Pompton Lake Acid Brook Delta Area

Health and Safety Plan

Pompton Lakes, New Jersey

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prepared by

Sevenson Environmental Services, Inc.

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Table of Contents

FIGURES

TABLES

ATTACHMENTS

Acronyms

ACGIH	**American Conference of Governmental Industrial Hygienists'**
AHA	**Activity Hazard Analysis**
AIDS	**Acquired Immune Deficiency Syndrome**
ANSI	**American National Standards Institute**
CFR	**Code of Federal Regulation**
CIH	**Certified Industrial Hygienist**
CO	**Carbon Monoxide**
CPR	**Cardiopulmonary resuscitation**
dB(A)	**Decibels A level**
DEET	**N-Diethyl-m-toluamide**
EMS	**Emergency Medical Service**
GFCI	**Ground Fault Circuit Interrupter**
HASP	**Health and Safety Plan**
HEPA	**High Efficiency Particulate Air**
HIV	**Human Immunodeficiency Virus**
HPS	**Hanta Virus Pulmonary Syndrome**
IDLH	**Immediately Dangerous to Life and Health**
lb	**Pound**
LEL	**Lower Explosive Limit**
m	**Meter**
MSDS	**Material Safety Data Sheets**
ml	**Milliliter**
mph	**Miles per hour**
NIOSH	**National Institute for Occupational Safety and Health**
OSHA	**Occupational Safety and Health Administration**
O_2	**Oxygen gas**
PEL	**Permissible Exposure Limit**
PID	**Photo Ionization Detector**
PPE	**Personal Protective Equipment**
ROPS	**Roll Over Protective Structure**
SHM	**Safety and Health Manager**
SOPs	**Standard Operating Procedures**
SOR	**Safety Observation Report**
SPA	**Safe Plan of Action**
SSHO	**Site Safety and Health Officer**
TBD	**To Be Determined**
TLV	**Threshold Limit Value**
USCG	**United States Coast Guard**
USEPA or EPA	**United States Environmental Protection Agency**

1.0 Introduction

Sevenson Environmental Services, Inc., is under contract to the Chemours Company (Chemours) to provide dredging services for removal of sediment in the Pompton Lake Acid Brook Delta Area.

The work consists of mobilization/demobilization of equipment to and from the site; shakedown of dredges, booster pumps; dredging; sediment processing and transport; sheet pile installation; and other activities necessary for completion of the work.

1.1 Plan Objective

The objective of this Health and Safety Plan (HASP) is to define the requirements and designate protocols to be followed during site work, dredging, and sediment processing. The applicability of the HASP extends to Sevenson personnel and our subcontractors. Work performed under this contract will comply with applicable Federal, State, and Local laws and regulations as well as Sevenson's Corporate Health and Safety Plan (Sevenson, 2014) and Chemours' safety and health requirements. Through careful planning and implementation of site-specific safety protocols, Sevenson will strive for zero accidents and incidents for this project.

1.2 Safety and Health Policy Statement

Sevenson's management is committed to the safety of each and every employee and Site visitor. There is no place at Sevenson for an employee who will not work safely or who will endanger the safety of their fellow workers. It is essential that all managers and supervisors insist on the maximum safety performance and awareness of all employees under their direction by enthusiastically and consistently administering all safety rules and regulations. It is Sevenson's policy to take the necessary actions in engineering, planning, designing, assigning, and supervising work operations, to create a safe work-site. Sevenson will:

- ALL Site personnel have the authority to stop or suspend any activity they feel or believe to be unsafe.
- Maintain safe and healthful working conditions.
- Provide and assure the use of all necessary personnel protection equipment to ensure the safety and health of site employees.
- Require that site work be planned to provide a range of protection based on the degree of hazards encountered under actual working conditions.
- Provide site workers with the information and training required to make them fully aware of known and suspected hazards that may be encountered, and of the appropriate methods for protecting themselves, their co-workers, the public, and the environment.
- Protect the public and the environment from adverse effects caused by the work.

1.3 Drug and Alcohol Policy

Sevenson is committed to providing a safe, efficient, and productive work environment for all employees. Using or being under the influence of drugs or alcohol on the job may pose serious safety and health risks. To help ensure a safe and healthful working environment, employees may be asked to provide body substance samples (such as urine, blood, or breath) to determine the illicit or illegal use of drugs and alcohol. Refusal to submit to drug testing may result in disciplinary action, up to and including termination of employment.

Copies of the above drug testing policy (Sevenson's Substance Abuse Program) will be provided to **all Sevenson employees**. Employees will be asked to sign an acknowledgement form indicating that they

have received a copy of the drug testing policy. Questions concerning this policy or its administration should be directed to the Director of Health and Safety at 716-284-0431.

1.4 Project Safety and Health Expectations

The safety and health of workers, Chemours, the public, and the environment are fundamental responsibility assumed by Sevenson under this contract. Sevenson will:

- Promote project safety with an objective of zero injuries, illnesses, or property damage.
- Promote a zero at risk behavior work environment.
- Promote and encourage stop work authority of someone feels or believes an activity or task is unsafe.
- Manage activities in a proactive way that effectively increases the protection of site workers, the public, and the environment.
- Reduce safety and health risk by identifying and eliminating hazards from site activities.
- Carry out site activities in a manner that complies with all applicable safety, health, and environmental laws and regulations.

1.5 Project Safety and Health Compliance Program

Compliance with the requirements of applicable Federal, State, and local laws will be accomplished through a combination of written programs, employee training, workplace monitoring, and system enforcement. Continued and regular inspections by supervisors and safety personnel, as well as upper management with total involvement in the safety program will produce an atmosphere of voluntary compliance. However, disciplinary action for violations of project requirements will be taken, when necessary.

All site personnel and unescorted visitors[1] at the site will be required to read and verify compliance with the provisions of this HASP and its specific appendices. In addition, visitors will be expected to comply with relevant Occupational Safety and Health Administration (OSHA) requirements (e.g., training, personal protective equipment, etc.). In the event that a person does not adhere to the provisions of the HASP, they will be requested to leave the work area. All nonconformance incidents will be recorded in the Daily Safety Report.

The SSHO or Quality Control Manager will conduct impromptu surveillance on a daily basis of all work areas and subcontractor's activities to ensure that safety and health is properly implemented. In addition, any reports from employees concerning unsafe work practices, acts, or conditions will be investigated promptly. Unsafe acts, practices, or conditions will be reported to the affected worker or supervisor at the time of inspection.

The safe and efficient work practices of Sevenson require a spirit of teamwork and cooperation from all employees along with uniform standards of expected behavior. Employees who refuse or fail to follow the standard set forth by this HASP, Sevenson's Corporate Health and Safety Plan, or regulatory standards, will subject themselves to disciplinary action up to, and including discharge. In cases not specifically mentioned, employees are expected to use good judgment and refer any questions to their supervisors.

[1] Unescorted visitors are personnel that are familiar to the project site but are not assigned to the site on a full time basis. Such as Sevenson, Parson, or Chemours support team members, delivery personnel (i.e., fuel delivery, backfill material drivers, dumpster pickup) etc.

1.6 Project Safety Incentive Program

It is expected that all employees perform their assigned tasks in a safe and healthful manner. Therefore, safe work performance is a key element in an employee's review of their suitability for continued employment.

Workers participating in Sevenson's Job Safety Enhancement Program (JSEP) will be eligible to receive small trinkets (high visibility T-shirts, hats, calendars, better quality safety glasses, etc.) for turning in JSEP observation forms and will be entered into a drawing for a chance to win a higher value item such as a pair of work boots, jacket, Gortex raingear, etc..

1.7 References

During development of this HASP, consideration was given to current safety and health standards defined by the United States Environmental Protection Agency (EPA), 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;
- Pompton Lakes Works Site Safety Manual;
- USEPA Standard Operating Safety Guides, June 1992;
- NIOSH Pocket Guide to Chemical Hazards, August 2006;
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Chemical Substances and Chemical Agents, 2014;

In addition to the above-referenced documents, Sevenson has established a comprehensive and realistic Safety, Health, and Environmental Program based on past experience, sound engineering practice, employee training, and enforcement of safety and health regulations to prevent unreasonable safety and health risks. For specific procedures/programs associated with this project, refer to the Sevenson Corporate Health and Safety Plan. A copy of the Sevenson Corporate Health and Safety Plan will be maintained in the Sevenson office trailer.

1.8 Health and Safety Plan Revisions

The development and preparation of this HASP has been based on site-specific information provided to Sevenson. Should any unforeseen hazard become evident during the performance of the work, the Project Manager will bring such hazard to the attention of Chemours both verbally and in writing for resolution as soon as possible. In the interim, Sevenson will take necessary actions to maintain safe working conditions in order to safeguard on-site personnel, visitors, the public, and the environment. Modifications of any portion or provision of the HASP will be requested in writing from Chemours by the Project Manager, and authorized in writing. No changes to the HASP will be allowed until the item has been reviewed and an addendum prepared and approved by Sevenson's Safety and Health Manager.

1.9 Scope of Work

The purpose of this project is to mechanically excavate upland soils located adjacent to the shoreline, hydraulically dredge sediments within the Acid Brook Delta, process and dispose the removed materials, and restore the disturbed areas.

The tasks to accomplish this are as follows:

- Mobilization and work area isolation measures. This includes the movement of personnel and equipment to the site, site preparation, fish collection and removal, and installation and maintenance of sheet piling and silt curtains etc. as necessary to prevent turbidity.

- Soil excavation and hydraulic dredging, this work involves the mechanical removal of impacted material in the upland areas along the shoreline on the south side of Lakeside Avenue, mechanical debris removal as required to support hydraulic dredging operations, hydraulic dredging to remove target sediments in the Acid Brook Delta, and in-situ stabilization.
- Dewatering and solids processing. This work includes the setup of a mechanical dewatering (filter press) of hydraulically dredged sediments, adding reagent to promote solidification, and staging of the processed materials.
- Material handling. This work includes movement of material onsite and into staging locations in preparation for disposal, loading material into trucks, and transport to an offsite landfill.
- Demobilization and restoration. This work includes placement of an eco-layer in the dredge area, Acid Brook Delta and uplands restoration, and removal of personnel and equipment from the site.

Figure 1
Site Overview

2.0 Organization and Responsibilities

While the Sevenson Safety and Health Department directs and supervises the overall Safety, Health and Environmental Program, the responsibility for Safety and Health extends throughout our organization from top management to every employee. For this reason, it is each person's duty to notify the management personnel if a hazardous condition is identified and to make a "stop work" call if the condition represents an immediate danger to life or health, until the SSHO can make a further determination. The following are the Sevenson project personnel positions and responsibilities for this project. Refer to ***Figure 2 – "Organizational Chart"***.

- **Vice President/Program Manager:** Michael Crystal
- **Project Manager:** Mark Schmitt
- **Project Superintendent:** TBD
- **Safety and Health Manager:** Paul Jung CIH, CSP
- **Site Safety and Health Officer:** TBD
- **Subcontractors:** TBD

2.1 Program Manager

The Program Manger directs and manages all aspects of the project in compliance with all contract and technical requirements. The Program Manager will monitor and control all subcontractors to achieve optimal performance and ensure safe, high quality performance that complies with all contract requirements.

2.2 Project Manager

The Project Manager reports to the Program Manager. His responsibilities include coordinating project activities with the Project Superintendent and serving as the primary liaison with Chemours. The Project Manager prepares all correspondence, submittals, and other documentation required for the project; coordinates schedules; and administers the contract. The Project Manager prepares reports and documentation, supervises inspection personnel, and reviews and approves procurement and subcontract activities.

2.3 Project Superintendent

The Project Superintendent supervises and coordinates all construction crew activities relating to site preparation, excavation, dredging, shipping, and restoration. The Project Superintendent has the operational responsibility for the implementation of the HASP on this project. This includes establishing an attitude of concern for safety matters by initiating prompt corrective action of hazards brought to his attention, and ensuring that the project safety and health requirements are initiated and observed by all project personnel.

