinery.
- Report and/or remove hazards.
- Keep a safe buffer zone between workers using equipment and tools.
- Workers must take particular care when walking on the geotextile-working mat.

4.1.1.17 COLD STRESS (SEASONALLY APPLICABLE)

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10° F with a wind velocity of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18° F. As a general rule, the greatest incremental increase in wind chill occurs when a wind velocity of 5 mph increases to 10 mph. Additionally, evaporation of water removes heat from the substrate. Thus, the body suddenly cools when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

Extreme cold for a short time may cause severe injury to the surface of the body. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears are the most susceptible. Frostbite of the extremities can be categorized into the following:

- Frost nip or initial frostbite: characterized by sudden blanching or whitening of the skin.
- Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages: (1) shivering, (2) apathy, listlessness, sleepiness, and sometimes rapid cooling of the body to less than 95° F, (3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate, (4) freezing of the extremities, and finally (5) death. In addition to the requirements below, all project personnel will comply with the cold stress TLV recommended by ACGIH. The minimum requirements to control against cold stress are as follows:

- Thermal socks, long cotton underwear, hard hat liners, and other cold weather gear can aid in the prevention of hypothermia.
- Blankets, warm drinks (other than caffeinated coffee), and warm break areas are essential.
- Cold stress training should be reviewed during the winter months.

4.1.1.18 HEAT STRESS (SEASONALLY APPLICABLE)

Heat stress may be a hazard for workers wearing protective clothing even if the temperature is moderate. The same protective materials that shield the body from chemical exposure prevent heat and moisture from dissipating. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient temperature and the work being performed, heat stress can occur very rapidly - within as little as 15 minutes.

In its early stages, heat stress can cause discomfort and inattention, resulting in impaired functional abilities that can threaten the safety of both the individual and his co-workers. Personnel will be instructed to recognize the symptoms of the onset of heat stress. While it is not anticipated that heat stress monitoring will be required for this project, the SSHO may periodically check all personnel working in thermal stress areas to ensure that the symptoms are recognized. Frequency of heat stress monitoring and checks for symptoms of heat stress will increase with rises in air temperature, humidity, and the degree of exposure to high temperature areas.



An ambient temperature of 72.5° F when workers are in Level C or higher, will be used as an action level to implement pulse monitoring, oral temperatures and administrative controls, including rest breaks and work rotation, to prevent employees from experiencing heat-related health effects including weight loss. The guidance for workers wearing permeable clothing is specified in the current version of the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values for Heat Stress.

The following parameters should be used when monitoring workers:

Heart rate - Count the radial pulse as early as possible in the rest period to ensure a more accurate reading. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one third and keep the rest period at the same length. If, at the end of the following work period, the heart rate still exceeds 110 beats per minute, shorten the work period again by one-third.

Oral Temperature - The utilization of oral temperature applies to the time immediately after the worker leaves the contamination reduction zone. Using a clinical thermometer, take the temperature for three minutes. If the oral temperature exceeds 99.6 F (37.6 C), shorten the next work cycle by one-third, without a change to the rest period.

If the oral temperature still exceeds 99.6 F (37.6 C) at the end of the following work period, shorten the next work cycle by one-third. Do not permit a worker to perform duties requiring a semi-permeable or impermeable garment if the oral temperature exceeds 100.6 F (38.1C). Ear canal readings are a valid method to monitor the temperature of workers who remain in the contamination reduction zone.

The oral temperature shall not exceed 100.4° F. If an employee's pulse rate exceeds the maximum age-adjusted heart rate ($0.7(220-AGE)$), and/or the oral temperature exceeds 100.4o F, the employee shall be required to stop work and rest at the work site or move to an air-conditioned room after proper decontamination. The affected employee may be allowed to return to work after his/her pulse rate has dropped below 100 beats per minute. The SSHO in consultation with the affected employee, and medical personnel if necessary, shall determine whether an employee is ready to return to work. Fluids shall be provided and rest breaks will be taken. The frequency of breaks will increase with the temperature. Such things as cooling vest; portable fans and breaks in air conditioned areas shall be used if necessary.

When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day. If necessary, a work/rest regimen will be instituted.

The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, i.e., the Wet Bulb Globe Temperature, duration and type of activities performed.

A worker who becomes irrational or confused or collapses on the job should be considered a heat stroke victim, and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke. While awaiting the ambulance, begin efforts to cool the victim down by performing the following:

- Move the victim to a cooler environment and remove outer clothing.
- Wet the skin with water, and fan vigorously or repeatedly apply cold packs or immerse the victim in a tub of cool (not ice) water.
- If no water is available, fanning will help promote cooling.

Any individual showing susceptibility to heat stress will be referred to a physician for evaluation. In addition, the use of prescription drugs can also contribute to the effects of heat stress and will be considered during the assignment of work. Cool (50°-60°F) water or a sport drink, such as Gatorade will be made available to workers and encourage them to drink small amounts frequently, e.g., one cup every 20 minutes. Ample supplies of liquids will be placed close to the work area.



4.1.1.19 FLAMMABLE MATERIALS

The use of flammable materials for fuels, cleaners, or polyethylene piping creates a potential for fire. Controls for such materials are as follows.

- Ignition sources will be excluded from any area where flammable materials are present (used or stored).
- Equipment on site shall be bonded and grounded, spark proof, and explosion resistant, as appropriate.
- Particular attention to bonding/ grounding shall be made during transfer of flammable/combustible liquids and when ventilation equipment is in use.
- There will be no smoking on the job site. If there are smokers on site, they will be provided with a designated smoking area.
- Fuels used by on-site personnel will be stored in approved safety containers designed for that purpose.
- Fuels will be stored in a common location to be determined by the SHSO. This common fuel storage location, once established, will be marked with warning signs "Flammable Liquid" and "No Smoking."
- All electrical appliances used will be UL approved for the potential hazards of the atmospheres in which they will be used.
- Fire extinguishers consistent with OSHA 1910.150 and will be kept in sufficient number of locations to allow on-site personnel the opportunity to extinguish incipient fires.

4.1.1.20 MECHANICAL AND FLAME CUTTING EQUIPMENT

Hot work (i.e., welding, cutting, brazing, etc.) can be hazardous as an ignition source and as a source of airborne contaminants. The latter is especially true when cutting on painted and/or contaminated metal. Any hot work that would take place near flammable materials in tanks or in a confined space can present an explosion hazard. Cutting equipment and compressed gas cylinders present potential physical, electrical, tripping, and flammable hazards such as welding flash and welding burns. The following outline some controls:

- All hot work shall be performed in accordance with Subpart Q of the OSHA General Industry Standard (29 CFR 1910.251-.257) and with Hot Work Procedures.
- No hot work shall be performed without a Hot Work Permit.
- The area where hot work is to be performed shall be inspected by a qualified person recognized by ER H&S staff. This qualified person shall issue a Hot Work Permit.
- Cutting, welding, or other operations that produce excessive heat, open sparks, or flames will not be permitted within 100 feet of a potential liquid fuel source.
- Sacrificial anodes, if used, will be attached using a cold method.
- Extinguishing capabilities equal to or greater than two 10-pound ABC multipurpose dry chemical fire extinguishers will be available in the immediate vicinity of hot work.

4.1.1.21 FIRE

Fire is a potential hazard associated with the on-site activities. Local fire and police department telephone numbers will be posted in a visible area in the support zone in the on-site office trailer. Smoking is prohibited within the exclusion zone, and will be confined to an area located in the support zone and away from any flammable materials.

All heavy equipment will be supplied with Type B fire extinguishers and additional Type ABC fire extinguishers will be located in the support zone. All personnel on-site will be instructed on the use and locations of all on-site fire extinguishers. Each fire extinguisher will be inspected regularly during field activities to make certain that it is in operable condition.

4.1.1.22 CONFINED SPACE

A confined space is defined as a job location large enough for a body to enter, a location where there is limited or restricted access/egress, and a location that is not designed for continuous human occupancy. Hazards associated with confined space include potentially higher than normal chemical concentrations, flammable



atmospheres, potential for asphyxiation, entrapment or potential physical exposures. Any work in a confined space should be performed following ER confined space procedures.

4.1.1.23 UNDERGROUND UTILITIES

Before any intrusive activities begin, ER will determine the location of underground utilities (sewers, telephone, fuel, electric, water lines, or any other underground installations) that may be encountered during the removal action. ER will notify DIGSafely NEW YORK ONE CALL CENTER at (800) 962-7962 for a mark out of utilities in the operational area. For more information on New York's ONE CALL CENTER contact (800) 272-4480.

4.1.1.24 HOUSEKEEPING

Housekeeping hazards can produce congestion, disorder, dirt, waste, trash, and other obstacles and can lead to slips, trips, and fall potentials. Such accidents can result in strains, sprains, broken bones, contusions, fractured ribs, and fatalities. Work areas shall be kept sufficiently clean and orderly so that work activities can proceed in an efficient and safe manner such that safety and quality are maintained. These areas will be adequately lighted, ventilated, protected, and accessible as appropriate for the work being performed.

- Machinery and equipment will be arranged and stored to permit safe, efficient work activities and to provide ease in cleaning. Tools and accessories will be safely stored in cabinets, racks, or other suitable devices out of traffic areas.
- Sufficient waste containers and receptacles will be provided in appropriate locations and will be emptied regularly. Work areas and floors will be maintained free of material, debris, obstructions, foreign materials, or slippery substances such as oil, water, and grease.
- Aisles, traffic areas, and exits will be maintained free of materials and debris. Flammable and combustible materials will be stored in approved containers, appropriately labeled, and properly disposed. Waste rags will be stored in metal containers to preclude spontaneous combustion. Flammable and combustible materials will be stored in dedicated, ventilated storage rooms in accordance with OSHA Standards. Personnel will be held accountable for keeping their work areas clear of housekeeping hazards.

4.1.2 POTENTIAL BIOLOGICAL HAZARDS

Of potential concern are poisonous spiders and snakes, poisonous/irritating plants (poison oak, poison ivy), and stinging insects, particularly those to which individuals may have developed allergies (i.e. bees, wasps). Individuals with allergies to insect stings (bees, wasps, etc.) should notify the Site H&S Coordinator and other supervisory personnel. Tailgate safety briefings should identify potential locations of poisonous plants and dense foliage where insects or snakes may be hidden. A first aid kit will be available to treat minor insect bites and stings. Adherence to safe work practices such as not reaching into dark places or picking up rocks and other objects, inspecting clothing and exposed skin for presence of ticks periodically during the day, and wearing steel-toed safety boots, long-sleeve shirts, and heavy leather work gloves when removing or contacting vegetation.