- The Superintendent plans and requires that all work be performed in compliance with this HASP, the Sevenson Corporate Health and Safety Plan, DuPont's safety requirements, and/ all applicable local, state, and federal regulations. He will impress upon all subcontractors' supervisory personnel a sense of responsibility and accountability of each individual to maintain a safe workplace and to work in a safe manner.

2.4 Safety and Health Manager (SHM)

The Safety and Health Manager formulates, administers and coordinates programs for the company to reduce the risk of loss due to employee injury, regulatory non-compliance, general liability, fire, theft, or damage. The Safety and Health Manager will develop written detailed policies and. The Safety and Health Manager will:

- Be responsible for the development, implementation, and oversight, of the HASP.
- Visit the site as needed to audit the effectiveness of the HASP.
- Provide consultation as needed to ensure that the HASP is fully implemented.
- Coordinate any modifications to the HASP with the SSHO and Chemours.
- Provide continued support for upgrading/downgrading the level of personal protection for project tasks.

2.5 Site Safety and Health Officer (SSHO)

Under the direction of the Safety and Health Manager, the SSHO will be responsible for the implementation of this HASP and for the daily coordination of safety activities with the Project Superintendent and Chemours to ensure that the planned work objectives reflect adequate safety and health considerations. The SSHO will maintain a complete copy of this plan (and its supplements and addenda) at the site during all field activities and assure that all workers and visitors are familiar with it. He will perform site-specific training and briefing sessions for employee(s) prior to the start of field activities at the site and a briefing session each day before starting work. He will ensure the availability, proper use and maintenance of specified personal protective equipment, decontamination equipment, and other safety and health equipment. He will maintain a high level of safety awareness among team members and communicate pertinent matters to them promptly. The SSHO will:

- Assist and represent the Safety and Health Manager in on-site training and the day-to-day on-site implementation and enforcement of the accepted HASP.
- Be assigned to the site on a full time basis for the duration of field activities.
- Have the authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations; and all aspects of the HASP. This includes, but is not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination site control, standard operating procedures used to minimize hazards, safe use of engineering controls; the emergency response plan, confined space entry procedures, spill containment program, and preparation of records. This will be accomplished by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log.
- Stop work activities if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- Consult and coordinate any modifications to the HASP with the Safety and Health Manager, the Site Superintendent and Chemours.
- Conduct accident investigations and prepare accident reports.
- Review results of daily quality control inspections and document safety and health findings in the Daily Safety Inspection Log.
- Coordinate with Site Management and the Safety and Health Manager, recommend corrective actions for identified deficiencies, and oversee the corrective actions.
- Prepare Activity Hazard Analysis for site tasks.

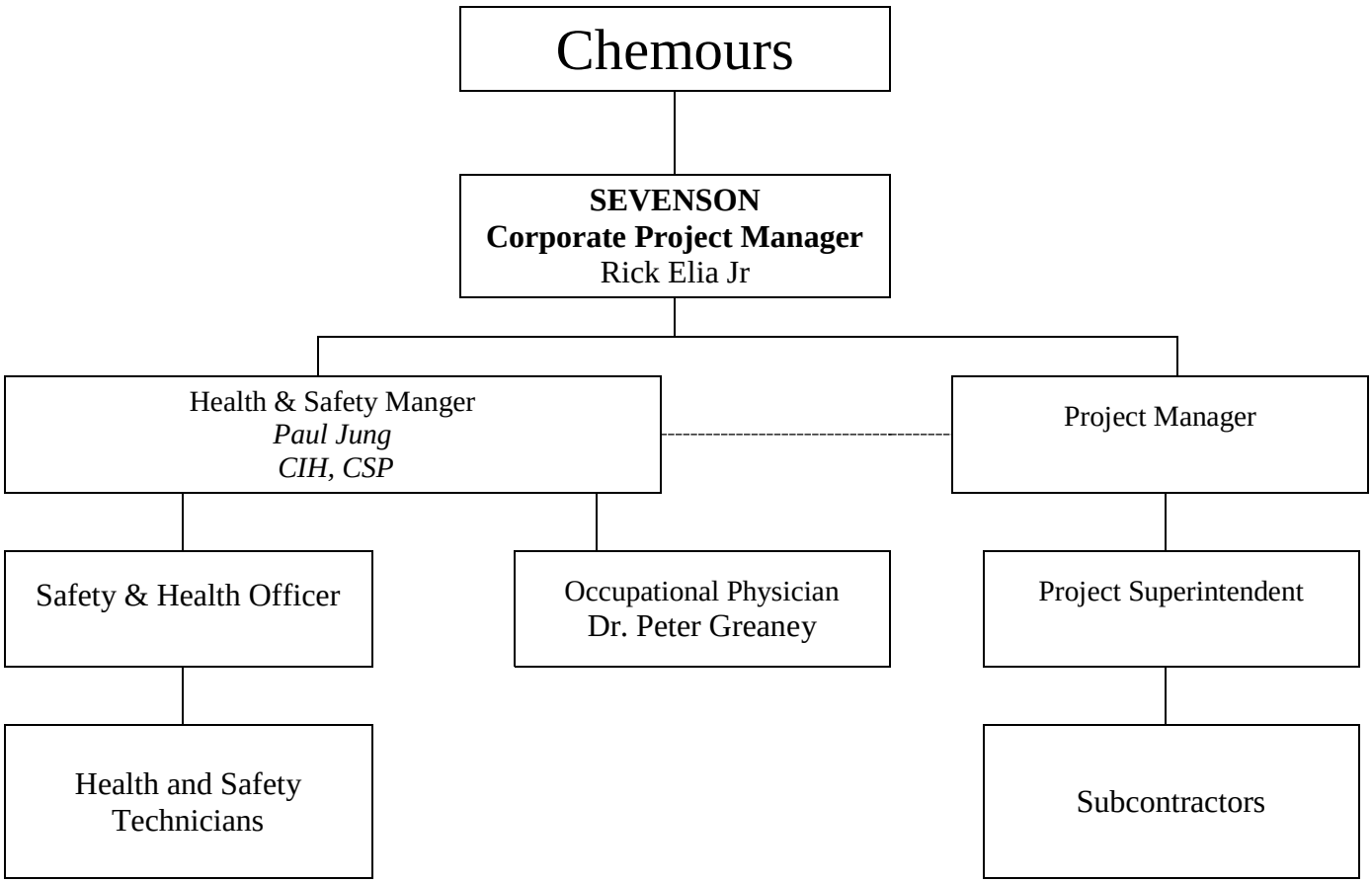
2.6 Subcontractors

Subcontractors utilized during activities at the Site will be provided a copy of the plan prior to commencing work. The SSHO will verify subcontractor employee training and will monitor and enforce compliance with the established plan and standard operating procedures. As with all site

personnel, subcontractors will be briefed on the provisions of this HASP and attend all daily toolbox safety meetings.

Sevenson will continually monitor a subcontractor's safety performance. Sevenson will observe subcontractors for hazards or unsafe practices that are both readily observable and occur in common work areas. The SSHO will note subcontractor work practices on the daily Quality Control Report. If non-compliance or unsafe conditions or practices are observed, the subcontractor safety representative will be notified and corrective action will be required. The subcontractor will determine and implement necessary controls and corrective actions. If repeat non-compliance/unsafe conditions are observed, the subcontractor will be required to stop affected work until adequate corrective measures are implemented.

Figure 2
Organizational Chart



3.0 Hazard/Risk Analysis

Below is a general summary of the risks that this HASP addresses during dredging and sediment processing/handling at the Site. This is a summary of the major anticipated risks and is not intended to be a complete listing of all potential risks that may be encountered during the project.

1. Working around heavy equipment (struck by, caught in equipment)
2. Exposure to hazards associated with working on or near water (drowning)
3. Materials handling and transfer (ergonomic issues)
4. Heavy lifting (strains, sprains)
5. Biological hazards (plants, animals, insects)
6. Pressure systems (Hydraulic lines, sediment transfer lines)
7. High noise levels
8. Cuts/lacerations (saws, wire rope, etc.)
9. Exposure to temperature extremes (heat stress, cold stress)
10. Severe weather conditions (high winds, precipitation, lightning)
11. Hazards associated with watercraft such as boats, barges, work platforms (falling overboard, collisions with other watercraft and stationary objects)
12. Exposure to chemical contaminates and chemicals brought on site.
13. Crane and rigging for sediment process equipment
14. Staging and picking up of sheet pile with loaders and excavator mounted sheet pile driving head
15. Swinging of placement of equipment with crane or other heavy equipment

3.1 Site Tasks and Operations

Sevenson has developed an Activity Hazard Analysis (AHA) for the major phases of the work. A major phase of work is defined as an operation involving a type of activity presenting hazards not experienced in previous operations, or where a new subcontractor or work crew is to perform the specified phase. The analysis will define the activity being performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard. An AHA will also be prepared by the SSHO when new tasks are added; job situations change, or when it becomes necessary to alter safety requirements; refer to ***Attachment 1 - "Activity Hazard Analysis".*** Work will not proceed on a particular task/work area until the AHA has been reviewed and site personnel understand the hazards and controls of the activity to be performed.

Additionally, Sevenson has a real-time hazard identification program known as the Safe Plan of Action (SPA), which is found in ***Attachment 2 – "Safety and Health Forms"***. While the AHA is used as a training/auditing tool, the SPA is a planning tool for the work crew to address the details of a work process or activity and any potential changing conditions. The superintendent or foreman as well as the work crew participate in developing the SPA, and this is done before the start of each day's work.

3.2 Hazards

The following potential hazards may be encountered during the work activities at the Site.

3.2.1 Safety/Physical Hazards

Potential safety hazards include: working on or near water, electrical, heavy equipment/vehicle traffic, material handling, hand and power tools, noise exposure, slip/trips/falls, heat and cold stress, and falls from elevation. Safety/Physical hazards associated with the project are presented below.

3.2.1.1 Electrical

Overhead power lines, downed electrical wires, and buried cables all pose a danger of shock or electrocution if contacted or severed during site operations. A minimum distance of 20 feet will be maintained between overhead transmission lines and equipment. This distance will vary according to voltage, the greater the voltage, the greater the clearance between any part of the equipment and the power line; refer to ***Table 1 - Minimum Clearance from Energized Overhead Electrical Lines***. When required, a spotter will be utilized to maintain a safe distance between equipment and overhead wires. The basic rule is, "Don't locate equipment in a position where it can come in contact with overhead power lines." Maintain the required distance from the lines. Overhead electrical power lines will be considered energized unless the person owning such line, or operating officials of the electrical utility supplying the line assures that it is not energized and it has been visibly grounded.

Table 1 –
Minimum Clearance From Energized Overhead Electrical Lines

Nominal System Voltage	Minimum Rated Clearance
0 to 50 kV	10 Feet (3 m)
51 to 200 kV	15 Feet (4.5 m)
201 to 350 kV	20 Feet (6 m)
351 to 500 kV	25 Feet (7.5 m)
501 to 650 kV	30 Feet (9.1 m)
651 to 800 kV	35 Feet (10.7 m)
801 to 950 kV	40 Feet (12.2 m)
951 to 1100 kV	45 Feet (13.7 m)
Clearance values calculated using: (Initial kV-50kV) x (4 inches/10kV)x(1 foot/12 inches) = increased distance (feet) over 10 feet. Add this value to 10 feet to yield minimum rated clearance	

Table 11-1 USACE EM-385-1-1 (Sept 2008)

* If work is required closer to overhead transmission lines a Proximity Permit may be issued by Chemours. The Proximity Permit allows work within 10 feet of the transmission line. If work needs to be performed within 10 feet of the transmission line, the transmission lines must be de-energized by the appropriate agency.

There are various means of insulating the wires, as well as barriers and alarms that may be available to reduce the risk of injury to workers, but the use of such devices does not change the requirements of any other applicable standards or laws. In addition, these and other measures (such as grounding the equipment itself) may not be fully effective and may create a false sense of security. Only the utility company is authorized to de-energize, insulate, or handle the lines. No one else may attempt these operations.

Qualified, licensed electricians will be utilized to install any electrical equipment that is not plug ready system. The electrician(s) shall be responsible for ensuring all flash arc protection is provided for the Flash Arc Hazard Class for any energized equipment or system they must perform work on.