4.1.2.1 POISONOUS PLANTS

Poison ivy and poison oak can result in rashes and blisters within a couple of hours or days after contact. The irritation comes from the plant resin and through itching and scratching can be carried from the original point of contact to other areas of the body. Following contact, it is best to remove one's clothing and wash the skin with copious changes of soap and water, being careful not to rupture any blister that may have formed. For mild cases application of a simple soothing lotion (calamine should be in the first aid kit) should be enough; but in severe exposures there may be a raised body temperature indicating the need for medical attention.

4.1.2.2 SPIDERS AND OTHER INSECTS

Although most spiders are harmless, there are two species that pose a potential hazard: the brown recluse or violin spider (*Lox osceles reclusa*), and the black widow (*Latrodectus mactans*). Spider bites, although rarely fatal, are often quite painful. Symptoms may include severe pain in the area of the bite, profuse sweating, nausea,



abdominal cramps, and difficulty breathing and speaking. Field personnel are reminded to exercise extreme caution when working in dark, damp, covered areas since spiders are typically found in these locations.

First aid procedures for minor insect bites and stings include: cold applications, use of soothing lotions (e.g., calamine), and for a bee sting, removal of the venom, stinger, and venom sac. If the bite or sting is from a poisonous spider or produces a severe reaction, implement the following procedures: calm and keep the victim from moving about, preferably in a prone position and immediately transport to the nearest medical emergency facility. If the victim cannot be transported to a hospital and emergency assistance is not immediately available, the field team should remove the venom sac with the Sawyer extractor, immobilizing the bitten extremity and keeping it below the heart, and, if necessary, provide artificial respiration and CPR. However, it is essential to get the victim to a hospital immediately.

If a tick is attached to the skin, gently pull it out with tweezers, being careful not to squeeze the tick's body, clean the bitten area with antiseptic and watch for any rash. If possible save the tick in a bottle for later identification. Certain ticks (*Ixodes* spp.) commonly found on deer, but also on dogs and mice, are vectors (carriers/transmitters) of the bacterium *Borrelia burgdorferi*, the cause of Lyme disease. The tick must feed for approximately 48 hours for the bacterium to be transmitted, and even then the risk of infection is only 4 percent in individuals bitten by an infected tick. Nevertheless, since Lyme disease in rare cases causes transient heart problems, chronic arthritis, and nervous system disorders, check for ticks, especially on hairy parts of the body following activities in high grass and brush. If bitten by a tick, watch for the characteristic rash within five weeks of the bite (ring of redness surrounding a central pale area) which is often accompanied by flu-like symptoms and pain in the muscles and joints, especially the knees.

4.1.2.3 SNAKES

Snake bites are serious and should be treated as though from a venomous snake, such as a rattlesnake (triangular head, thick body, pits between the eyes and nostrils, generally 4 to 6 feet long, blotched brownish, gray or red coloration, characteristic rattles). Seek medical attention immediately; transport the victim to the nearest medical facility (see Table 1 for telephone numbers and Figure 3A and 3B for directions). Signs and symptoms of venomous poisoning include swelling, pain, and tingling at the bite site, tingling and a metallic taste in the mouth, fever, chills, blurred vision, and muscle tremors. Even if the bite is not from a venomous snake there is a real possibility of tetanus. The following first aid steps should be followed while transporting the individual to the emergency room or waiting for medical assistance, if the victim cannot be moved:

- Calm the victim and keep hydrated and comfortable;
- Immobilize the affected area and keep at or below the level of the heart;
- Remove rings, watches, and other constrictive items before swelling starts; and
- Gently clean the wound with an antiseptic soap and apply sterile dressing, don't apply ice or attempt to cut the bite site and suck out the venom.

The immediate goal should be safe and rapid transport to the emergency room without undue anxiety or activity that may accelerate absorption of the venom. A short walk is acceptable if the patient feels up to it and if no other alternative is available. A suction device, such as a Sawyer Extractor, can be used to effectively remove up to 30 percent of the venom if applied within three minutes of the bite. An Extractor, which is applied without incision, should be maintained in the first aid kit and used when indicated and certainly when there may be a delay in getting emergency medical treatment.

Personnel should remember that snake bites are preventable events. Most individuals that are bitten see the snake, but then take actions that put them at risk. Give snakes a wide berth, move away and the snake will not chase you. Always look before you step over an object, and before you turn over a rock or log, or place your hand in a crevice. Complete outdoor tasks during daylight hours. Personnel should always wear protective clothing (heavy leather work gloves, thick leather safety boots, long-sleeve shirts) when working in areas with tall grass or potential snake habitat.



4.1.2.4 OTHER WILD AND DOMESTIC ANIMALS

Other animal hazards that could be encountered include wild and domestic animals, primarily dogs. Most wild animals will be frightened away, but the more domestic they are, the less likely they will run. Beware of skunks and porcupines that do not flee or raise their tails vertically, you could become a target for noxious excretions or quills. The following guidelines are recommended to avoid animal attacks in the field:

- Surprising animals and thereby provoking an attack can be avoided by making noise when entering wooded or covered areas.
- Make a wide detour around all animals that are observed.
- If animals are present at the Site that pose a potential threat and cannot be scared away, return to the field trailer and notify the local animal control agency, or forest ranger.

Watch out for rodent nests; rodent infestations could pose a potential health hazard (rodents may carry hantaviruses, the causative agent of hemorrhagic fever); inhalation or ingestion of urine, feces or saliva, even aerosols, from infected rodents could transmit the virus to workers.

Bats could also be encountered. They are essentially harmless; less than 1 percent are infected with rabies, and attacks are rare. If there is an incident where someone may have been scratched, bitten, or even touched by a bat, wash the area with soap and water and get medical advice immediately. Anti-rabies treatment may be necessary.

Tables 4.1 and 4.2 below provide an overview of the task specific hazards and controls.

TABLE 4.1: Task Specific Hazards and Controls

Task Specific Safety Assessment		
Job Task: Interior/Exterior Building Construction		
Personal Protective Equipment: Level D		
Hazard	Sources	Control Measures
Ergonomics	Lifting and bending	- Buddy system/Proper lifting techniques - No individual lifting over 40 lbs.
Heat/Cold Stress	Excessive heat/cold Lack of air flow	- Cool/Warm break areas - Follow ER SOP HS-17 - Follow H&S Procedures (ACGIH Guidelines) - Plenty of Fluids & breaks
Noise	Heavy Equipment, Diaphragm Pumps, Air compressor	- Hearing protection required at all times when working near pumps, air compressors, and heavy equipment above 85db
Falls from elevation	Scaffold/ladders	- Competent person shall inspect scaffolding setup - Erected scaffolds and platforms should be inspected continuously by those using them - Exercise caution when entering or leaving a work platform - Do not overload scaffolds. Follow manufacturer's safe working load recommendations - Do not jump onto planks or platforms - Do not use ladders or makeshift devices to increase the working height of a scaffold. Do not plank guardrails to increase the height of a scaffold - Climb in access areas only, and use both hands - Where required, use proper personal fall arrest equipment, and use it properly - Inspect ladders daily prior to each use - Tag out or destroy damage ladders - Set up ladders on even surface at proper angle (4:1)



Task Specific Safety Assessment		
Job Task: Interior/Exterior Building Construction		
Personal Protective Equipment: Level D		
Hazard	Sources	Control Measures
		<ul style="list-style-type: none"> - Keep your body centered between the rails of the ladder - Never carry tools or materials in your hand when going up or down a ladder - Only one person should be on a ladder at a time - Secure ladder at top and bottom when feasible
Fire	Electrical devices/service	<ul style="list-style-type: none"> - Fire extinguishers with at least a 3A:40B:C rating shall be placed in work zones
Cuts/Punctures	Sharp Objects – Sheet Metal/ Nails/screws	<ul style="list-style-type: none"> - Beware of sharp objects - Wear leather gloves - Use safety utility knife - Always cut away from body
Slip/Trip/Fall	Attic Structure/roof trusses Uneven terrain/debris	<ul style="list-style-type: none"> - Install proper flooring/use work boards in attics - Keep area organized - Identify/mark hazards - Remove debris from walking/ working surfaces
Wildlife	Insect/Ticks/spiders/Dogs/Snakes	<ul style="list-style-type: none"> - Beware of and Avoid contact - Notify supervisor immediately if stung/bitten

TABLE 4.2: Physical Hazards

Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
Electrical	<ol style="list-style-type: none"> 1. Locate and mark existing energized lines. 2. De-energize lines if necessary to perform work safely. 3. All electrical circuits will be grounded. 4. All 120 volt single phase which are not a part of the permanent wiring will have a ground-fault interrupter in place. 5. Temporary wiring will be guarded, buried or isolated by elevation to prevent accidental contact by personnel or equipment. 6. Evaluate potential for high moisture/standing water areas and define special electrical wiring needs-typically requirement for low voltage lighting systems. 	<ol style="list-style-type: none"> 1. Utilize Qualified Electrical Contractor for any new or temporary electrical construction. 2. Ensure electrical equipment/material meet all local, state and federal code and specifications 3. Use GFCI for all power tool usage.
Ergonomic	<ol style="list-style-type: none"> 1. All operations evaluated for ergonomic impact. 2. Procedures written to define limits of lifting, pulling, etc. 3. Procedures to define how personnel will utilize proper ergonomic concepts and utilize mechanical material handling equipment. 4. Necessary mechanical material handling equipment specified and ordered for project. 	<ol style="list-style-type: none"> 1. Proper body mechanics techniques stressed and enforced on a daily basis. 2. Mechanical handling equipment maintained and utilized. 3. Proper body mechanics stressed in scheduled safety meetings. 4. Injuries reported and medically treated if in doubt about severity. 5. Operations changed as necessary based on injury experience or potential.
Existing Site Topography	<ol style="list-style-type: none"> 1. Survey site prior to layout. Identify areas unsafe for personnel or equipment due to physical conditions. 2. Identify/locate existing utilities. 3. Determine impact of site operations on surrounding properties, communities, etc. 4. Identify mechanized equipment routes both on site and onto and off the site. 5. Layout site into exclusion and contamination reduction zones based on initial site evaluation. 	<ol style="list-style-type: none"> 1. Awareness to work environment - regular inspection/audits to identify changing conditions. 2. Shut down operations when unknown conditions encountered.
Fires & Explosions	<ol style="list-style-type: none"> 1. Evaluate all operations for fire and explosion potential. 2. Define specific procedures for unique operations presenting unusual hazard such as flammable tank demolition. 3. Ensure that properly trained personnel and specialized equipment is available. 4. Define requirements for handling and storage of flammable liquids 	<ol style="list-style-type: none"> 1. Inspect fire suppression equipment on a regular basis. 2. Store flammables away from oxidizers and corrosives. 3. Utilize Hot Work Permit for all hot work on-site.



Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
	<ul style="list-style-type: none"> on site, need for hot work permits and procedures to follow in the event of fire or explosion. 5. Define the type and quantity of fire suppression equipment needed on site. 6. Coordinate which local fire fighting agencies to discuss unique fire hazards, hazardous materials, etc. 7. Ensure site operations comply with 29CFR 1910.157G. 	<ul style="list-style-type: none"> 4. Follow any site specific procedures regarding work around flammables. 5. Review and practice contingency plans. 6. Discuss on regular basis at scheduled safety meetings.
Flammable Vapor and Gases	<ul style="list-style-type: none"> 1. Evaluate site to determine sources of likely flammable gas or vapor generation. 2. Develop specific procedures to be followed in the event of exposure to flammables. 3. Specify specialized equipment needs for inerting flammable atmospheres, ventilating spaces and monitoring flammable vapor concentrations. 4. Define requirements for intrinsically safe equipment. 5. Develop contingency plan to follow in the event of fire or explosion. 	<ul style="list-style-type: none"> 1. Calibrated monitoring equipment available and utilized by trained personnel whenever working where flammable gas or vapor is present. 2. Monitoring performed at regular frequency and in all areas where vapor could generate or pool. 3. Equipment and operations shut down when threshold levels are exceeded. 4. Contingency plans reviewed regularly by all involved personnel. 5. Work areas are carefully inspected to look for possible ignition sources. Sources are removed. 6. Operations shut down if specific task procedures can't be followed to the letter.
Heavy Equipment Operation	<ul style="list-style-type: none"> 1. Define equipment routes and traffic patterns for site. 2. Insure that operators are properly trained on equipment operation for all equipment required on project. 3. Define safety equipment requirements, including back up alarm and roll over, for all equipment on site. 4. Define equipment routes and traffic patterns for site. 5. Implement SOP of requiring operators to safety inspect equipment on a daily basis in accordance with manufacturer requirements. 6. Evaluate project requirements to ensure that equipment of adequate capacity is specified. 	<ul style="list-style-type: none"> 1. Equipment inspected as required. 2. Equipment repaired or taken out of service. 3. Ground spotters are assigned to work with equipment operators. 4. Utilize standard hand signals and communication protocols. 5. Personnel wear the proper PPE; utilize hearing protection, gloves for handling rigging, etc. 6. Equipment safety procedures discussed at daily scheduled safety meetings. 7. Personnel do not exceed lifting capacities, load limits, etc. for equipment in question. 8. Personnel follow basic SOP's which prohibit passengers on equipment, activating brakes and grounding buckets, securing loads prior to movement, etc.
Illumination	<ul style="list-style-type: none"> 1. Evaluate all operations and work areas to determine lighting requirements. 2. Specify specialized lighting requirements including explosion proof, intrinsically safe, lighting needs. 3. Determine if nighttime outdoor operations are necessary. 4. Evaluate tasks to be performed and number of light plants necessary to allow operations. 5. Ascertain if outdoor lighting from nighttime operations will have an impact on surrounding communities. 	<ul style="list-style-type: none"> 1. Inspect specialized equipment and discard or replace as needed. 2. Add additional lighting to areas with lighting deficiencies. 3. Inspect drop cords and portable lights on regular basis. Replace or repair as necessary.
Noise	<ul style="list-style-type: none"> 1. Local community noise standards examined. 2. Expected loud operations evaluated to determine compliance with community standards. 3. Loud operations scheduled for approved time periods. 4. Noise level standards established for equipment brought onto site. 5. Hearing protection requirements defined for personnel expected to have excessive exposures. 	<ul style="list-style-type: none"> 1. Personnel receive annual audiogram. 2. Personnel required to wear hearing protection. 3. Routine noise level monitoring and dosimetry performed. 4. Defective equipment repaired as needed. 5. Ongoing hearing conservation education promoted at scheduled safety meetings. 6. Medical evaluation following noise (impact) exposure if symptoms present themselves.
Personal Injuries	<ul style="list-style-type: none"> 1. Site operations will be evaluated for exposures with serious injury potential such as falling objects, pinch points, flying objects, falls from elevated surfaces, etc. 2. A written Fall Prevention Program will be developed if workers will be required to work at heights greater than 6 feet from unguarded work locations. 3. PPE requirements will be based on potential for injury. 	<ul style="list-style-type: none"> 1. Personnel will wear required PPE. 2. Specialized equipment such as rope grabs, winches, etc. will be inspected prior to each use. 3. Defective equipment will be immediately replaced. 4. All injury and near miss incidents will be reported to the SHSO.



Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
		<ol style="list-style-type: none"> 5. First aid/CPR trained person on site at all times. 6. First aid on site. 7. Transport for medical care if necessary.
Small Equipment Usage	<ol style="list-style-type: none"> 1. Site operations will be evaluated to determine need for specialized intrinsically safe, explosion-proof and UL approved equipment and instruments. 2. Implement requirement for G.F.I., double insulated tool usage, or assured grounding program in all outdoor operations, will be utilized. 3. Specify equipment needs to ensure that equipment used only for the purpose for which it is designed and to prevent abuse or misuse of the equipment. 4. Specify requirements for the inspections and maintenance of specialized equipment. 5. Specify that all equipment utilized on the project meets all OSHA requirements. 	<ol style="list-style-type: none"> 1. Inspect each tool prior to each use. 2. Ensure all guards are in use and properly positioned. 3. Ensure item being worked on is properly braced if necessary. 4. Get help when appropriate to hold or brace item being worked on. 5. Wear leather or other appropriate gloves in addition to level C PPE.
Weather Conditions	<ol style="list-style-type: none"> 1. Evaluate prevailing weather conditions for the site. 2. Contingency plans developed for likely severe weather conditions such as tornado, and extreme thunderstorm. 3. Provide for daily weather forecast service in extreme weather areas. 4. Plan to weatherize safety systems, such as showers and eye washes that would be impacted by extreme cold weather. 5. Order necessary specialized cold weather clothing. 6. Grounding and bonding requirements defined for thunderstorm areas. 7. Sheltered air conditioned break areas provided for extreme hot and cold weather zones. 	<ol style="list-style-type: none"> 1. Employees trained in contingency plan for severe weather conditions. 2. Emergency water sources inspected regularly in cold areas. 3. Weather service contacted regularly during storm conditions. 4. Supervisory personnel cease operations during extreme storm conditions (i.e., thunderstorms). 5. Personnel evacuate to safe assembly area.
Heat Stress	<ol style="list-style-type: none"> 1. Anticipate possible high temperatures (summer months). 2. Be aware of heat stress symptoms, quit sweating, pale, clammy skin, dizziness 	<ol style="list-style-type: none"> 1. Cool break area. 2. Drink water. 3. Buddy system/ awareness 4. First aid on site. 5. Medical care if symptoms persist.
Cold Stress	<ol style="list-style-type: none"> 1. Anticipate possible low temperatures (winter months). 2. Remember the temperature does not have to be below freezing to have a cold stress situation. 	<ol style="list-style-type: none"> 1. Warm break area. 2. Warm decaffeinated drinks. 3. Buddy system/ awareness. 4. First aid on site. 5. Medical care if symptoms persist

4.1.3 Chemical Hazards

The predominant VOCs, or contaminants of concern (COC), in the groundwater plume originating from the LAI site are TCE and PCE. To a lesser extent, other VOCs such as: chloromethane (CM), 1,1-dichloroethene, methyl tert-butyl ether (MTBE), 1,1-dichloroethane (DCA), cis-dichloroethene (DCE), chloroform and 1,1,1-trichloroethane (TCA) are also known to be present. Material Safety Data Sheets are found in **Appendix C**.

4.1.3.1 EXPOSURE ROUTE

A primary exposure route of concern at the site is contact with the contaminated groundwater. Air monitoring will be performed to assess the effectiveness of the mitigation system using direct reading instruments (such as PID and FID), will be used. Direct contact of the skin and eyes with contaminated material is an important route of exposure. To protect workers against dermal contact, they will wear specified protective clothing, and safety glasses for operations involving potential exposure to hazardous materials.

Although ingestion should be the least significant route of exposure, employees will be made aware of ways in which this type of exposure can occur and methods to avoid such exposure. Deliberate ingestion of chemicals is unlikely. Personal hygiene habits that provide a route of entry for chemicals will be restricted. Proper decontamination procedures will reduce/eliminate potential of ingesting hazardous materials. Site personnel will wash their hands, face and other exposed parts of their skin before eating or smoking.



4.1.3.2 TRICHLOROETHYLENE (TCE)

Trichloroethylene (TCE) is a nonflammable, colorless liquid at room temperature which has a sweet odor and evaporated easily. Its vapor pressure at 25 degrees C is 74mmHg and density at 20 degrees C is 1.465 g/ml. Its melting and boiling point are -87.1 degree C and 86.7 degrees C, respectively. Currently, TCE is primarily used as a solvent to degrease metals for fats, waxes, resins and oils. It is used in the manufacturing of other chemicals. TCE is a probable human carcinogen. Humans are susceptible to TCE through ingestion, inhalation and dermal routes. The primary target organs are the liver, kidney, central nervous system, cardiovascular system, hematopoietic system and reproduction. Some health effects of TCE include headaches, dizziness, poor concentration, impaired heart function, unconsciousness, nerve, kidney, and liver damage, and death.

The Occupational Safety and Health Administration (OSHA) has set an average permissible exposure limit of 100 ppm to protect workers during each 8-hour work shift in a 40-hour workweek and a ceiling of 200 ppm that shall not be exceeded at any time.

4.1.3.3 VOLATILE ORGANIC COMPOUNDS

Although reports of drums containing solvents have not been reported, an outline of some basic hazards related to volatile chemicals has been presented in this section. Most VOCs are listed as probable or known human carcinogens. VOCs generally enter the body through ingestion, inhalation and dermal routes. The primary target organs are the liver, kidney, central nervous system, cardiovascular system, hematopoietic system and reproduction. Some health effects of VOCs include headaches, dizziness, poor concentration, impaired heart function, unconsciousness, nerve, kidney, and liver damage, and death.