Electrical equipment used on-site may also pose a hazard to workers. Whenever possible, Sevenson will use low-voltage equipment with ground-fault interrupters and watertight, corrosion-resistant connecting cables to help minimize this hazard.

No employee will be permitted to work in the proximity of any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or it has been locked and tagged out. These procedures will be utilized when work has to be performed on energized equipment.

All electrical wiring and equipment will be intrinsically safe for use in potentially explosive environments and atmospheres. Ground-fault circuit interrupters are standard for use at the site.

3.2.1.2 Heavy Equipment/Vehicle Traffic

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: dredges, excavators, loaders, dozers, cranes, and trucks. Sevenson 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. Inspections will be documented using the Equipment Checklist; refer to ***Attachment 2 – Safety and Health Forms***. 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 1A:10B:C fire extinguisher. Spill material shall be available in the vehicle to control the loss of fluids in the event of a leaking or failed hose or fluid container (brake master cylinder reservoir, etc.). 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 four feet clear of the operational area of the equipment.

During construction activities, 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 hand signals to the operator of both equipment and vehicles in the work area. **Note: Hand signals must be defined prior to starting the task and shall be discussed in the safe plan of action and pre job briefing.** When spotters are required for directing equipment, the operator must immediately stop movement if they lose sight of their spotter. Movement may only begin again when visual contact is restored and maintained. 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. If special instructions are necessary for receiving a truck, the Site Superintendent will be responsible for notifying all affected personnel prior to the truck arriving at the site. The Site Superintendent shall provide adequate instructions

Maintenance and inspection of vehicles and heavy equipment is a vital part of the overall safety program. Sevenson has a fully staffed equipment maintenance shop that handles all preventative and overhaul work for our entire vehicle and equipment fleet. 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. All heavy equipment used at the site will be equipped with rollover protective structures (ROPS).

3.2.1.3 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:

  - Cehmours mandates the heaviest object one person may lift is 50 pounds, team lift with two people is limited to 80 pounds total. The size, shape, and weight of the object to be lifted must first be considered.

- Mechanical lifting devices are the preferred way to move materials.
- 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.

Sheet piling will be removed from transportation trailers with either an excavator (rigging), a loader with fork attachment, or crane. Care shall be giving to pinch points and struck by hazards when lifting, moving, and stacking sheets. Tag lines shall be used if rigging is utilized to handle sheets. A spotter shall be used to keep personnel clear of equipment movements if a loader is used.

An excavator equipped with a sheet pile driving head will be utilized to drive sheet piling around the site. Ground personnel are to stay clear of the fall zone while the excavator operator is lifting, moving, threading, and driving sheets. This attachment grips the sheet so rigging is not necessary for lifting or placing sheets into place.

3.2.1.4 Hand and Power Tools

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

- Persons using power tools will be trained in their use.
- Ground Fault interrupters will be used 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.
- Non-sparking tools will be used in hazardous areas.
- 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.

3.2.1.5 Noise Exposure

Noise is generated during construction activities 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) impulse.

It is usually safe to assume that if you need to shout to be heard at arm's length, the noise level is at 90 dB (A) or above. Personnel operating or working around dredging and construction equipment will utilize hearing protection. Based on the nature of activities to be performed on site, the use of dredging equipment, heavy equipment, power tools, and other noise producing devices, Sevenson personnel are enrolled in a Hearing Conservation Program that meets the requirements of OSHA regulation 29 CFR 1910.95.

Based upon Sevenson's 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. Sevenson provides hearing protection equipment.

3.2.1.6 Excavation/Trenching Hazards

The hazard associated with excavation is low to moderate. In general, the main hazard encountered during soil excavation is the cave in of excavation sides with possible burial or crushing of workers. Causes of cave in may include (a) absence of shoring, (b) misjudgment of stability, (c) defective shoring, and (d) undercut sides. Other potential hazards include falling during access/egress, while monitoring or dismounting equipment, or stumbling into excavation. An overhead hazard can result from material, tools, rock, and/or soil falling into the excavation. Flammable atmospheres may also be encountered in excavation.

Sevenson will provide adequate shoring or sloping of sides of the excavation. Excavation/trenches will be inspected daily for changing conditions. Excavation/trenches, regardless of the depth or width, will be barricaded. The use of raised berms, caution signs, and caution tape will be instituted to protect personnel on the site. The excavation area will be delineated with caution tape during operations and barricaded/secured with safety fence at the end of each workday. Adequate means of exit, such as ladders, steps, ramps, or other safe means of egress, will be provided and be within 25 feet of lateral

travel. At least two means of exit will be provided for personnel working in excavations. Where the width of the excavation exceeds 100 feet, two or more means of exit will be provided on each side of the excavation. Personnel will not be allowed to enter an excavation or trench until it has been inspected and deemed safe for entry by the Competent Person for excavation and trenching. The excavation and trenching inspection form is located in ***Attachment 2 – Safety and Health Forms***. Excavation spoils will be kept a minimum of three feet from the edge of the excavation at all times.

3.2.1.7 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.

3.2.1.8 Heat Stress

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. The SSHO will 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.

The guidance for workers is specified in the current version of the ACGIH Threshold Limit Values for Heat Stress. If actual clothing differs from the ACGIH standard ensemble in insulation value and/or wind and vapor permeability, changes should be made to the monitoring requirements and work rest period to account for these differences. ***Table 2 – "Frequency of Physiological Monitoring***" provides the suggested frequency of physiological monitoring for fit and acclimatized workers.

Table 2 – Frequency of Physiological Monitoring		
Adjusted Temperature Calculation	Normal Work Clothing	Impermeable Clothing
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5 - 90.0°F (30.8 – 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5 - 87.5°F (28.1 – 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5 - 82.5°F (25.3 - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5 - 77.5°F (22.5 - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

The following parameters shall be used until workers are acclimated to working in hot weather. The SSHO or designee will be responsible for monitoring for heat stress. Once acclimated these values should be used as a guideline 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 (38.1°C). Ear canal readings are a valid method to monitor the temperature of workers.

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 100.4^{o} 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 vests, 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, such as, 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.

3.2.1.9 Cold Stress

Cold injury (frostbite and hypothermia) and impaired ability to work are hazards to persons working outdoors in low temperatures at or below freezing. Extreme cold for a short time may cause severe injury to exposed body surfaces (frost nip or frostbite), or result in profound generalized cooling (hypothermia). Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears, are the most susceptible to frost nip or frostbite.

Two factors influence the development of a cold weather 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. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked. The wind chill factor is the cooling effect of any combination of temperature and wind velocity or air movement. ***Table 3 – Wind Chill Index*** will be consulted when planning for exposure to low temperatures and wind. The wind chill index does not take into account the specific part of the body exposed to cold; the level of activity, which affects body heat production; or the amount of clothing being worn.

When practicable, the most sedentary tasks should be carried out during the warmest part of the day. If necessary, a light-work rotation schedule should be instituted or the work area heated. Heavy work that will cause heavy sweating resulting in wet clothing must also be monitored. 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 Wind Chill Temperature, duration, and type of activities performed).

Table 3 – Wind Chill Index													
Wind (mph)	Actual Temperature (°F)												
	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
	Equivalent Temperature (°F)												
5	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58
30	22	16	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	20	13	6	-1	-8	-15	-22	-29	-36	-42	-50	-57	-64
Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V0.16) + 0.4275T(V0.16) T = Air Temperature (°F) V = Wind Speed (mph)							***Frostbite occurs in 15 minutes or less***						

Table 4 - Maximum Daily Time Limits for Exposure at Low Temperatures gives the recommended time limits for working in various low temperature ranges.

Table 4 – Maximum Daily Time Limits for Exposure at Low Temperatures	
Temperature Range (°F)	**Maximum Daily Exposure**
30 to 0	No limit, providing that the person is properly clothed.
0 to -30	Total work time: 4 hours. Alternate 1 hour in and 1 hour out of the low-temperature area.
-30 to -70	Two periods of 30 minutes each at least 4 hours apart. Total low temperature work time allowed is 1 hour.
-70 to -100	Maximum permissible work time is 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air, is recommended.

Table 5 - Work/Warm-up Schedule applies to any 4-hour work period with moderate to heavy work activity, warm-up periods of ten (10) minutes in a warm location and an extended break (e.g., lunch) at the end of the 4-hour period in a warm location. For light-to-moderate work (limited physical movement) apply schedule one step lower. For example, at -35°C (-30°F) with no noticeable wind, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period.

Table 5 –
Work/Warm-up Schedule

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph wind		15 mph wind		20 mph wind	
^{0}C (approx.)	^{0}F (approx.)	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks
-26^0 to -28^0	-15^0 to -19^0	(Norm. Breaks) 1		(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4
-29^0 to -31^0	-20^0 to -24^0	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32^0 to -34^0	-25^0 to -29^0	75 min	2	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease	
-35^0 to -37^0	-30^0 to -34^0	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease			
-38^0 to -39^0	-35^0 to -39^0	40 min	4	30 min	5	Non-Emergency Work Should Cease					
-40^0 to -42^0	-40^0 to -44^0	30 min	5	Non-Emergency Work Should Cease							
-43^0 & below	-45^0 & below	Non-Emergency Work Should Cease									

To guard against cold injuries, workers should wear appropriate clothing and use warm shelters for removing personal protective equipment. The personnel decontamination trailer will be used as a warm shelter when required. The SSHO may periodically monitor workers' physical conditions, specifically checking for symptoms of frostbite.

3.2.1.10 Oxygen Deficiency and Confined Spaces

Oxygen deficiency may occur on-site during dredging maintenance operations or below deck entry, due to displacement of oxygen by other gases in these areas. The oxygen content of ambient air is 20.9 percent. Physiological effects of oxygen deficiency are readily apparent when the oxygen concentration decreases below 16 percent. Oxygen-deficient conditions may be controlled by air monitoring areas for oxygen concentrations using an O_2/LEL/CO Meter. Air monitoring will reduce risks by indicating when action levels have been exceeded. Oxygen levels less than 19.5 percent will result in an immediate evacuation of the area.

Areas not classified as confined spaces (i.e., engine compartments of dredges and support boats) where oxygen deficient atmosphere may be present shall be posted with a yellow and black warning sign. The warning sign shall convey the potential hazard and control (i.e., WARNING – THIS AREA MAY CONTAIN AN OXYGEN DEFICIENT ATMOSPHERE – AIR MONITORING REQUIRED PRIOR TO ENTRY).

Confined Spaces

A confined space is a space that is large enough and so configured that an employee can physically enter and perform assigned work, has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits) and is not designed for continuous employee occupancy. Simply working in a confined space is not necessarily a hazard. However, if certain hazardous conditions exist prior to, or are created during entry, then the confined space must be treated with utmost care.

Conditions that make a confined space especially dangerous (i.e., make it a permit-required space) are:

- Contains or has the potential to contain a hazardous atmosphere.
- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.

- Contains any other recognized serious safety or health hazard.

A hazardous atmosphere includes spaces that may expose employees to flammable gases, vapors, mists, or dusts; to an oxygen deficiency (<19.5 percent) or oxygen enriched environment (>23.0 percent); to air contaminants in excess of the PEL, or to any other atmospheric condition that is an immediate danger to life and health (IDLH).

When a permit-required space is present, the following hierarchy of controls should be used on the space:

- Avoid entry.
- Eliminate the hazards that make the confined space a permit-required space. Ventilation, lockout/tagout, block and bleed, and other procedures can be used to eliminate hazards. Hazard elimination must be verified by air monitoring and other test procedures.
- Eliminate the hazards to the point that only atmospheric hazards remain. Use the "atmospheric hazard only" procedures entry system discussed in 1910.146(c)(5).
- Minimize and control hazards to the fullest extent possible, and enter only after the requirements of a full permit entry have been satisfied.

Employees must receive training on confined spaces so that they will acquire the understanding, knowledge, and skills necessary for a safe entry into the confined space. Confined space training should be documented.

All equipment shall be surveyed by the SSHO as it is brought onsite to identify confined spaces. Once identified, the confined space shall be classified as permit or non-permit required confined spaces and labeled appropriately. Sevenson's Confined Space Inventory list will be updated to reflect identified spaces.

Sevenson's Confined Space Program can be referenced in Attachment 3.

3.2.1.11 Fall From Elevation

To prevent falls and injuries when employees work in areas where fall hazards cannot be eliminated by reasonable means, personnel will be required to use a full body harness and shock-absorbing lanyard. Personnel will make maximum use of primary fall protection systems, such as scaffolding and scissors lifts. These systems will be equipped with standard guardrails and safe means of access/egress.

Before any employee attempts to work in an area where a risk of falls exists, they must equip themselves with suitable fall-arresting equipment. Personnel riding on or working from a man lift must secure their safety lanyards to the basket at all times.

The fall protection equipment will be properly fitted and will not restrict the movements of the worker. Full safety harnesses are required for any work performed over six (6) feet in elevation unless work is being performed from a ladder. Work from portable ladders or fixed ladders less than 24 feet in height that are set up and properly utilized, and the user can maintain three points of contact do not require fall protection. However, if fall protection can be properly utilized, it will be.

Self-retractable lanyards (SRL) of the shortest workable length must be attached to a secure point in the vicinity of the work area. The line will be long enough not to restrict the worker's movements, but short enough to prevent tripping over the line and falls beyond the worker's extended reach for self-rescue; in any case, not over six (6) feet.

Sevenson's Fall Protection Program shall be utilized to control fall from heights during the project. A copy of this program is located in Attachment 4 of this plan.

3.2.1.12 Working On or Near Water

Some of the work conducted during this scope of work will be performed on or around water. This presents unique hazards and will be thoroughly addressed in all AHAs and Safe Plans of Actions; consideration will be given to and any applicable Coast Guard Regulations.

Personnel shall use Coast Guard approved Type I, III, or V PFDs while working over or on water where a drowning hazard exists.

Type II PFDs are not approved to be worn during activities at this project because the capability of a Type II PFD for turning unconscious wearers to a face-up position is not as effective as a Type I PFD.

Most Type III and V PFDs are not as effective as Type I in turning an unconscious wearer face up, but they are generally less bulky and restrictive, and are typically the PFD of choice in a marine work environment.

The use of inflatable PFDs is discouraged due to questionable reliability and maintenance requirements. In any case, the SSHO is available to help users select the appropriate type and style for the particular activity being conducted. The SSHO has the authority to prohibit the use of a particular PFD if it is damaged or otherwise not fit for use.

Each watercraft or work platform shall be equipped with at least one Type IV PFD, designed to be thrown to a person in the water and grasped and held by the user until retrieved from the water. A life ring or horseshoe buoy are two common examples of a Type IV PFD. Each style of Type IV PFD must be approved by the SSHO prior to use. Type IV PFDs shall have at least 90 feet of 3/8-inch solid braid polypropylene line, or equivalent attached to it.

For on shore areas or docks where PFDs are required, at least one Type IV PFD with 90 feet of 3/8-inch solid braid polypropylene line, or equivalent attached to it, shall be at intervals of not more than 200 feet.

Life Saving Skiffs

At least one lifesaving skiff (a powered John Boat or other smaller boat used in emergencies), shall be immediately available at locations where employees are working over or adjacent to water (based on an assessment by the SSHO for adjacent work).

OSHA has established the following criteria for determining when a lifesaving skiff is to be considered ‘immediately available’:

- The skiff must be in the water or capable of being quickly launched by one person.
- There must be at least one person present and specifically designated to respond to water emergencies and operate the skiff at all time when there are employees above water.
- When the operator is on break, another operator must be designated to provide the requisite coverage while employees are above water.

The designated operator must either man the skiff at all times or remain in the immediate area such that the operator can quickly reach the skiff and get underway.

Cold Water Immersion/Circum-Rescue Collapse

When water temperatures fall below 50°F workers shall be trained in cold water immersion and circum-rescue collapse. Any worker who experiences a cold water immersion event (water temperature < 50°F) shall receive medical observation.

Circum-rescue collapse is a complex physical phenomenon that can occur immediately before, during, or shortly after rescue from cold water. Its symptoms can range from fainting to death due to cardiac arrest.

In simple terms, the causes center around the body's lack of ability to maintain proper heart function, blood pressure, and core temperature under the stressful conditions of cold water immersion and/or the demanding physical requirements of the rescue itself. This condition was well documented in World War II when it was found that the safe recovery of downed pilots and sailors was greatly enhanced when rescued horizontally instead of pulled vertically form the water (thereby relieving some of the strain on the heart).

However, is some cases, even shortly after rescue, the consequence of rapid body cooling may cause the heart to continue to cool, until it reaches the temperature threshold for spontaneous cardiac arrest. In addition, stress hormones may also play a role. In this case, these hormones increase muscle strength and help maintain blood pressure during cooling. However, the rescue process could decrease these levels of hormones due to mental relaxation, and that could cause a decrease in blood pressure. To complicate matters, if a victim is placed in a vertical position, it caused the blood to pool in the legs and decreased blood pressure even more. The combination of a cooling heart and increased cardiac work to maintain blood pressure may cause symptoms ranging from fainting to cardiac arrest[2]..

3.2.1.13 Severe Weather

Winds

If high winds are forecast, work on the lake/delta shall stop before the winds become hazardous. Workers shall go to an appropriate shelter. In the event that a Small Craft Advisory is issued by the National Weather Service, work onboard vessel(s) will be halted and the vessel(s) will return to shore as quickly as possible. If a Small Craft Advisory is issued before work commences, work will be rescheduled following lifting of the advisory. Work from a vessel will be conducted at the discretion of the vessel operator/Captain and will cease if Force 6 winds (Strong Breeze) as defined on the Beaufort Wind scale (20 to 33 knots and waves 5 to 7 feet with whitecaps) are reported by National Weather Service. If an evacuation is enacted, an account for all persons will be conducted before leaving the Site.

Lightning

Work will not be permitted on the lake/delta, open areas, near trees or other equipment outside during lightning storms. Work will cease and field personnel provided appropriate shelter until the storm passes. Work shall not resume until at least 30 minutes after lightning was last observed. A lightning detection meter shall be utilized at the Site to monitor for storms that may produce lightning. When an approaching storm is within 20 minutes of the Site, water operations will be suspended. All waterborne personnel will be brought to shore to seek appropriate shelter.

Tornadoes

In the event of a tornado watch/warning all activities will be immediately suspended and workers brought to shore. In the event of a tornado warning all site activities will be suspended immediately and all workers will seek appropriate shelter.

3.2.1.14 Night Work Lighting Requirements

Operations conducted at night need to be properly illuminated. Table 6 defines the minimum lighting requirements for the project.

[2] Gordon G. Giesbrecht, PhD: John S. Hayward, PhD (2006). Problems and Complications with Cold-Water Rescue. *Wilderness and Environmental Medicine*, 17, 26 30.

Table 6 – Minimum Illumination Intensities in Foot-Candles	
Foot-Candles	**Area or Operation**
5	General construction area lighting.
3	General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exit ways.
30	First aid stations, infirmaries, and offices.

3.2.1.14 Cranes and Hoists

The target goal of a crane safety program is zero crane accidents. To achieve this goal, the following safe work procedures must be implemented and enforced at all company projects:

- The crane must have an annual 2nd party inspection within the past 12 months.
- Crane operators shall be licensed and certified for the type of crane to be used. The operator shall also have a current DOT or NCCCO physical..
- Crane operators are required to comply with crane manufacturer's specifications and limitations applicable to the operation of any and all cranes, derricks, and hoists.
- Rated load limits and recommended operating speeds, special hazard warnings, or instructions must be posted on all equipment.
- Hand signals to crane operators must conform to the applicable ANSI standard for the type of crane being used. A qualified signal person will only be allowed to direct crane movements. However, anyone on the crew may give the "STOP" command at any time to the crane operator. Hand signals will be covered in the pre job and lift plan briefing.
- Rigging shall only be performed by a qualified rigger or under the direction of a qualified rigger. The qualified rigger is responsible for ensuring all rigging has been properly selected and attached to the crane hook and load prior to authorizing the lift.
- A **competent person** who is knowledgeable in proper crane setup and operation activities must inspect all machinery and equipment prior to each use, and during use, to ensure it is in safe operating condition.
- Any defective parts must be repaired or replaced before use.
- A **competent person** who is knowledgeable in crane inspection techniques must perform an annual inspection of the hoisting machinery and provide a copy of the dates and results of inspections for each hoisting machine and piece of equipment to the site superintendent.
- All moving parts or equipment (belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheel, etc.) must be guarded to prevent contact by employees.
- Accessible areas within the swing radius of the rotating superstructure of the crane must be barricaded to prevent an employee from being struck or crushed by the crane.
- Exhaust pipes must be guarded or insulated to prevent contact by employees.
- Windows in cabs must be of safety glass, or equivalent, that introduces no visible distortions.
- Where necessary, a ladder or steps must be provided to allow access to a cab roof.

- Platforms and walkways must have anti-skid surfaces.
- A fire extinguisher of 5ABC rating must be accessible at all operator stations or cabs of equipment. No part of a crane or load is permitted within 10 feet (3.0 m) of electric power lines, except where electrical distribution and transmission lines have been de-energized and visibly grounded. A person will be designated to observe clearance of the equipment and provide timely warning to the crane operator.
- No employee is permitted to work beneath a suspended load.
- All lifts are to be planned by the lifting supervisor, crane operator, and rigger prior to making a lift with the crane. One Lift Plan may be prepared to cover multiple lifts of the same shape/size, weight, lifting radius, and rigging.

As part of a crane safety program, site superintendents will develop a working knowledge of Chemours's requirements for operating construction cranes, derricks, or hoists on project property. Interview prospective crane operators prior to site employment to ascertain competence and qualifications and check the prospective crane operator's past experience with previous employers, if possible. The Superintendent or his designee will conduct daily inspections to observe compliance with established Sevenson and Chemours crane and rigging procedures and immediately shut down any crane operations that jeopardize the safety of any jobsite personnel.

Crane use for this project will be limited to mobilization/demobilization of the sediment treatment facility, placement of waterborne equipment such as dredges, barges, floats, and piping. The crane operator will ensure the crane is on stable ground and is capable of performing the task requested. It is anticipated that a hydraulic crane will be used at the sediment treatment area and near the area where the waterborne equipment is to enter the water.

Sevenson's Critical Lift Program can be referenced in Attachment 5.

3.2.1.15 Control of Hazardous Energy

Whenever maintenance, servicing, or repairs are done to equipment, tools and machinery, there is a potential for injury from the accidental energization or movement of the equipment. Prior to beginning any work on equipment, steps must be taken to identify the energy sources present in the equipment, and to ensure that the energy sources are neutralized.

Hazardous energy sources fall into categories such as electrical, pneumatic, hydraulic, and potential (gravity, springs, etc.). One simple control in the construction industry has been to unplug cord-connected equipment. Vehicles and other motorized equipment can be protected from accidental starting by disconnecting the battery. Other controls include the use of identifiable padlocks on disconnects, breaker switches, and valves. Stored energy has the potential for release with great kinetic force and potential for injury.

All machinery or equipment capable of movement must be de-energized or disengaged and blocked or locked out during cleaning, servicing, adjusting or setting up operations, whenever required. The lockout procedure requires that stored energy (i.e. mechanical, hydraulic, air) be released or blocked before equipment is locked out for repairs. Appropriate employees are provided with individually keyed personal safety locks. Employees are required to keep personal control of their key(s) while they have safety locks in use. Employees must check the safety of the lockout by attempting a start up after making sure no one is exposed. Where the power disconnector does not also disconnect the electrical control circuit, the appropriate electrical enclosures must be identified. The control circuit can also be disconnected and locked out.

Temporary electrical service installation will be performed by a qualified electrician. Work may only be performed on de-energized equipment. Lockout/Tagout procedures will be implemented to assure the safety of personnel during electrical work activities.

Underground electric lines will be located and clearly marked. These utilities will be protected, removed, or relocated as needed to do the work safely. The excavation work will not be allowed to endanger the underground utility or the people doing the work. Barricades, shoring, or other supports as needed, will protect utilities left in place that are exposed by the excavation.