4.1.3.3.1 CHLOROMETHANE

Chloromethane is a clear, colorless gas (vapor) that is difficult to smell. It has a faintly sweet, nonirritating odor at high levels in the air. It is a naturally occurring chemical that is made in large amounts in the oceans and is produced by some plants and rotting wood and when such materials as grass, wood, charcoal, and coal burn. Chloromethane is also produced industrially, but most of it is destroyed during use. It is used mainly in the production of other chemicals such as silicones, agricultural chemicals, and butyl rubber. Chloromethane was used widely in refrigerators in the past, but generally this use has been taken over by newer chemicals such as Freon.

If the levels are high enough (over a million times the natural level in outside air), brief exposures to chloromethane can have serious effects on the nervous system, including convulsions, coma, and death. Exposure can cause staggering, blurred and double vision, dizziness, fatigue, personality changes, confusion, tremors, uncoordinated movements, nausea, and vomiting. These symptoms can last for several months or more, but complete recovery is possible. Exposure to chloromethane has also had harmful effects on the liver, kidney, heart rate, and blood pressure.

The Occupational Safety and Health Administration (OSHA) has set an average permissible exposure limit of 50 parts of chloromethane per million parts of workroom air (50 ppm) to protect workers during each 8-hour work shift in a 40-hour workweek. The exposure limit recommended by the National Institute for Occupational Safety and Health (NIOSH) is 100 ppm for each 8-hour workshift in a 40-hour workweek.

4.1.3.3.2 1,1-DICHLOROETHENE

1,1-Dichloroethene is an industrial chemical that is not found naturally in the environment. It is a colorless liquid with a mild, sweet smell. It is also called vinylidene chloride. 1,1-Dichloroethene is used to make certain plastics, such as flexible films like food wrap, and in packaging materials. It is also used to make flame retardant coatings for fiber and carpet backings, and in piping, coating for steel pipes, and in adhesive applications.



Exposure to 1,1-dichloroethene occurs mainly in the workplace. Breathing high levels of 1,1-dichloroethene can affect the liver, kidney, and central nervous system. This chemical has been found in at least 515 of 1,416 National Priorities List sites identified by the Environmental Protection Agency. The main effect from breathing high levels of 1,1-dichloroethene is on the central nervous system. Some people lost their breath and fainted after breathing high levels of the chemical. Breathing lower levels of 1,1-dichloroethene in air for a long time may damage your nervous system, liver, and lungs. Workers exposed to 1,1-dichloroethene have reported a loss in liver function, but other chemicals were present. OSHA has set an occupational exposure limit of 1 ppm of 1,1-dichloroethene in workplace air for an 8-hour workday, 40-hour workweek. NIOSH currently recommends that workers breathe as little 1,1-dichloroethene as possible.

4.1.3.3 METHYL TERT-BUTYL ETHER (MTBE)

Methyl *tert*-butyl ether (MTBE) is a flammable liquid which is used as an additive in unleaded gasoline. Drinking or breathing MTBE may cause nausea, nose and throat irritation, and nervous system effects. MTBE has been found in at least 11 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

MTBE has a distinctive, disagreeable odor. It is made from blending chemicals such as isobutylene and methanol, and has been used since the 1980s as an additive for unleaded gasoline to achieve more efficient burning.

Breathing small amounts of MTBE for short periods may cause nose and throat irritation. Some people exposed to MTBE while pumping gasoline, driving their cars, or working in gas stations have reported having headaches, nausea, dizziness, and mental confusion. However, the actual levels of exposure in these cases are unknown. In addition, these symptoms may have been caused by exposure to other chemicals.

There are no data on the effects in people of drinking MTBE. Studies with rats and mice suggest that drinking MTBE may cause gastrointestinal irritation, liver and kidney damage, and nervous system effects.

The EPA has issued guidelines recommending that, to protect children, drinking water levels of MTBE not exceed 4 milligrams per liter of water (4mg/L) for an exposure of 1-10 days, and 3 mg/L for long term exposures.

The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended an exposure limit of 40 parts of MTBE per million parts of air (40 ppm) for an 8-hour workday, 40-hour workweek.

4.1.3.3.4 1,1-DICHLOROETHANE (DCA)

1,1-Dichloroethane (DCA) is a colorless, oily liquid with a sweet odor. It evaporates easily at room temperature and burns easily. It does not occur naturally in the environment.

In the past, 1,1-dichloroethane was used as a surgical anesthetic, but it is no longer used this way. Today it is used primarily to make other chemicals, to dissolve substances such as paint, varnish, and finish removers, and to remove grease.

Very limited information is available on the effects of 1,1-dichloroethane on people's health. The chemical was discontinued as a surgical anesthetic when effects on the heart, such as irregular heartbeats, were reported.

Studies in animals have shown that 1,1-dichloroethane can cause kidney disease after long-term exposure to high levels in air. Delayed growth was seen in the offspring of animals who breathed high concentrations of the chemical during pregnancy.

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of 1,1-dichloroethane be reported to the EPA.

OSHA has set an occupational exposure limit of 100 milligrams of 1,1-dichloroethane per cubic meter of air (100 mg/m³) for an 8-hour workday, 40-hour workweek.



NIOSH currently recommends that a level of 12,150 mg/m³ be considered immediately dangerous to life and health. This is the exposure level of 1,1-dichloroethane that is likely to cause permanent health problems or death.

4.1.3.3.5 1,1-DICHLOROETHENE

1,1-Dichloroethene is an industrial chemical that is not found naturally in the environment. It is a colorless liquid with a mild, sweet smell. It is also called vinylidene chloride. 1,1-Dichloroethene is used to make certain plastics, such as flexible films like food wrap, and in packaging materials. It is also used to make flame retardant coatings for fiber and carpet backings, and in piping, coating for steel pipes, and in adhesive applications.

The main effect from breathing high levels of 1,1-dichloroethene is on the central nervous system. Some people lost their breath and fainted after breathing high levels of the chemical. Breathing lower levels of 1,1-dichloroethene in air for a long time may damage your nervous system, liver, and lungs. Workers exposed to 1,1-dichloroethene have reported a loss in liver function, but other chemicals were present.

The EPA has set a limit in drinking water of 0.007 parts of 1,1-dichloroethene per million parts of drinking water (0.007 ppm). EPA requires that discharges or spills into the environment of 5,000 pounds or more of 1,1-dichloroethene be reported.

NIOSH currently recommends that workers breathe as little 1,1-dichloroethene as possible.

4.1.3.3.6 CHLOROFORM

Chloroform is a colorless liquid with a pleasant, nonirritating odor and a slightly sweet taste. It will burn only when it reaches very high temperatures. In the past, chloroform was used as an inhaled anesthetic during surgery, but it isn't used that way today. Today, chloroform is used to make other chemicals and can also be formed in small amounts when chlorine is added to water. Other names for chloroform are trichloromethane and methyl trichloride.

Breathing about 900 parts of chloroform per million parts air (900 ppm) for a short time can cause dizziness, fatigue, and headache. Breathing air, eating food, or drinking water containing high levels of chloroform for long periods of time may damage your liver and kidneys. Large amounts of chloroform can cause sores when chloroform touches your skin.

It isn't known whether chloroform causes reproductive effects or birth defects in people.

The EPA drinking water limit for total trihalomethanes, a class of chemicals that includes chloroform, is 100 micrograms per liter of water (100 µg/L).

4.1.3.3.7 1,1,1-TRICHLOROETHANE (TCA)

1,1,1-Trichloroethane is a synthetic chemical that does not occur naturally in the environment. It also is known as methylchloroform, methyltrichloromethane, trichloromethylmethane, and α-trichloromethane. Its registered trade names are chloroethene NU® and Aerothene TT®.

No 1,1,1-trichloroethane is supposed to be manufactured for domestic use in the United States after January 1, 2002 because it affects the ozone layer. 1,1,1-Trichloroethane had many industrial and household uses, including use as a solvent to dissolve other substances, such as glues and paints; to remove oil or grease from manufactured metal parts; and as an ingredient of household products such as spot cleaners, glues, and aerosol sprays.

If you breathe air containing high levels of 1,1,1-trichloroethane for a short time, you may become dizzy and lightheaded and possibly lose your coordination. These effects rapidly disappear after you stop breathing contaminated air. If you breathe in much higher levels, you may become unconscious, your blood pressure may decrease, and your heart may stop beating. Whether breathing low levels of 1,1,1-trichloroethane for a long time



causes harmful effects is not known. Studies in animals show that breathing air that contains very high levels of 1,1,1-trichloroethane damages the breathing passages and causes mild effects in the liver, in addition to affecting the nervous system. There are no studies in humans that determine whether eating food or drinking water contaminated with 1,1,1-trichloroethane could harm health. Placing large amounts of 1,1,1-trichloroethane in the stomachs of animals has caused effects on the nervous system, mild liver damage, unconsciousness, and even death. If your skin contacts 1,1,1-trichloroethane, you might feel some irritation. Studies in animals suggest that repeated exposure of the skin might affect the liver and that very large amounts may cause death. These effects occurred only when evaporation was prevented.

EPA regulates the levels of 1,1,1-trichloroethane that are allowable in drinking water. The highest level of 1,1,1-trichloroethane allowed in drinking water is 0.2 parts 1,1,1-trichloroethane per 1 million parts of water (0.2 ppm).

OSHA has set a limit of 350 parts 1,1,1-trichloroethane per 1 million parts of air (350 ppm) in the workplace.

4.1.4 EXPOSURE ROUTE

An exposure route of concern at the site is through is inhalation and dermal contact. Work will be performed in the minimum of **Level D PPE** during major construction operations and **Level D (Modified)** for any work where exposure to contaminated groundwater may occur. Direct contact of the skin and eyes with contaminated material is another important route of exposure. To protect workers against dermal contact, they will wear specified protective clothing and self contained breathing apparatus for operations involving potential exposure to hazardous materials. Proper personal decontamination procedures will be emphasized during remedial construction activities.

Although ingestion should be the least significant route of exposure, employees will be made aware of ways in which this type of exposure can occur and methods to avoid such exposure. Deliberate ingestion of chemicals is unlikely. Personal hygiene habits that provide a route of entry for chemicals will be restricted. Proper decontamination procedures will reduce/eliminate potential of ingesting hazardous materials. Site personnel will wash their hands, face and other exposed parts of their skin before eating or smoking.

4.1.5 OPERATIONAL CHEMICALS/HAZARD COMMUNICATION PROGRAM

Operational chemicals may be brought to the project-site for use in activities supporting the source removal action. These chemicals are used for fuels in operating heavy equipment, glues for welding pipes, painting, etc. OSHA under the Hazard Communication Standard (29 CFR 1910.1200) regulates operational chemicals use. MSDSs for operational chemicals are kept on file at the site. An inventory list of the anticipated operational chemicals (Hazardous Chemical Inventory List) for use at the project will be maintained at the site and updated as new material is received.

4.1.6 ENGINEERING CONTROLS

The use of engineering controls for the protection of personnel is the first means of mitigation. This involves the elimination of hazards and the isolation of the workers from the hazards. Implementation of engineering controls can reduce the need for personal protective equipment by separating the worker from the contaminated material. During the source removal action vapors and dust may be generated. The Site Superintendent and SSHO will be constantly alerted to the possibility of unacceptable vapor levels.

5.0 Training Requirements

This section describes ER's project training requirements and site visitor policy. Training of all personnel shall be in accordance with OSHA 29 CFR 1910.120 and the National Fire Protection Association (NFPA) standards.

5.1 PROJECT TRAINING REQUIREMENTS

The training listed in Table 5-1 will be provided to project participants as noted. All required training will be documented and this documentation maintained onsite.



Table 5-1

Project Training Requirements:		
Topic	Description	Personnel
General Training		
Site Safety and Health Plan	Site-specific hazards and control requirements, before commencement of field work. Includes training in proper use and care of PPE.	All project personnel
Activity Hazard Analysis	Activity-specific hazards, controls and training requirements for a specific phase or activity, prior to commencement of activity	Workers, supervisors and oversight personnel engaged in the activity
Daily Safety Briefing	In addition to plan-of-the-day and daily hazard reminders, often used to cover a specific topic; provided refresher training on various issues; or changes in hazards, controls or procedures.	All field workers, supervisors and field oversight personnel
Emergency Action Plan	Roles, responsibilities, recognition of emergency conditions, reporting and notification, evacuation and other procedures.	All project personnel, with detailed information on procedures for workers with special responsibilities
OSHA 40-Hour Hazardous Waste Operation (HAZWOPER) Training	General hazards and controls for hazardous waste activities at remediation sites, prior to performing work in an exclusion zone.	General site workers, supervisors, oversight personnel on HAZWOPER sites
OSHA 8-Hour Supervisor	Managing HAZWOPER work activities	Supervisors and management support staff on HAZWOPER sites
OSHA 8-Hour Refresher	Current annual refresher for HAZWOPER sites.	Workers, supervisors and oversight personnel engaged in the activity
Hazard Communication	Requirements for MSDS, labels; hazards of site materials and controls; location of and access to inventories and MSDS.	All project personnel potentially exposed to hazardous materials
Fire Extinguisher	General education on selection, distribution, and proper use of fire extinguishers.	All project personnel
Special Training		
First aid/ Cardiopulmonary Resuscitation (CPR)	Red Cross, National Safety Council or other authorized course, with current refresher	At least 2 project personnel
Fall Protection	Fall (from elevation) hazards, fall protection techniques, especially proper use of personal fall arrest systems and rescue procedures.	Task-specific, workers exposed to fall hazards.
Lockout/tagout	Site-specific energy control and verification procedures.	Authorized personnel working on de-energized systems, and affected employees whose work may be impacted by a lockout/tagout situation.
Other Heavy Equipment operations	Qualified by Construction Manager, Superintendent or Equipment Supervisor as documented on ECC Equipment Operator Qualifications Form	Equipment Operators
Power tools (e.g. chain saws, chippers, powder-actuated tools, compressed air systems)	Hazards and proper use and maintenance as described in operations manual. Powder-operated tool users certified by manufacturer.	Tool users

5.2 VISITOR INDOCTRINATION POLICY

All site visitors will be required to review the daily tailgate safety issues and sign the visitor log. At a minimum, all visitors must be informed of the anticipated hazards and PPE requirements, designated work zones, escort procedures, and emergency procedures.

5.3 GENERAL HAZARDOUS WASTE OPERATION TRAINING

Prior to arrival on-site, ER will be responsible for certifying that the employees meet the requirements of preassignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). ER will provide documentation certifying that each general Site worker has received a minimum of 40 hours of instruction off site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. All personnel must also receive 8 hours of refresher training annually. At no time should anyone be working on-site without the minimum training requirements. Consistent with OSHA 29 CFR 1910.120 paragraph (e)(4), individuals



designated as Site Supervisors require an additional 8 hours of training. A certificate of Worker/Visitor Acknowledgement will be completed and submitted for each site worker and visitor who will enter the contamination reduction zone, and/or exclusion zone.

5.4 SITE-SPECIFIC TRAINING

All personnel working at the Site during source removal action will review this SSHP with the SSHO. Personnel will sign an acknowledgment form to document their review and agreement to comply with the provisions of the SSHP. The SSHO will be responsible for training Site visitors in the hazard associated with the Site, to explain emergency procedures and instruct them in the use of protective gear required during the visit. Visitors meeting requirements of HAZWOPER may be allowed in the Exclusion Zone if conditions permit and if escorted by the SSHO.

Prior to commencement of onsite field activities, all site employees will attend a site-specific safety and health training session. The Site Safety and Health Officer will ensure that personnel are familiar with the requirements of this Site-Specific Safety and Health Plan. The initial session will consist of the contents of this SSHP and specific procedures developed for the project. The SSHO shall also provide initial site-specific training for replacement employees.

5.5 SAFETY MEETINGS

A well-ordered flow of information is essential to a good safety program. ER LLC, through a program of safety meetings at all levels, intends to accomplish the goals of safety awareness, education, and participation. The SSHO shall conduct daily safety meetings with ALL on-site personnel. An opportunity shall be provided for employees to voice safety-related concerns. The SSHO will submit a synopsis of each meeting including topics covered, safety-related concerns, action items to be addressed, status of previous items and a signed attendance list.

5.6 HAZARD COMMUNICATION TRAINING

OSHA's standard for hazard communication requires that all workers be informed of potentially hazardous materials used in their work area. ER provides employees with information and training on hazardous chemicals at their work site at the time of their initial assignment, annually, and whenever a new chemical is introduced into their work site that could present a potential hazard. Personnel are briefed on the general requirements of the OSHA hazard communication standard and duty-specific hazards by their immediate supervisor before they begin any duties on the work site. Personnel transferred from another site are also briefed on the duty-specific hazards by their immediate supervisor before they begin any duties on the work site.

6.0 Medical Monitoring Requirements

6.1 PRE-EMPLOYMENT MEDICAL EXAMINATION

- a) Pre-employment medical examinations are required for persons working at hazardous waste sites.
- b) All examinations must be completed and documented prior to assignment to this site.
- c) All examinations will be conducted following parameters established by WorkCare™.

6.2 SITE SPECIFIC MEDICAL EXAMINATION

- a) Site specific medical examination is not anticipated for this project

6.3 ANNUAL MEDICAL EXAMINATION

The medical examination must have been within a 12-month period prior to on-site activity and repeated annually.



6.4 SUSPECTED EXPOSURE MEDICAL EXAMINATION

- a) Following any suspected uncontrolled exposure to site contaminants, personnel should be scheduled for a special medical examination (not anticipated for this project).
- b) The medical examination will be specific for the contaminants and the associated target organs or physiological system.
- c) Questions regarding the type of medical examination can be directed to ER's Corporate Health and Safety Manager.

6.5 CONTRACTOR PHYSICAL EXAMINATION REQUIREMENTS

All subcontractors entering the reduction or exclusion zone will have adequate medical surveillance satisfying 29 CFR 1910.120.10 (f).

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

This section provides an outline of the PPE and guidelines that will be implemented to minimize chemical, physical, and biological exposures and accidents during source removal action. Where engineering controls and job hazard analyses do not eliminate all job hazards, employees will (where appropriate) wear PPE.

These include items such as, hard hats, face shields, safety goggles, glasses, hearing protection, foot guards, gloves etc. The SSHO will ensure that equipment selected will meet the following requirements:

- It will be appropriate for the particular hazard.
- It will be maintained in good condition.
- It will be properly stored when not in use, to prevent damage or loss.
- It will be kept clean, fully functional and sanitary.
- Must meet all applicable ANSI standards.

Personal clothing and jewelry can present additional safety hazards. Supervisors will ensure that workers wear appropriate clothing, which will not interfere with the PPE. All PPE will be selected in accordance with 29 CFR 1910.132. ER will provide proper PPE to all employees. All protective clothing will be properly used, stored, selected, and maintained.

7.1 PPE HAZARD ASSESSMENT

Selection of the appropriate PPE is a complex process, which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards, routes of potential exposure to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and clothing seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases, the breakthrough time of the protective material should exceed the work duration.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits or equipment.

The following are guidelines are used to select PPE. Based on the site characterization and analysis performed during the source removal action, a combination of PPE has been selected from the different protection levels



(i.e., A, B, C, D Modified or D) as being suitable to the hazards of the work to be performed. Characteristics, capabilities and limitations are summarized in this section.

- Level A: The highest level of skin, eye, and respiratory protection (**Level A PPE is not anticipated on this project**).
- Level B: Should be worn when the highest level of respiratory protection is needed, but a lower level of skin protection is needed, compared to that of level A (**Level B PPE is not anticipated on this project**).
- Level C: Should be worn when the criteria for using air-purifying respirators are met, and a lesser or the same level of skin protection is needed, compared to that of level B (**Level C PPE is not anticipated on this project**).
- Level D Modified: Should be worn when respiratory protection is not warranted but minimal dermal protection is necessary (i.e. Nitrile gloves, Tyveks etc.).
- Level D: Level D provides minimal protection against chemical hazards. A work uniform consisting of coveralls and/or long pants and sleeves may be worn in any area without the potential for significant respiratory or skin contact hazards.

Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound work practices.

7.1.1 HEAD PROTECTION

All personnel shall wear a hard hat that meets the requirements and specifications in ANSI Safety Requirements for Industrial Head Protection Z89.1-1969. Exceptions to this requirement are personnel in the site office and rest and eating areas.

7.1.2 HAND PROTECTION

Outer gloves used on the Site for source removal action shall be either chemical resistant or general purpose. The appropriate glove shall be determined by the SSHO for a specific work task. Chemical resistant gloves shall be selected using appropriate chemical degradation guides. Cotton work gloves will be worn when work activities require the handling of sharp and rough-surfaced objects.