Sevenson's Control of Hazardous Energy Program is located in Attachment 6

3.2.2 Chemical Hazards

Operational chemicals may be brought to the project-site for use in activities supporting the construction activities. These chemicals are used for fuels in operating heavy equipment, glues for welding pipes, etc. The use of operational chemicals is regulated by OSHA under the Hazard Communication Standard (29 CFR 1910.1200). Material Safety Data Sheets (MSDSs)/Safety Data Sheets (SDSs) for operational chemicals are kept on file in the project office trailer. An inventory list of the anticipated operational chemicals (Hazardous Chemical Inventory List) for use at the site will be maintained at the site and updated as new material is received.

After reviewing the environmental sampling results, it has been determined that the primary contaminants of concern are lead and mercury. A worker protection program and air monitoring program for the chemicals of concern can be found in other sections of this HASP. Chemical Information Sheets for lead and mercury can be found in Attachment 7.

Sevenson's Hazardous Communication Program is located in Attachment 8 of this Plan.

3.2.3 Biological Hazards

There is a potential for encountering biological hazards such as bites from ticks, spiders, rodents, and snakes, and exposure to poison ivy and oak. Biological hazards and controls are presented below.

3.2.3.1 Needlestick Injuries

A needle stick injury occurs when a carelessly discarded hypodermic needle penetrates your skin, for example, through stepping on a syringe and/or needle that has been discarded at the site. Needle stick injuries transmit infectious diseases, especially blood-borne viruses. Accidental punctures by contaminated needles can inject hazardous fluids into the body through the skin. There is potential for injection of drugs, but injection of infectious fluids, especially blood, is by far the greatest concern. Accidental injection of blood-borne viruses is the major hazard of needle stick injuries, especially the viruses that cause AIDS (the HIV virus), hepatitis B, and hepatitis C.

General Universal Precautions will be observed to prevent contact with hypodermic needles or other potentially infectious materials. Work practice controls will be used to eliminate or minimize employee exposure (i.e. inspect area prior to work). If you are stuck by a discarded needle, immediately report it to the SSHO. Following a report of an exposure incident, the employer will immediately make available to the exposed employee medical evaluation counseling, treatment, and post-exposure prophylaxis, when medically indicated.

3.2.3.2 Ticks

Working in tall grass, especially in or at the edge of wooded areas, increases the potential for ticks to affect workers. Ticks are vectors of many different diseases including Lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of commercially prepared tick repellent, such as N, N-Diethyl-m-toluamide (DEET), help prevent tick bites. Please note that there are some concerns with

the use of DEET on skin and associated potential adverse health effects. The SSHO can provide you the SDS and information sheet as well as answer any questions for the use of this product. Periodically during the workday, employees working in tall grass will inspect themselves for the presence of ticks and notify the SSHO of any tick bites as soon as possible.

3.2.3.3 Rodents and Wildlife

During site operations, animals such as mice and rodents may be encountered. Workers will use discretion and avoid all contact with animals. If these animals are interfering with site operations, or if dead animals are observed, the SSHO should be contacted immediately for assistance and advice.

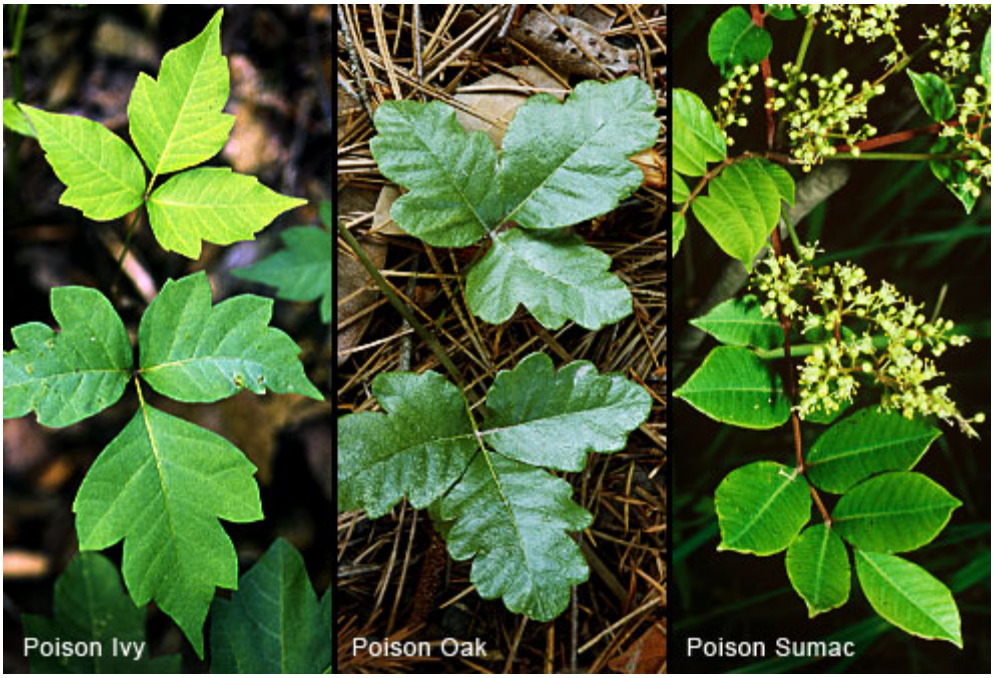
Hanta virus Pulmonary Syndrome (HPS) is a disease that may be contracted when a person comes into contact with Hanta virus-infected rodents, their nesting materials, droppings, urine, or saliva. HPS may develop when virus particles are inhaled, absorbed through broken skin or the eyes, or when bitten by an infected animal. The majority of HPS cases have been reported in the southwest; however, there is the potential for Hanta virus transmission in most regions with rodent populations. Risk to workers at the site is considered to be low; however, the severity of disease is high. Therefore, field personnel should be aware of the potential for exposure and should avoid coming into contact with rodents or their burrows or dens.

Rabies is an acute, infectious, often fatal viral disease transmitted to humans by the bite of warm-blooded, infected animals. This disease affects the central nervous system of humans. A rabid animal may be recognized by signs of raging, uncontrollable movement and possible foaming near or at the mouth. The best control method is avoidance of animals that could be rabid. If bitten by a potentially rabid animal, contact the SSHO immediately. The animal in question must be captured or trapped so that it can be tested for rabies. The bitten individual will seek medical attention immediately.

3.2.3.4 Poisonous Plants

Poison ivy, poison oak, and poison sumac are identified by three or five leaves radiating from a single stem. Poison ivy is in the form of a vine while oak and sumac are bush-like. All of these plants can produce a delayed allergic reaction. The plant tissues have an oleoresin, which is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur 24 to 48 hours after exposure resulting in rashes that itch and blister. Should exposure to any of these plants occur, wash the affected area with a mild soap and water within one-half hour, but do not scrub the area. The best preventative measure for poisonous plants is recognition and avoidance.

Photographs of Poisonous Plants



3.2.3.5 Snakes

The degree of toxicity resulting from snakebites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches. The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt. Personnel will not put their hands in areas where they cannot be seen.

There are 23 species of snakes in New Jersey. Only two of there are poisonous, the northern copperhead and the timber rattlesnake. ***Attachment 9*** provides information and pictures of the 23 species of snake found in New Jersey.

In the event you come across a poisonous snake, do not attempt to capture or kill. Warn others in the area and stop all work in the immediate area, keep all personnel clear of the area and notify the SSHO and Superintendent.

The Division of Fish and Wildlife's Endangered and Nongame Species Program (ENSP) has developed the Venomous Snake Response Team (VSRT) to respond to human/venomous snake interactions and increase an awareness of our responsibilities for living in venomous snake country. The VSRT is a group of trained volunteers that includes animal control officers, park rangers, local and state police, and other select individuals that are on-call to remove venomous snakes from private lands upon request. They also educate landowners about snakes and instruct them on how to live safely in snake country. Snakes are removed from harm's way and returned to nearby areas away from human habitation.

Landowners that encounter timber rattlesnakes or northern copperheads on their property and wish to have them removed should contact ENSP immediately.

Monday–Friday (8:30 am–4:30 pm)

Northern Region Office:

908-735-8975, 735-9281 or 735-2931

After hours, weekends, or when unable to contact a biologist at one of the telephone numbers above:

1-877-WARN-DEP

3.2.3.6 Flying Insects

Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while project activities occur. Mosquito bites can be effectively prevented by the use of insect repellants containing DEET. Please note that there are some concerns with the use of DEET on skin and associated potential adverse health effects. The SSHO can provide you the SDS and information sheet as well as answer any questions for the use of this product. Treatment for insect bites and bee stings can be effected by the use of commercially prepared ointments. Personnel who are allergic to bee stings will notify the SSHO prior to working on the project.

3.2.3.7 Spiders

Personnel will be alert to the potential for spider bites. Spiders sometimes establish residence in stored clothing and PPE. It is advisable for personnel to inspect clothing and PPE for spiders prior to donning. In New Jersey the brown recluse and black widow spider are of medical concern. Immediate reporting and medical evaluation is necessary if personnel suspect being bitten by the Brown Recluse or Black Widow spider. If a spider bite is sustained, personnel will report it to the SSHO.

3.2.3.8 Snapping Turtles

The common snapping turtle is an aggressive, freshwater turtle usually found in ponds, streams, and canals. They will defend themselves if cornered and cut off from the water by striking out with their head, which can reach almost all the way back along the shell. In the water, snapping turtles will always leave instead of attack; however, they may become curious and approach swimmers or boats very closely. If encountered, avoid the turtle and allow it adequate room to escape. If approached, make loud splashing noises.

3.2.3.9 Water Fowl

Water fowl, particularly geese, can present a hazard during the nesting season. The may charge aggressively to protect nest sites and young against people. Goose attacks on humans have caused serious physical injury, such as broken bones, head injuries and emotional distress. If attacked, maintain direct eye contact and keep your chest and face pointed towards the goose. If the goose acts aggressively, calmly and slowly back away, watching for obstacles. Maintain a neutral demeanor, i.e., do not act hostile or show fear.

Areas where water fowl congregate can be soiled with droppings, creating a slipping hazard. Droppings may also carry disease. Do not feed water fowl.

3.2.3.10 Black Bear

Due to the fact that a large portion of the site is covered by dense woods and its proximity to Ramapo State Forrest, black bears are frequently encountered onsite. When a bear(s) are sited avoid them as much as possible, avoid eye contact, and slowly back away. Make your presence known by speaking in a loud assertive voice or clapping your hands. Never feed bears. Use caution when bringing food on site or storing food in vehicles as food may attract bears.

3.3 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 sediment processing and stockpiling dust may be generated. The SSHO will be constantly alert to the possibility of unacceptable dust levels.

3.3.1 Dust Control

Control measures will be implemented for all operations where dust is likely to be generated. Careful planning and implementation of controls will reduce potential dust concentrations. There are a number of specific construction practices, which will reduce levels of airborne particulates. These include:

- Providing for a misting spray during material handling activities.
- Applying water on haul roads.
- Reducing the active work area surface and limiting the number of concurrent operations.

3.3.2 Noise Control

Noise levels will be controlled to meet the applicable OSHA standards for workers as well as for the off-site community. This will be accomplished by the use of mufflers on equipment and planning of operations to comply with the New Jersey Commercial Noise Requirements.

4.0 Safety and Health Training

4.1 Site-Specific Training

All personnel working at the Site during construction activities will review this HASP with the SSHO. Personnel will sign an acknowledgment form to document their review and agreement to comply with the provisions of the HASP. All visitors must sign the visitor's log and wait in the Sevenson field office for a briefing before entering the Site.

The SSHO will be responsible for ensuring Site visitors are trained in the hazard associated with the Site, to explain emergency procedures, and instruct them in the use of protective gear required during the visit.

As a minimum the site-specific training will include:

- Explanation of the overall HASP.
- Project management and roles.
- Health effects of chemicals used at the Site.
- Physical hazards associated with the project.
- Selection, use, and limitations of available safety equipment and proper procedures for its use.
- Personal hygiene and decontamination for chemicals used at the Site.
- Site rules and regulations.
- Site communication and the “Buddy System”.
- Emergency preparedness procedures.
- Fall Protection Equipment.
- Water Safety.
- Review applicable Sevenson and Chemours Standard Operating Procedures.
- Site Specific Hazard Communication.

4.2 Periodic Sessions

Periodic training will be provided at least weekly and prior to each change of operation. The training will address safety and health procedures, work practices, any changes to the HASP, review activity hazard analysis, work task or schedule, and review of safety discrepancies and accidents.

4.3 Safety Meetings

A well-ordered flow of information is essential to a good safety program. Sevenson, through a program of safety meetings at all levels, intends to accomplish the goals of safety awareness, education, and participation.

The SSHO will conduct daily safety meetings with ALL on-site personnel. An opportunity will be provided for employees to voice safety-related concerns. A synopsis of each meeting including topics covered, safety-related concerns, action items to be addressed, status of previous action items, and a signed attendance list shall be maintained as part of the Daily Safety Report.

4.4 Hazard Communication Training

OSHA's standard for hazard communication requires that all workers be informed of potentially hazardous materials used in their work area. Sevenson 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.

4.5 First Aid/CPR Training

At least two site personnel will be required to complete first aid and cardiopulmonary resuscitation (CPR) training and receive the appropriate certification. CPR certification is renewed annually; first aid certification is renewed every three years. All first aid/CPR training is American Red Cross-approved or in accordance with OSHA standards. Additionally, First Aid/CPR qualified personnel will have received blood borne pathogen training as required by 29 CFR 1910.1030.

A list of personnel who are qualified and are willing to perform first aid and/or CPR in the event of an injury or illness will be posted with the emergency phone list and map to the hospital. This list will be updated as necessary to reflect qualification expirations, requalification, or as personnel are added or removed from the project. It will be the duty of the SSHO to update and ensure the accuracy of this list within two working days of a qualification or employment status change.

5.0 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 construction activities. 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. Sevenson will provide proper PPE to all employees (except prescription safety glasses and safety shoes). All protective clothing will be properly used, stored, selected, and maintained.

5.1 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 that 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.

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.

5.1.1 Head Protection

All personnel will 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, rest and eating areas, or in equipment or vehicles equipped with a falling object protection system.

5.1.2 Hand Protection

Leather gloves will be required for all construction type work at the site unless otherwise specified in the SPA. Outer gloves used on the Site for handling contaminated material will be chemical resistant. The appropriate glove will be determined by the SSHO for a specific work task. Chemical resistant gloves will be selected using appropriate chemical degradation guides. Leather or cut resistant (Kevlar) work gloves will be worn when work activities require the handling of sharp and rough-surfaced objects. If sharp or rough surfaced objects are located inside an exclusion zone, leather or cut resistant gloves will be worn over the chemical resistant gloves. Contaminated leather or cut resistant gloves will remain inside the exclusion zone or disposed of prior to leaving the contaminated area.

Always reference the MSDS/SDS for the chemical or product being used to determine the appropriate hand protection.

5.1.3 Eye/Face Protection

Eye protection will be worn by all personnel. Double eye protection will be required when power-washing equipment. All eye/face protection provided will be ANSI Z87 approved. Face shields will be required during pressure washing, grinding, and chainsaw activities. Chemical goggles may be

required when handling chemicals. Always reference the MSDS/SDS for the chemical or product being used to determine the appropriate eye and face protection.

5.1.4 Footwear

At least one layer of foot protection will be a steel/composite-toed safety boot. All safety boots will be ASTM F2413 approved. Additional or alternate footwear may be required or authorized by the SSHO.

5.1.5 Respiratory Protection

To control and or minimize the threat of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of this program will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (for example, dust suppression). When effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection will be used. A respiratory protection program will be implemented that is compliant to the requirements of 29 CFR 1910.134, "Respiratory Protection." Respiratory protection equipment will be NIOSH-approved, and respirator use will conform to ANSI Z88.2.

Respirators will be provided when such equipment is necessary to protect the health of the employee. Sevenson will:

- Provide the respirators, which are applicable and suitable for the purpose intended.
- Be responsible for maintaining a written Respiratory Protective Program in accordance with 29 CFR 1910.134. The employee will use the provided respiratory protection in accordance with instructions and training received.
- Respirators will be selected on the basis of hazards to which the worker is exposed.
- The user will be instructed and trained in the proper use of respirators and their limitations.
- Respirators will be regularly cleaned and disinfected.
- Respirators will be stored in a convenient, clean, and sanitary location.
- Respirators used routinely will be inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use, such as self-contained devices, will be thoroughly inspected at least once a month and after each use.
- Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained.
- There will be regular inspections and evaluations to determine the continued effectiveness of the program.
- Employees will not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A physician will determine whether an individual is physically fit to wear a respirator. The physician's clearance allows the worker to don a respirator and work in conditions of high ambient temperatures. Heat stress will be closely monitored.

Each respirator will be individually assigned and not interchanged between workers without cleaning and sanitizing. The cartridges/filters will be changed at least daily or at the first sign of breakthrough based on contaminant warning properties or if the user experiences excessive breathing resistance. Respirators used for mercury must have an end of life service indicator on the cartridge. Cartridges for mercury will be changed at least daily or when the end of service life indicator indicates the cartridge should be replaced. Respirators will be cleaned and stored in an uncontaminated atmosphere after each use. Used cartridges will be disposed in the trash.

All employees working at the Site during construction activities who have the potential of wearing a respirator will be fit-tested to ensure they utilize the proper size respirator. Sevenson will arrange for fit testing. The fit test is conducted according to the manufacturer's suggestions. The test will consist of an odorous vapor qualitative test. As per OSHA regulations, personnel that are unable to pass a fit test will not enter a work area when respiratory protection is required. In addition, facial hair is prohibited from the respirator seal area. Any person with facial hair will not be permitted to enter a work area where respiratory protection is required, regardless of the fit test results. Documentation of the fit testing will be maintained on-site.

Sevenson's Respiratory Protection Program can be referenced in Attachment 10.

5.2 Exclusion Zone PPE

5.2.1 Level A

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

- Positive pressure, full face piece, self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA (NIOSH-approved)
- Fully encapsulating suit (Tychem, butyl rubber)
- Outer gloves: neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots.
- Steel-toed safety boots
- Hard hat

5.2.2 Level B

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

- Positive pressure, full face piece, self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA (NIOSH-approved)
- Disposable coverall (Tyvek, Polycoated Tyvek or Saranex)
- Outer gloves: neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots.
- Steel-toed safety boots
- Hard hat

5.2.3 Level C

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

- Full-face, air purifying, cartridge-equipped respirators (NIOSH-approved) utilizing P-100 (HEPA) filters (half-face if approved by SSHO). Cartridges and/or filters must be replaced as needed and, as a minimum, changed weekly
- Disposable coverall (Tyvek or Polycoated Tyvek)
- Outer gloves: leather, cotton, neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots
- Steel-toed safety boots
- Hard hat

5.2.4 Modified Level D

Modified Level D equipment, used as appropriate, is as follows:

- Disposable coveralls – Tyvek or Polycoated or equivalent for wet work (equipment decontamination) or as required
- Outer gloves – leather, cotton, nitrile as required
- Inner gloves – nitrile surgical with cotton liner (cotton liner optional)
- Boot covers – Tyvek or equivalent
- Outer boots – rubber or latex disposable
- Safety boots
- Hard hat
- Reflective vests
- Safety glasses – with face shield as required

1. SSHO shall determine the need for upgrade or downgrade of PPE levels based on a conservative interpretation of information provided by air monitoring data and other appropriate information.
2. The SSHO's Daily Safety and Inspection log will list protective ensemble(s) in use for each task.

5.2.5 Level D

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

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

Air monitoring using direct-reading instruments and personal air sampling will be performed to determine if an upgrade or downgrade from initial PPE levels is warranted. All decisions on the level of protection will be based upon a conservative interpretation by the SSHO of the information provided by air monitoring results, environmental results, and other appropriate information.

5.3 Initial Levels of Protection

Based upon Sevenson's experience from past projects, the levels of contamination identified in project documents, and the nature of the construction activities to be performed at the site, the initial levels of protection to be used are outlined in ***Table 7, "Initial Levels of Protection***". This table lists each work task and the initial level of protection. The initial level of protection is defined as that level in which work commences.

Table 7 – Initial Levels of Protection	
Task	**Level**
Mobilization	D
Site Preparation	D
Sheet Pile Installation	D
Soil Excavation	D Modified (Tyvek)
Dredging	D Modified (Tyvek)
Sediment Processing	D Modified (Tyvek)
Truck Loading	D Modified (Tyvek)
Sheet Pile Removal	D Modified (Tyvek)
Restoration	D
Demobilization	D

Air monitoring using direct-reading instruments will be performed to determine if an upgrade or downgrade from initial PPE levels is warranted. All decisions on the level of protection will be based upon a conservative interpretation by the SSHO of the information provided by air monitoring results, environmental results, and other appropriate information

6.0 Medical Surveillance Program

The Medical Surveillance Program is designed to track the physical condition of employees on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures. The Medical Surveillance Program is a part of the overall Sevenson Safety and Health program.

6.1 Baseline Medical Monitoring

Each employee must receive a baseline physical, which can be part of an annual medical monitoring program, prior to being permitted to enter the Exclusion Zone or Contamination Reduction Zone. The content of the physical has been determined by Sevenson's Occupational Physician as suggested by NIOSH/OSHA/USCG/EPA's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities. The minimum medical monitoring requirements for work at the Site are as follows:

- Complete medical and work histories
- Physical examination
- Pulmonary function tests (FVC and FEV1)
- Blood chemistry (CBC & SMAC 24)
- Urinalysis with microscopic examination
- Audiometric Testing
- Eye examination and visual acuity
- Chest X-Ray (as directed by the Occupational Physician)
- Electrocardiogram (as directed by the Occupational Physician)
- Other Biological testing as prescribed by the Occupation Physician
- Serum Lead
- Zinc Protoporphyrin
- Baseline Urinalysis for mercury

The medical surveillance provided to the employee includes a judgment by the medical examiner of the ability of the employee to use either positive- or negative-pressure respiratory protection equipment. Any individual found to have a medical condition, which could directly or indirectly be aggravated by exposure to these site contaminants, will not be employed for the project. Individuals not capable of satisfying the project requirements for wearing respiratory protection equipment will be

evaluated on a case-by-case basis based prior to being employed. A copy of the medical examination is provided at the employee's request.

The employees will be informed of any medical conditions that would result in work restriction or that would prevent them from working at hazardous waste sites. 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.

6.2 Periodic Monitoring

In addition to a baseline physical, all employees require a physical every 12 months unless the advising physician believes a shorter interval is appropriate. The Occupational Physician has prescribed an adequate medical evaluation, which fulfills OSHA 29 CFR 1910.120 requirements. The pre-assignment medical outlined above is applicable.

All personnel working on the Site that enter an active Exclusion or Contamination Reduction Zone will verify currency (within 12 months) with respect to medical monitoring. Sevenson will obtain a copy of the physician's written opinion detailing the employee's ability to perform hazardous waste site work. All personnel who work in the Exclusion zone will participate in a biological monitoring program for mercury. These employees will be tested pre-employment and post-employment at the site for mercury in the urine. Additional testing for urine level mercury or blood lead may be necessary based on air monitoring data. The Safety and Health Manager or Occupational Physician will make the determination on additional sampling.

6.3 Exposure/Injury/ Medical Support

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. It will be up to the occupational health physician to advise the type of test required to accurately monitor for exposure effects.

Any employee, who develops a time loss illness exceeding one working day, or injury during the period of the contract, must be evaluated by the occupational health physician. A written statement indicating the employee’s fitness, signed by the occupational physician must be submitted prior to the employee entering the work site.

6.4 Medical Records

The results of medical testing and full medical records will be maintained in accordance with 29 CFR Part 1910.1020. A copy of the medical certification will be kept on the Site for each person entering the Contamination Reduction Zone and Exclusion Zone.

7.0 Air Monitoring

The primary contaminates of concern are lead and mercury. Worker exposure to these primary contaminates will be monitored with the use of real time instrumentation and integrated air monitoring equipment and methodologies.