7.1.3 EYE/FACE PROTECTION

All personnel in the CRZ and EZ shall wear Eye/Face protection. Double eye protection will be required when power-washing equipment during decontamination. All eye/face protection provided shall be ANSI Z87-1989 approved.

7.1.4 FOOTWEAR

Footwear will be steel-toed safety boots.

7.2 LEVELS OF PROTECTION

The level of protection must correspond to the level of hazards known or suspected for the specific work activity.

7.2.1 LEVEL D

Level D equipment will be worn when there are no chemical hazards present. Typical use is during site setup/demobilization in the support zone of a site. The following outlines the PPE for level D:

- Work uniform (Long pants and Shirt)
- Hard hat
- Steel-toed safety boots (with disposable overboots, as required)
- Safety glasses
- Leather or heavy cloth gloves (as needed)



- Hearing Protection (when working around noise generating equipment)

7.2.2 LEVEL D MODIFIED

Level D Modified protection will be worn as the minimum work uniform. It will not be worn in any work area with respiratory or skin hazards. The following criteria allow the use of Level D protection: direct reading instruments indicate levels from background to 5 ppm above background in the breathing zone; and the specific work function precludes splashes, immersion, or potential for unexpected inhalation of any chemicals. Level D equipment, used as appropriate, is as follows:

- Coveralls or work uniform
- Tyvek (style TY 122) coveralls or equivalent
- Outer gloves: leather, cotton, neoprene or nitrile (based on chemical hazard and compatibility)
- Inner gloves: latex or nitrile (doubled)
- Steel-toed safety boots
- Hard hat
- Safety glasses
- Hearing protection

7.2.3 LEVEL C (NOT ANTICIPATED)

Level C protection will be worn during product transfer operations and where probable exposure to site contaminants is likely. The following criteria allow the use of Level C protection: direct reading instruments indicate levels from background to < 25 ppm above background in the breathing zone; and Oxygen concentrations between 19.5% and 21%; LEL levels less than 10%.

Level C equipment, used as appropriate, is as follows:

- Coveralls or work uniform
- Tychem SL (style SL 122) coveralls or equivalent (where splash hazards exist);
- Tyvek (style TY122) Suits inner;
- Outer gloves: leather, cotton, neoprene or nitrile (based on chemical hazard and compatibility)
- Inner gloves: latex or nitrile (doubled)
- Steel-toed safety boots
- Boot covers
- Hard hat
- Full-faced respirator with combination organic vapor equipped with P-100 filter. (a simple P-100 cartridge is appropriate for asbestos work)

7.3 INITIAL LEVELS OF PROTECTION

Once the need for PPE is established, a careful evaluation of the hazards is necessary so that a selection can be made that minimizes the risk to the user. For chemical situations, knowing the hazard includes being aware of: the type of chemical, the physical state (liquid, solid or gas), and the physiological effect (toxic, corrosive, etc.). Knowing the level of exposure is also important when selecting protective clothing and equipment. After the appropriate level of PPE has been determined, the choice of Chemical Protective Clothing (CPC) material must be considered. Among the most important factor in selecting the appropriate CPC is chemical resistance.

7.3.1 PROJECT PERSONAL EQUIPMENT REQUIREMENTS

Project Personal Protective Equipment Requirements:							
Activity	Respiratory Protection	Body Protection	Head Protection	Hand Protection	Eye/Face Protection	Foot Protection	Hearing Protection



Project Personal Protective Equipment Requirements:							
Activity	Respiratory Protection	Body Protection	Head Protection	Hand Protection	Eye/Face Protection	Foot Protection	Hearing Protection
Site Mobilization (Level D)	None	None	ANSI-approved Hard Hat	Leather work gloves	ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when using power tools
Building Construction (Interior/Exterior) (Level D)	None	None	ANSI-approved Hard Hat	Leather work gloves	ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when using power tools
Command Post (Level D)	none	none	nearby	none	none	ANSI approved safety boots	none

8.0 AIR MONITORING PLAN

The air monitoring program addressed in this section has been developed to aid in the appropriate selection of personal protective equipment, engineering controls, and work practices as well as to document exposures to on-site personnel. The requirements of this section are specifically designed to meet the requirements of OSHA 1910.120, 1910.1000, the TLVs (ACGIH), and existing Health and Safety Procedures enforced by ER.

8.1 PERIODIC MONITORING

Periodic monitoring shall be conducted when the possibility of an increased airborne concentration or flammable atmosphere has developed. The following situations will necessitate monitoring to determine if exposures have risen:

- When work begins for each task at different locations on the site.
- When contaminants other than those previously identified are being handled.
- When a different type of operation is initiated.
- When weather conditions change.
- When conducting maintenance operations where peak concentrations are suspected.

8.2 FREQUENCY AND DURATION

Real-time air monitoring will be conducted periodically each day when work operations involve the potential exposure to site contaminants of concern. Work areas with the potential for unacceptable exposures, flammable atmospheres, or oxygen deficiency will have a photo ionization detector (PID), and an O2/LEL oxygen meter in continuous use. Chemical sorbent tubes may be used periodically during field construction and installation activities during certain operations when peak (high) concentrations may be present.

During operations, frequent monitoring will be conducted using a PID or a flame ionization detector (FID) instrument. The instrument used will be capable of detecting the organic contaminants known to be present. When not actively used for testing, this instrument will be placed in a continuous operating mode near the area with the highest potential airborne contamination.

A combination combustible gas/oxygen meter will be used to make frequent tests during intrusive operations at the container opening, excavation, and work area. When not being actively used, this instrument will be placed in a continuous operating mode near the area with the highest potential contamination.



The frequency and duration of air monitoring may be increased at the discretion of the SHSO. Sampling will be increased during intrusive work and will be decreased if the results prove exposures to be at acceptable levels. Project Management staff including the Project Managers, the SHSO, and/or their qualified designees will work together to identify:

- When peak concentrations may be encountered.
- When and where unusual contaminants may be present.
- Where site personnel are concerned about airborne contaminant concentrations and request air sampling to be performed.

8.3 TYPES OF AIR MONITORING AND SAMPLING

The air monitoring program will include real-time, direct reading instruments which will allow site personnel to respond immediately to changes in site hazards, rather than waiting for laboratory analysis of samples.

8.4 EQUIPMENT MAINTENANCE, CALIBRATION, AND OPERATION

Air monitoring equipment will be maintained and calibrated according to the established sampling and analytical methods and the manufacturer's instructions and recommendations. Real-time instrument maintenance and calibration data will be recorded by the SHSO on the ER calibration log and/or in the Health and Safety logbook. Real-time particulate monitoring instruments will be zeroed at least once a day. Air sampling pumps (used for any type of air monitoring) will be calibrated with a primary or secondary standard before and after each use. Real-time vapor monitoring instruments will be calibrated to a test gas at least once a day, and more often if the instrument is thought to be unreliable.

Calibration requirements must be specific to the model used. Instruments used to measure total volatile organic compounds will be calibrated daily before site entry and the following information will be recorded:

- Date
- Time
- Site name
- Calibration gas: concentration and identity
- Meter scale
- Span potentiometer setting
- Difficulties
- Calibrator's name (printed)
- Probe type
- Battery charge status
- Pre-calibration reading
- Post-calibration reading

8.5 AIR MONITORING

Air monitoring will be performed during all operations. The following outlines the action levels:

LEL

<10% LEL (ambient atmosphere) Continue monitoring
>10% LEL Stop work and evacuate affected areas until levels <10% are measured.

Oxygen

<19.5% O₂ Stop work and evacuate affected area until levels are >19.5% but <25% O₂ are measured in ambient air, or >19.5% but <23.5% O₂ is measured in a confined space.



>19.5% to 21% (ambient atmosphere) Acceptable O₂ levels for ambient atmosphere continue monitoring.
>21% (ambient atmosphere) Fire/explosion hazard potential, stop work and consult ER LLC Safety Manager

VOCs (using PID)

<5 ppm Continue work.
5-25 ppm Up-grade to Level C PPE
>25 ppm Up-grade to Level B PPE and contact ER Safety Manager

8.6 REPORTING OF AIR SAMPLING RESULTS

Results of all air monitoring (real-time and integrated) will be provided to personnel on site. Integrated air sampling results will be submitted into the respective employee medical record for assistance in the annual medical monitoring program. Monitoring results will be reviewed at the daily safety meeting.

9.0 ACCIDENT PREVENTION PROCEDURES/PRACTICES

9.1 MEDICAL AND FIRST AID REQUIREMENTS

First-aid kits/stations and required contents are maintained in a serviceable condition. Unit-type kits have all items in the first-aid kit individually wrapped, sealed, and packaged in comparable sized packages. First-aid stations will be located as close as practicable to the highest concentration of personnel. First-aid stations will be well-marked and available to personnel during all working hours. First-aid stations will be equipped with a first aid kit, the size of which will be dependent upon the number of personnel normally employed at the work site.

Emergency telephone numbers and Route to the Area Hospital will be clearly posted and easily visible at all times.

There should be OSHA posters prominently displayed and warning signs posted for any known or potential hazard(s) present. Material Safety Data Sheets (MSDS) must be available on the job site at all times.

9.2 HAZARDOUS SUBSTANCES

When hazardous substances are used in the workplace, the hazard communication program dealing with Material Safety Data Sheets (MSDS), labeling and employee training will be in operation. MSDS materials will be readily available for each hazardous substance used. A training program plus regular question and answer sessions on dealing with hazardous materials will be given to keep employees informed. The program will include an explanation of what an MSDS is and how to use and obtain one; MSDS contents for each hazardous substance or class of substances; explanation of the "Right to Know"; identification of where employees can see the employer's written hazard communication program and where hazardous substances are present in their work area; the health hazards of substances in the work area, how to detect their presence, and specific protective measures to be used; as well as informing them of hazards of non-routine tasks and unlabeled pipes.

9.3 HOUSEKEEPING

A policy of trash removal and the maintenance of good housekeeping practices should be implemented on all jobsites. The accumulation of construction debris may pose a significant fire hazard in addition to tripping and falling hazards.

Good housekeeping practices are the result of planning and organization. All personnel on the site must work together to maintain a clean worksite. The prompt removal of waste materials will permit a free flow of traffic through the work areas. Daily, or more frequent, inspections will be conducted by the general contractor to verify that the housekeeping controls are in place and being enforced.



Housekeeping activities in themselves may pose health hazards such as exposures to dusts, biological agents, and discarded chemicals. Liquid and solid waste chemicals must be placed in leak-proof containers for proper disposal.