7.1 Real Time Air Monitoring

7.1.1 Mercury

Real-time air monitoring for mercury vapor will be performed in the breathing zone of workers during excavation activities. Air monitoring will be performed at the work area using a Jerome 431X Mercury Vapor Analyzer (or equivalent). Real-time air monitoring equipment calibration will be performed in accordance with the manufacturer’s recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration

procedures for all air monitoring devices will be maintained on site. The real time action level for upgrading to Level C PPE for mercury in the air will be 0.0125 mg/m^3. This action level is based on one half of the ACGIH threshold limit value.

7.1.2 Lead and Dust

There is no direct reading instrument for the determination of airborne lead. However, through the use of a real-time air monitor for dust we can develop a dust action level that will prevent workers from being exposed to lead over the permissible exposure limit. Real time dust monitoring will be performed in the breathing zone of workers during activities that can cause dust emissions. Air monitoring will be performed at the work area using a Dust Trak Particulate Monitor. Real-time air monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site.

A conservative real time dust action level for lead exposure can be made by using the following formula:

Equation 1
Real Time Dust Action Level for Lead Exposure

$$\text{Dust Action Level (lead) mg/m}^3 = \frac{(1.0\text{E06 mg/kg})(\text{Lead PEL mg/m}^3)}{(\text{Lead Concentration mg/kg})(\text{Safety Factor})}$$

$$\text{Dust Action Level (lead) mg/m}^3 = \frac{(1.0\text{E06 mg/kg})(0.03\text{ mg/m}^3)}{(1{,}700\text{ mg/kg*})(4)} = 4.4\text{ mg/m}^3$$

* 99% UCL average concentration of lead

7.1.3 Hydrogen Sulfide

During the dredging process and the handling of contaminated sediments there is a potential for hydrogen sulfide generation. Hydrogen sulfide monitoring will be conducted periodically during dredging and sediment processing activities until a negative exposure assessment can be made. Hydrogen sulfide monitoring will be conducted with ah Multi-Rae Plus or equivalent portable gas monitor. Hydrogen sulfide monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site

7.1.4 O_2, LEL, CO, and VOCs

A Multi-RAE Plus or equivalent Portable Gas Monitor will be utilized to monitor for explosive, oxygen enriched/deficient atmospheres during confined space entries, hot work permit operations, and during sediment processing activities. Monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site

7.1.5 Decision Making for Real Time Data

A decision-making protocol for an upgrade in levels of protection and/or withdrawal of personnel from an area based on atmospheric hazards determined by real time data is outlined in ***Table 8 – "Operational Action Levels".***

Table 8 –
Operational Action Levels 8-hour TWA

Air Monitoring Instrument	Monitoring Location	Task	Action Level	Site Action	Reason
Multi-Rae Plus	Work Area	Hot Work Permit	LEL: > 0 % O_2: > 23.0 % VOC: > 20 ppm H_2S: > 10 ppm	Do not perform hot work activities! Ventilate area	Increase risk for fire or explosion
Multi-Rae Plus Jerome 431X Mercury Vapor analyzer	Work Area/Breathing Zone	Confined Space Entry	O_2: < 19.5 % O_2: > 23.0 % LEL: > 10 % CO: > 35 ppm VOC: > 20 ppm H_2S: > 10 ppm Hg: > 0.0125mg/m^3	Do not enter or terminate confined space entry	Increase risk for injury, death, or fire/explosion
Multi-Rae Plus	Work Area	Dredging and Sediment Processing	H_2S: > 10 ppm	Evacuate area, notify SSHO and Health and Safety Manager immediately	50 percent of OSHA PEL. Process needs to be evaluated by Health and Safety Manager
Particulate Monitor	Work Area/Breathing Zone	Dredging and Sediment Processing	Total Particulate >4.0 mg/m^3	Upgrade to Level C or control source of dust emission	Possibly exceed OSHA Lead PEL
Jerome 431X Mercury Analyzer	Work Area/Breathing Zone	Dredging and Sediment Processing	Hg: >0.0125mg/m^3	Upgrade to Level C	½ of ACGIH TLV

Table 8A – Operational Action Levels 10-hour TWA					
Air Monitoring Instrument	**Monitoring Location**	**Task**	**Action Level**	**Site Action**	**Reason**
Multi-Rae Plus	Work Area	Hot Work Permit	LEL: > 0 % O_2: > 23.0 % VOC: > 20 ppm H_2S: > 7 ppm	Do not perform hot work activities! Ventilate area	Increase risk for fire or explosion
Multi-Rae Plus Jerome 431X	Work Area/Breathing Zone	Confined Space Entry	O_2: < 19.5 % O_2: > 23.0 % LEL: > 10 % CO: > 35 ppm VOC: > 20 ppm H_2S: > 7 ppm Hg: >0.008mg/m^3	Do not enter or terminate confined space entry	Increase risk for injury, death, or fire/explosion
Multi-Rae Plus	Work Area	Dredging and Sediment Processing	H_2S: > 7 ppm	Evacuate area, notify SSHO and Health and Safety Manager immediately	50 percent of OSHA PEL. Process needs to be evaluated by Health and Safety Manager
Particulate Monitor	Work Area/Breathing Zone	Dredging and Sediment Processing	Total Particulate >2.8 mg/m^3	Upgrade to Level C or control source of dust emission	Possibly exceed OSHA Lead PEL
Jerome 431X Mercury Analyzer	Work Area/Breathing Zone	Dredging and Sediment Processing	Hg: >0.008mg/m^3	Upgrade to Level C	½ of ACGIH TLV

Table 8B – Operational Action Levels 12-hour TWA					
Air Monitoring Instrument	**Monitoring Location**	**Task**	**Action Level**	**Site Action**	**Reason**
Multi-Rae Plus	Work Area	Hot Work Permit	LEL: > 0 % O_2: > 23.0 % VOC: > 20 ppm H_2S: > 5 ppm	Do not perform hot work activities! Ventilate area	Increase risk for fire or explosion
Multi-Rae Plus Jerome 431X	Work Area/Breathing Zone	Confined Space Entry	O_2: < 19.5 % O_2: > 23.0 % LEL: > 10 % CO: > 35 ppm VOC: > 20 ppm H_2S: > 5 ppm Hg: >0.006mg/m^3	Do not enter or terminate confined space entry	Increase risk for injury, death, or fire/explosion
Multi-Rae Plus	Work Area	Dredging and Sediment Processing	H_2S: > 5 ppm	Evacuate area, notify SSHO and Health and Safety Manager immediately	50 percent of OSHA PEL. Process needs to be evaluated by Health and Safety Manager
Particulate Monitor	Work Area/Breathing Zone	Dredging and Sediment Processing	Total Particulate >2.0 mg/m^3	Upgrade to Level C or control source of dust emission	Possibly exceed OSHA Lead PEL
Jerome 431X Mercury Analyzer	Work Area/Breathing Zone	Dredging and Sediment Processing	Hg: >0.006mg/m^3	Upgrade to Level C	½ of ACGIH TLV

7.2 Exposure Monitoring

To determine worker exposure to the various contaminates and as a means to determine the accuracy of the real time air monitoring, worker exposure monitoring using NIOSH protocols will be conducted. NIOSH test method 6009 will be used for mercury and NIOSH 7300 for lead. This monitoring will take place at the beginning of each operation in which there is the potential for airborne exposure the lead and mercury. Also if the particulate and/or mercury vapor real time action limit is exceeded, exposure monitoring will then occur. Two of the potentially highest exposed workers per shift will be sampled during each event.

Sample results will be sent to the SSHO and the SHM for review. Affected employees will be notified of the sample results by the SSHO within five working days of their receipt.

8.0 Site Control Measures

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

8.1 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 has completed Supervisor's Training will be present at the Site whenever work is performed in the Exclusion Zone or Contamination Reduction Zone. Similarly, at least two First aid/CPR-trained individuals will be present at the Site when work is performed in those zones.

8.1.1 Exclusion Zone

This zone, commonly known as the Hot Zone, is where there will be direct contact with the potentially contaminated material. PPE will be required in this zone. The SSHO will enforce these requirements. The level of PPE required will be based on hazard, site condition and air monitoring performed. 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.

8.1.2 Contamination Reduction Zone

This zone, commonly known as the Warm Zone, is where workers and equipment will be decontaminated. This will 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 Exclusion Zone 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.

8.1.3 Support Zone

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

8.2 Site Entry and Control Log

All site personnel on this project will undergo safety orientation by the SSHO prior to starting work at the site. This training will include general site safety rules, hazardous locations, personal protective equipment guidelines, and onsite emergency procedures. All site personnel will satisfy the following requirements before initiating work onsite within the Exclusion or Contamination Reduction Zones:

- Receive and pass a physical examination, including certification of ability to wear respiratory protection.
- Receive adequate hazardous waste training according to 29 CFR 1910.120 or 29 CFR 1926.65.
- Receive a briefing on all aspects of the HASP.
- Are properly dressed, equipped, and trained in accordance with all personal protective guidelines.
- Are thoroughly trained regarding decontamination procedures.
- All personnel performing tasks when respiratory protection is needed will comply with the requirements of this plan

All personnel entering and exiting the Exclusion and Contamination Reduction Zones will sign in and out through the Support Zone. The log will indicate the date and time entering and exiting, the

location entered, personal protective equipment utilized and decontamination procedures, refer to ***Attachment 2 – Safety and Health Forms for the Site Entry and Exit Log***

9.0 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.

During construction activities at the Site, all items taken into the Exclusion Zone must be considered contaminated and must be carefully inspected and/or decontaminated before leaving the Site. All contaminated vehicles; equipment and material will be cleaned and decontaminated to the satisfaction of the SSHO prior to leaving the Site. Decontamination procedures will be posted at every decontamination station throughout the project.

9.1 Personal Decontamination

Personnel exiting the Exclusion Zone during construction activities at the Site will follow the procedure below.

Decontamination of personnel and equipment will be performed using mild soap and lukewarm water, brushes, and pressures washers as applicable.

As the worker leaves the Exclusion Zone, 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.

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 their respirators (applicable to level C) followed by removal of inner gloves. Used cartridges and inner gloves will be placed into plastic garbage bags.

The change trailer will be used by the on-site staff for short breaks during the workday. The trailer will have an area for changing, washbasins, and counters. This trailer is considered part of the Support Zone and cannot be entered from the Contamination Reduction Zone unless the individual has completed the outlined decontamination procedures. All equipment will be decontaminated before being brought into the trailer.

9.2 Respirator Decontamination

Respirators are to be decontaminated, cleaned and sanitized before reuse. Cartridges and/or filters must be replaced as needed and, as a minimum, changed daily. The respirators are then cleaned with cleaning and sanitizing solutions, wiped dry and placed into sanitary containers or bags and sealed closed. Before departing the change locker facility, respirators are placed into storage compartments for next day use.

9.3 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. brushes, sprayers, detergent and, if necessary, other appropriate solvents). Large heavy equipment will be decontaminated with pressure steam wash as required.

The decontamination area for vehicles and equipment leaving the Exclusion Zone will be located within the Contamination Reduction Zone. Equipment will be decontaminated over 2 layers of 6-mil plastic placed on the ground. Scrapers and brushes will be used to remove gross contamination prior to final decontamination. A pressure steam cleaner will be used for the final cleaning and decontamination of the equipment. The combination of dry removal with the brushes and use of the steam cleaner will minimize the generation of contaminated liquid. All solids and liquids will be collected for disposal. Efforts will be made to minimize soil (even non-contaminated soil) from being tracked off-site. Dirt and mud will be removed from trucks and vehicles leaving the Site to the extent practicable.

9.4 Decontamination Log

A decontamination log will be maintained and will list the equipment name and model number, the equipment I.D. number, the activities the equipment was used for, the method of decontamination, amount of decontamination, date and time of decontamination and names of personnel doing the decontamination. This log will be maintained by the SSHO and included in the Safety and Health Report. Refer to ***Attachment 2 – Safety and Health Forms for the Equipment Decontamination Log***.

9.5 Decontamination Residue

Decontamination residue consists of disposable PPE (such as Tyvek, gloves, tape and cartridges) and settled solids. Decontamination residue will be drummed and stored in the Exclusion Zone until subsequent disposal or for treatment.