10.0 SITE CONTROL MEASURES

This section outlines site control measures to be implemented to minimize potential exposure to and accidental spread of hazardous substances during source removal action. Listed below are the work zones that shall be established. The zone boundaries may be modified as necessary as new information becomes available.

10.1 WORK ZONES

The Site will be divided into Exclusion, Contamination Reduction and Support Zones. It should be recognized that the Site control zones will be modified continually. A map showing the work zones will be updated daily and posted in the Site office. The SSHO will review the location of work zones at the daily safety briefing. The SSHO and at least one person who have completed Supervisor's Training will be present at the Site whenever work is performed in the Exclusion Zone or Contamination Reduction Zone.

10.1.1 EXCLUSION ZONE (EZ)

This zone, commonly known as the Hot Zone, is where there will be direct contact with the potentially contaminated material. PPE shall be required in this zone. The SSHO shall enforce these requirements. The level of PPE required shall be based on hazard, Site condition and air monitoring performed. The outer boundary of the Exclusion Zone will be delineated with orange safety fence. Modification to the size and boundary of the Exclusion Zone will be made in the field by the SSHO based on operations and wind direction. The Exclusion Zone may be subdivided into different areas of contamination and different levels of PPE may be assigned based upon the expected type and degree of hazard.

All activities in exclusion zone will be conducted using the "buddy system". This involves a buddy who is able to provide his or her partner with assistance, observe for signs of chemical or heat exposure, check integrity of PPE and go for help when needed.

10.1.2 CONTAMINATION REDUCTION ZONE (CRZ)

This zone, commonly known as the Warm Zone, is where workers and equipment shall be decontaminated. This shall minimize the spread of contaminants from the Exclusion Zone into clean areas. The Contamination Reduction Zone will consist of the area located in front of or next to the exclusion zone so that personnel or equipment exiting the EZ can be decontaminated and doff the PPE. Emergency equipment to be located in this area will include eye wash stations, fire extinguishers, first aid kits and other appropriate equipment. The Contamination Reduction Zones or personal decontamination stations will be established adjacent to the Exclusion Zones. These stations will provide a means for prompt removal of potentially contaminated outer PPE at a location convenient to operations.

10.1.3 SUPPORT ZONE

This zone, commonly known as the Clean Zone, is considered to be uncontaminated. This area shall be used as a storage area for operations equipment and where break and toilet and shower facilities will be located.

11.0 PERSONAL HYGIENE AND DECONTAMINATION

Decontamination (Decon) is the process of removing or neutralizing potentially harmful contaminants that have accumulated on personnel and equipment in order to reduce the spread of contamination outside the work area. Decontamination is critical to the Safety and Health of Site workers and it protects the community by minimizing the off-site migration of contaminants. One of the most important aspects of controlling contaminated material migration is the prevention of the spread of contamination. Good contamination prevention will minimize employee and public exposure.



All personnel and equipment leaving the Exclusion Zone must be decontaminated in the Contamination Reduction Zone prior to entering the Support Zone. The decontamination process is composed of a series of steps performed in a specific sequence. The basic concept is that more heavily contaminated items will be decontaminated and removed first, followed by decontamination and removal of inner, less contaminated items.

11.1 PERSONAL DECONTAMINATION

Personnel exiting the Exclusion Zone during source removal action at the Site shall follow the procedure below. As the worker leaves the Exclusion Zone, s/he places his equipment and tools in the Exclusion Zone or Contamination Reduction Zone. After the worker places his equipment and tools down, gross contamination will be removed from outer clothing and boots. Workers will then remove their outer boots and outer gloves and place them in plastic garbage bag-lined containers.

Respiratory protection will be washed and triple rinsed at a washing and rinsing station. Once outer gloves are removed, workers will remove all outer garments and place them in plastic garbage bag lined containers. Once workers are fully decontaminated and all garments are removed, workers will remove inner gloves.

The level and complexity of the decontamination stations will be job and chemical specific. Below outlines a typical decontamination set-up based upon level of protection.

Level D Modified Decontamination

Station 1: Dry Decon

Deposit equipment used on site (tools, sampling devices and containers, monitoring equipment clipboards, etc.) in separate containers with plastic liners. Deposit all PPE used into a plastic container. Equipment: Various size containers plastic liners

11.2 EQUIPMENT DECONTAMINATION

Nearly all contractor hardware (not consumable) is considered to be recoverable. As such, they will be decontaminated using the proper equipment, i.e. wet paper towels and water.

11.3 DECONTAMINATION RESIDUE

Decontamination residue consists of disposable PPE (such as Tyvek, gloves, tape, etc.) Decontamination residue will be bagged and removed daily from the residence location. Due to the nature of the work the PPE will be disposed of with municipal trash.

11.4 PERSONAL HYGIENE AND SANITATION

Hands and face shall be thoroughly washed before eating, smoking, drinking, chewing gum or tobacco. When possible, avoid contact with contaminated materials.

An adequate supply of potable water will be provided to the employees working at the Site. Clearly labeled potable containers will be used to dispense drinking water. Containers will be cleaned at the beginning of each day. The containers will be equipped with taps to access the water. Clean disposable cups will be provided daily.

Eating, drinking, smoking, chewing gum or tobacco or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited during source removal action except in designated eating or smoking areas outside the Exclusion and Contaminant Reduction Zones. ER employees, subcontractor employees, and service personnel are required to thoroughly decontaminate themselves prior to entering the Support Zone.



12.0 General Field Safety Rules

- Horseplay is not permitted at any time.
- All visitors must be sent to the command post.
- It is ER policy to practice administrative hazard control for all site areas by restricting entrance to exclusion zones to essential personnel and by using operational SOPs.
- Eating, drinking, or smoking is permitted only in designated areas in the support zone.
- Hands and face must be thoroughly washed upon leaving the decon area.
- All equipment must be decontaminated or discarded upon exit from the exclusion zone.
- All personnel exiting the exclusion zone must go through the decontamination procedures described in Section 10.0.
- Safety Equipment described in Section 6.0 will be required for all field personnel.
- Personnel will only travel in vehicles where individual seats for each occupant are provided.
- Seat belts will be worn as required.
- Fire extinguishers will be available on site and in all areas with increased fire danger such as the refueling area.
- A minimum of two personnel will always be on site whenever heavy equipment is operated.
- Only necessary personnel need to be on or around heavy equipment.
- Employees will not interfere with or tamper in any way with air monitoring equipment.
- Backhoes or other equipment with booms shall not be operated within 10 feet of any electrical conductor.

Minimum Clearance from Energized Overhead Electric Lines

NOMINAL SYSTEM VOLTAGE	MINIMUM REQUIRED CLEARANCE
0-50 kV	10 feet
51-100 kV	12 feet
101-200 kV	15 feet
201-300 kV	20 feet
301-500 kV	25 feet
501-750 kV	35 feet
751-1000 kV	45 feet

- Visitor log will be maintained at the command post or with the security guard. All personnel coming on site will sign in and out on a daily basis.
- Security will be maintained at the site by closing all gates during normal work hours. Site will be locked up in the evening.
- If unauthorized members of the public are found on site, contact RPM immediately and do not leave the individual unattended.
- Visitors are not allowed in the work areas without authorization. Visitors must sign in at the Command Post and receive authorization to enter the site.
- Buddy System
 - The buddy system is mandatory at anytime that personnel are working in the exclusion zone, remote areas, on tanks, or when conditions present a risk to personnel.
 - A buddy system requires at least two trained/experienced people who work as a team and maintain at a minimum audible and/or visual contact while operating in the exclusion zone.
- Communication Procedures



- Radios will be used for onsite communications and Channel(Repeater) will be the designated channel.
- The crews should remain in constant radio or visual contact while on site.
- The site evacuation signal will be 3 blasts on the air or vehicle horn.

13.0 Hazard Communication Program

Each contractor will be responsible for maintaining a copy of their Hazardous Communication Program and MSDSs on site. The following items are specific to this job site:

13.1 MATERIAL SAFETY DATA SHEETS

1. Material Safety Data Sheets will be maintained at the Command Post in the Health and Safety Binder or be readily available via the internet.
2. MSDS' will be available to all employees for review during the work shift.
3. See Attachment C and/or the ER Health and Safety Binder. Will also be available on internet.

13.2 CONTAINER LABELING

1. All containers received on site will be inspected by the contractor using the material to ensure the following:
 - a. all containers clearly labeled
 - b. appropriate hazard warning
 - c. name and address of the manufacturer

13.3 THE FOLLOWING CHEMICALS WERE BROUGHT TO THE SITE: (ADD AS REQUIRED)

1. Gasoline
2. Diesel Fuel

13.4 EMPLOYEE TRAINING AND INFORMATION

1. Prior to starting work, each employee will attend a health and safety orientation and will receive information and training on the following:
 - a. an overview of the requirements contained in the Hazardous Communication Standard
 - b. Hazardous chemicals present at the site
 - c. the location and availability of the written Haz Com Program
 - d. physical and health effects of the hazardous chemicals
 - e. methods of preventing or eliminating exposure
 - f. emergency procedures to follow if exposed
 - g. how to read labels and review MSDS' to obtain information
 - h. location of MSDS file and location of hazardous chemical list

14.0 Emergencies/Incidents/Injuries

It is essential that site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

14.1 EMERGENCY CONTACTS FOR THE LAWRENCE AVIATION INDUSTRIES SITE

Service	City / Location	Emergency Phone
Fire	Port Jefferson, NY	911
Police	Port Jefferson, NY	911



Ambulance	Port Jefferson, NY	911
Hospital	St. Charles Hospital 200 Belle Terre Rd Port Jefferson, NY 11777	(631) 474-6000
Occupational Medicine Clinic	Health Source Med. 3001 Expressway Dr. North Suite 200 C Islandia, NY 11749	(631) 435-0110
Poison Control Center		(800) 424-9300

NOTE: Maps and directions to the hospital will be posted in the site office trailer/pickup truck.

14.2 ADDITIONAL EMERGENCY NUMBERS

National Response Center 800-424-8802
Center for Disease Control 404-488-4100 (24 hr)

Environmental Restoration Contacts

Environmental Restoration 888-814-7477 (24 Hr.)
Environmental Restoration (St. Louis) 636-227-7477

14.3 EMERGENCY EQUIPMENT AVAILABLE ON-SITE

Communications Equipment	Location
Public Telephones	NA
Private Telephones	Office: 21 Perry St., Port Jefferson
Mobile Telephones	On site
Two-Way Radios	N/A
Emergency Alarms/Horns	On site
Other:	

Medical Equipment	Location
First Aid Kits	Office: 21 Perry St., Port Jefferson and On site
Stretcher/Backboard	TBD
Eye Wash Station: (within 100 feet of hazard zone)	On site
Safety Shower	On site

Fire Fighting Equipment	Location
Fire Extinguishers	Office and on site
Other	

Spill or Leak Equipment	Location
Absorbent Boom/Pads:	Storage Trailer
Dry Absorbent:	Storage

Additional Emergency Equipment	Location



14.4 INCIDENT REPORTING/INVESTIGATIONS

- All incidents, including personal injury and property damage, must be reported to the RM, Supervisor, or SHSO immediately
- The RM will contact ER Corporate Health and Safety by telephone immediately. The RM, SHSO, and effected employees will conduct an immediate investigation of the incident and document all results on the Incident and Investigation Report form
- The Response Manager will assign a supervisory individual to accompany all injured personnel to the clinic and follow guidelines outlined in the ER Return to Work Program
- Copies of all Incident and Investigation Reports will be sent to the ER Corporate Health and Safety Manager

15.0 Emergency Response Contingency Plan

15.1 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES

As the administrator of the project, the PM has primary responsibility for responding to and correcting emergency situations. The PM will:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, total evacuation and securing of the site or up-grading or down- grading the level of protective clothing and respiratory protection.
- Take appropriate measures to protect the public and the environment including isolating and securing the site, preventing run-off to surface waters and ending or controlling the emergency to the extent possible.
- Ensure that appropriate Federal, State and local agencies are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted.
- Ensure that appropriate decon treatment or testing for exposed or injured personnel is obtained.
- Determine the cause of the incident and make recommendations to prevent the recurrence.
- Ensure that all required reports have been prepared.

15.2 MEDICAL EMERGENCIES:

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.) First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to Corporate Health and Safety.

Onsite First Aid Support - Onsite medical support during project execution will be available from two or more individuals who are trained in First Aid and Cardiopulmonary Resuscitation (CPR) and blood borne pathogens.

First aid kits shall be Type III, 16 unit kits, including one pocket mouthpiece or CPR barrier. Kits shall be checked prior to use, and at least weekly when work is in progress to ensure that contents are replaced as used.

Medical Transport of Employees and Case Management - For non-emergency injuries, a local clinic will be identified with the assistance of the Corporate Medical Consultant, Dr. Peter Greaney or the WorkCare Occupational Health Nurse, Marsha Locke. These individuals will be contacted prior to transporting the injured worker to the clinic. The WorkCare provider will attempt to contact the clinic ahead of the arrival of the patient to establish oversight of case management. Under no circumstances will an injured employee drive unescorted to a hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The SHSO or other project management personnel will transport the injured person to the facility. The employee



who transports the injured person shall be trained in first aid and CPR whenever possible. When the injury is severe, or when in doubt concerning the severity of injury, the employee will be transported by ambulance.

Injured employees that require medical treatment or are taken to a doctor, hospital, clinic, etc., will not be allowed to resume work without a written return to work statement from the treating physician. This statement shall supply a medical diagnosis of the problem, the date of return to work, and work limitations. Should a return to work statement such as "light duty" be given, the treating physician will be contacted to determine the specific limitation. ER will make an assessment of work the employee normally performs whether or not the limitation interferes with the employee's normal work.

Whenever there are questions on the appropriateness of the diagnosis or prescribed course of treatment, WorkCare will be contacted to arrange for a second opinion. Copies of all Incident and Investigation Reports will be sent to the ER Corporate Health and Safety Manager

15.3 FIRE OR EXPLOSION:

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival the PS or designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on- site.

If it is safe to do so, site personnel may:

- Use firefighting equipment available on site.
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

15.4 SPILLS, LEAKS OR RELEASES:

In the event of a spill or a leak, site personnel will:

- Locate the source of the spillage and stop the flow if it can be done safely.
- Begin containment and recovery of the spilled materials.

15.5 EVACUATION ROUTES AND RESOURCES:

Evacuation routes and rally points will be determined have been established by work area locations for this site. All work areas have been provided with two designated exit points. Evacuation should be conducted immediately, without regard for equipment under conditions of extreme emergency. See site map for evacuation routes.

Evacuation notification will be three blasts on an air horn, vehicle horn, or by verbal communication via radio.

- Keep upwind of smoke, vapors or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation is not via the decontamination corridor, site personnel should remove contaminated clothing once they are in a location of safety and leave it near the exclusion zone or in a safe place.
- The PS will conduct a head count to insure all personnel have been evacuated safely.
- In the event that emergency site evacuation is necessary, all personnel are to:
 1. Escape the emergency situation;
 2. Decontaminate to the maximum extent practical; and,
 3. Meet at the designated rally point.
- In the event that the command post is no longer in a safe zone, meet: TBD.



Attachment A

Site Safety Plan Amendments

Site Safety Plan Amendment #	
Site Name:	
Date:	
Type of Amendment:	
Reason for Amendment:	
Alternate Safeguard Procedures:	
Required Changes in PPE:	

EPA On-Scene Coordinator

(Date)

ER Response Manager

(Date)

ER Health and Safety Manager

(Date)



**ENVIRONMENTAL
RESTORATION, LLC**

**ERRS REGION 2, CONTRACT EP-S2-10-03
SITE HEALTH AND SAFETY PLAN
LAWRENCE AVIATION INDUSTRIES SITE – FEBRUARY 2011**

Attachment B

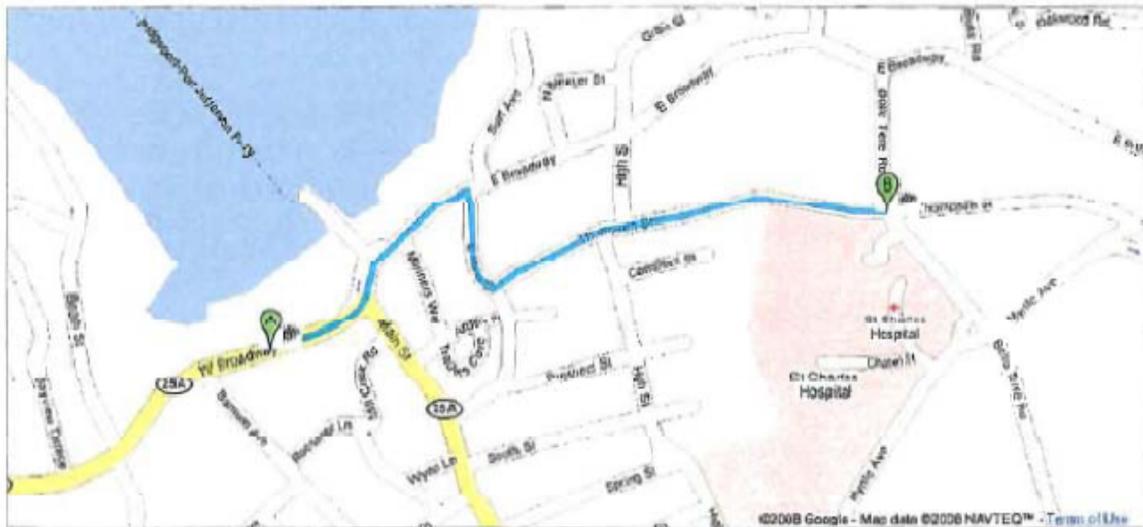
Site Maps

Hospital Map and Directions



Start **Port Jefferson, NY**
End **Saint Charles Hospital**
**200 Belle Terre Road, Port Jefferson,
NY 11777**

Travel **0.7 mi – about 2 mins**



Port Jefferson, NY

Drive: 0.7 mi – about 2 mins

1. Head **east** on **W Broadway/RT-25A** toward **Main St/RT-25A** 0.2 mi
Continue to follow W Broadway
- ➔ 2. Turn **right** at **E Main St** 0.1 mi
- 3. Turn **left** at **Thompson St** 0.4 mi
1 min



Saint Charles Hospital 200 Belle Terre Road, Port Jefferson, NY 11777

These directions are for planning purposes only. You may find that construction projects, traffic, or other events may cause road conditions to differ from the map results.



Occupational Medical Center Route

Google maps

11749
13.8 mi – about 23 mins

Save trees. Go green!
Download Google Maps on your
phone at google.com/gmm





▶ Port Jefferson, NY

- | | | |
|----|--|--------------------------|
| 1. | Head northwest on Main St toward W Broadway | go 721 m
total 721 m |
| 5A | 2. Turn left at New York 25A W/W Broadway
Continue to follow New York 25A W
About 7 mins | go 5.0 m
total 5.0 m |
| ↩ | 3. Turn left at N Country Rd/Main St | go 0.4 m
total 5.4 m |
| ➔ | 4. Keep right at the fork
Continue to follow N Country Rd
About 5 mins | go 4.6 m
total 10.0 m |
| | 5. Continue onto Hauppauge Rd
About 2 mins | go 0.5 m
total 10.5 m |
| ↩ | 6. Turn left at Woodhollow Rd | go 851 m
total 10.5 m |
| ➔ | 7. Take the 1st right onto Mt Pleasant Rd
About 4 mins | go 1.6 m
total 12.1 m |
| | 8. Continue onto Blydenburgh Rd
About 3 mins | go 1.2 m
total 13.3 m |
| ➔ | 9. Turn right at Expy Drive N
Destination will be on the right
About 2 mins | go 0.4 m
total 13.8 m |

▶ 3001 Expy Drive N, Islandia, NY 11749

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.
Map data ©2011 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.



Attachment C

MATERIAL SAFETY DATA SHEETS (MSDS)



Attachment Z

SITE-SPECIFIC TRAINING RECORD



SITE-SPECIFIC TRAINING RECORD

This is to advise that _____ conducted a Site-Specific Training Course
(Instructor's name)

for _____ at the
(Company Name)

_____ project on _____
(TO #, Project Name) (Date)

The total duration of the instructions was _____ hours.

Instruction covered the topics checked off below:

- Site Location, Description and History
- Potential site hazards (chemical, physical, and biological)
- Chemical, physical, and toxicological properties of site contaminants
- Safe work practices
- Training requirements
- Medical Surveillance
- Control Zones
- Monitoring
- Selection, use, and limitation, of personal protective equipment
- Personnel and equipment decontamination
- Emergency response procedures
- Hazard communication
- Blood borne pathogen briefing

The following participant attended the training course for the full duration indicated above.

Name (Print)

Signature