9.6 Personal Hygiene and Sanitation

Hands and face will be thoroughly washed before eating, smoking, drinking, chewing gum or tobacco.

When possible, avoid contact with contaminated materials.

Temporary support facilities such as wash facilities, eating areas, changing areas, and portable toilets will be located in the Support Zone. This area will remain “clean” and free of contamination.

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.

Portable toilet facilities will be provided on-site for employees and will be located in the Support Zone.

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 construction activities except in designated eating or smoking areas outside the Exclusion and Contaminant Reduction Zones. Sevenson employees, subcontractor employees, and service personnel are required to thoroughly decontaminate themselves prior to entering the Support Zone

Hands and face will be thoroughly washed before eating, smoking, drinking, chewing gum or tobacco.

When possible, avoid contact with hazardous materials.

Temporary support facilities such as wash facilities, eating areas, changing areas, and portable toilets will be located in the support area.

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.

10.0 Emergency Contingency Plan

This section describes the emergency response plan that will be implemented by Sevenson employees to handle emergencies. The nature of the project, the contaminants present and the activities planned for the site are such that there is little potential for an emergency, which would result in a significant release of hazardous substances, and in any way threaten the adjoining community. However, there is always the potential at any construction site for emergency situations to occur which threaten the on-site workers. Possible examples of emergency situations during construction activities include man overboard, equipment fires or contact of equipment with overhead power lines. In all of these cases, procedures will be implemented to minimize the possibility of an emergency situation. The procedures outlined below are designed to ensure that the workforce reacts quickly and appropriately to emergency situations, thereby protecting the health and wellbeing of the individual workers. It is expected that modifications may be necessary upon actual site set-up and conditions.

NOTE: In the event of a serious or life threatening emergency the primary consideration is the immediate health of the individual rather than routine contamination controls. Standard contamination control protocols shall not interfere with the prompt medical attention required of a seriously injured worker.

10.1 Pre-Emergency Planning

During the site safety briefings held daily, all employees will be informed of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes to be used during an emergency.

On a continual basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency.

10.2 Personnel Responsibilities

All on-site employees have a role in mitigating an emergency incident. The Project Superintendent has primary responsibility for responding to and directing emergency response operations to correct emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. He is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed.

The following is an outline of job titles and corresponding responsibilities during an emergency.

- The SSHO directs emergency response activities and serves as liaison with Chemours and Chemours Representative's personnel and, subcontractors. In the event of an emergency the Site Superintendent will be the Incident Commander.
- The SSHO recommends that work be stopped if any operation threatens worker or public health or safety and advises Site Manager of emergency procedures if necessary. Provides emergency medical care on site. Notifies emergency services. The SSHO will assume the responsibility of Incident Commander if the Project superintendent is off-site.

10.3 Evacuation Routes and Procedures

In the event of an emergency that necessitates an evacuation of the site, on-site personnel will be notified by hand-held or mobile two-way radios to leave the area by immediate emergency exit. An

alternate method of communication will be the use of a portable air horn sounded in regularly spaced, repeated blasts.

During an evacuation, all non-emergency radio transmissions will cease. The SSHO will control the scene until the appropriate municipal and state agencies arrive. Since site conditions, (i.e., wind direction, precipitation, and work location), change often, the SSHO will determine the appropriate evacuation procedures.

All personnel will assemble/muster at the designated rally point for roll call. Access to the site will be restricted.

10.4 Emergency Decontamination Procedures

Decontamination of an injured or exposed worker will be performed if decontamination does not interfere with essential treatment. The objective is to successfully administer first aid without exposing rescue workers and the victim to contaminants. Project personnel will meet with the local hospital to discuss the possibility of having to treat injured personnel from the site.

If the hazards are low and decontamination can be performed, then a wash, rinse and removal of protective clothing will be performed.

If the hazards are high and decontamination cannot be done, then the following procedures will be performed:

- Wrap the victim in blankets or plastic sheeting to reduce contamination of rescue workers or other personnel.
- Alert emergency and medical personnel to potential contamination. Emergency entry into the exclusion zone will be controlled by the SSHO. The SSHO will determine if the victim can be moved from the exclusion zone. If entrance into the exclusion zone is required, the SSHO will ensure that the emergency workers don the proper PPE.
- If required, arrange to have the SSHO accompany the victim to the hospital if required

10.5 Medical Treatment/First Aid

The SSHO will be trained in CPR and First Aid and have first aid kits for use in a medical emergency. First Aid Kits will be located in the main support area, Contamination Reduction Zone and at the work activity locations. Eyewash stations will be available at the Contamination Reduction Zone. Eyewash stations will be of the pressurized, 15-minute discharge type. On-site employees have a basic knowledge of first aid and will assist the Site Superintendent and SSHO. Community emergency services (EMS, Fire, and Police) will be notified immediately if their resources are needed on site.

If necessary, the injured or sick party will be taken to Chilton Memorial Hospital– Please refer to ***Figure 3 – "Route to Hospital Map"***, for directions to the area hospital. Route to the area hospital will be posted and easily visible at all times.

10.6 Emergency Alarms/Notifications and Procedures

When any emergency occurs on-site the SSHO and Project Superintendent will be notified immediately. The Project Superintendent or the SSHO will notify Chemours. Please refer to the ***Table 9 – "Emergency Telephone Numbers"*** for emergency telephones. Emergency Telephone numbers and the Emergency Call Tree will be posted and easily visible at all times.

To notify any site workers of an emergency, workers can be signaled by way of hand held or mobile two-way radios or as a backup, the use of an emergency alarm (portable air horn). Any audible pattern of blasts from a portable air horn becomes difficult to interpret due to distance and the inhibitory effects of a respirator.

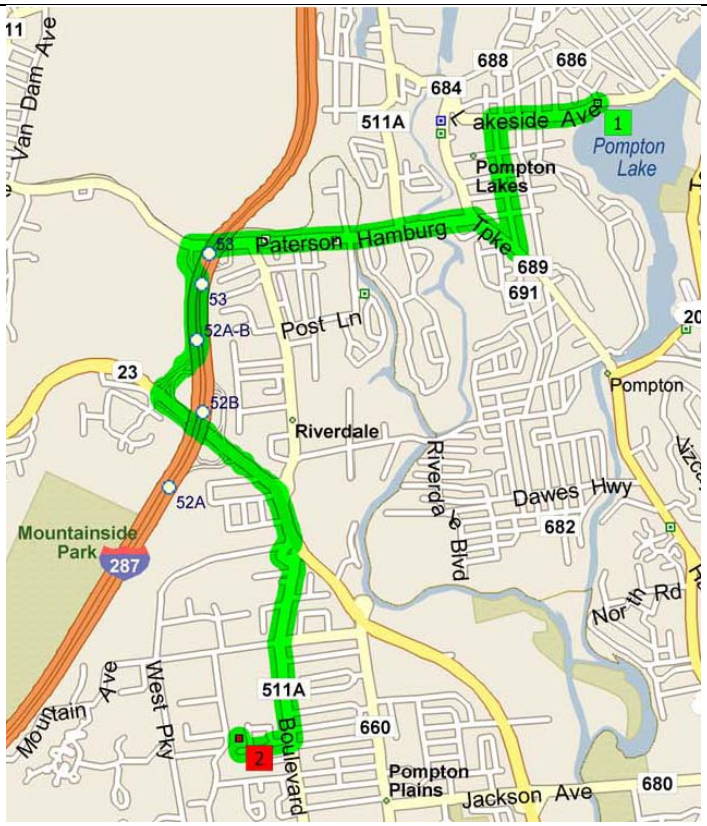
All emergency communications will flow through the radio network. Outside emergency services will be notified, as necessary. The site evacuation alarm consists of one long blast on a horn, every 10 seconds. Any time the alarm system is activated; on site personnel will be notified immediately. Personnel will extinguish any nearby ignition source and prepare for emergency response activities. This alarm will also be used to alert personnel of a sudden release of hazardous materials.

The observer of the emergency condition will brief the responding personnel as to the nature and location of the incident. When they have assessed the situation, a decision whether or not to implement these procedures will be made. If these Emergency Contingency Procedures are not implemented, supervisory personnel will give the “All Clear” verbally. The "All Clear" will be used to indicate a return to normal (non-emergency) conditions following emergency response activities. The alarm signals will be prominently posted at the site. The audible alarm system will be discussed with each resident within hearing range of the alarm system.

In the event of an emergency rescue while working on the water develops the highest level supervisor working on the water will be responsible for determining what immediate actions need to take place. This person shall be responsible for identifying the emergency, direct personnel in rescue or evacuation operations, summons first aid or medical assistance, coordinate movement of injured personnel with medical responders, and assist local emergency personnel as necessary. Evacuation and rescue procedures shall be developed as part of the SPA for the work to be performed on or over water.

Rally points for the various work areas shall be identified by the SSHO and Superintendent during mobilization and as Site conditions change throughout the project. Rally points shall be designated on maps and shall be distributed throughout the Site in office/break trailers, designated entry and exit points for exclusion zones, and the employee bulletin boards. Rally point locations shall be discussed as necessary at morning safety meetings when changes in locations or travel paths are made and at all pre-job briefings for new tasks.

Figure 3
Route to Hospital Map



Directions from Site to Chilton Memorial Hospital 4.5 miles ~ 10 minutes

Mile	Instruction	For	Toward
0.0	**Depart near Pompton Lakes on Lakeside Ave (West)**	**0.4 mi**	
0.4	Turn LEFT (South) onto CR-691 [Ramapo Ave]	0.5 mi	
0.9	Turn RIGHT (North-West) onto CR-689 [Paterson Hamburg Tpke]	0.5 mi	
1.4	Road name changes to Paterson Hamburg Tpke	0.8 mi	
2.1	Take Ramp (LEFT) onto I-287	0.4 mi	I-287 / RT-23
2.5	At exit 52A-B, turn RIGHT onto Ramp	0.1 mi	RT-23 / Riverdale / Wayne / Butler
2.6	Take Ramp (LEFT) onto SR-23	0.9 mi	RT-23 / Riverdale / Wayne
3.5	Keep RIGHT onto Local road(s)	109 yds	
3.5	Bear LEFT (South) onto Local road(s)	120 yds	
3.6	Bear RIGHT (South-East) onto Local road(s)	65 yds	
3.6	Bear RIGHT (South) onto CR-511A [Boulevard]	0.7 mi	
4.3	Turn RIGHT (West) onto Francisco Dr	0.2 mi	
4.5	Turn RIGHT (North) onto Local road(s)	87 yds	
4.5	**Arrive 07444**		

Table 9 – Emergency Telephone List	
Pompton Lakes Police Dept	911
Pompton Lakes Fire Dept & EMS	911
Ambulance (Pompton Lakes Rescue Squad)	911
Plant Security	973-835-1300
Division of Fish and Wildlife's Endangered and Nongame Species Program Venomous Snake Response Team (VSRT)	*Monday–Friday (8:30 am–4:30 pm)* Northern Region Office: 908-735-8975, 735-9281 or 735-2931 *After hours, weekends, or when unable to contact a biologist at one of the telephone numbers above:* 1-877-WARN-DEP
Hospital – Chilton Memorial Hospital 97 West Parkway Pompton Plaines, New Jersey	973-831-5000
Clinic – Clinton Occupational Health 242 West Parkway Pompton Lakes, New Jersey	973-831-5116
Dr. Greaney – Occupational Medicine (Work Care)	714-456-2154
WorkCare Injury Intervention	888-449-7787
Sevenson Environmental Services, Inc.	
Paul Jung - Safety and Health Manager	716-284-0431, 716-609-1767 (cell)
Mike Crystal - Program Manager Vice-President	716-284-0431
Mark Schmitt. – Project Manager	716-923-5638 (cell)
TBD- Site Superintendent	TBD (cell)
TBD– Site Health and Safety Officer	TBD
Chemours Contact – David Epps	973-492-7733
David Berg – NJDEP	609-633-1455
Rory Grube – OBG Safety Manager	(973-492-7723, 862-228-4595(cell)
National Response Center	800-424-8802
CHEMTREC	800-424-9300

10.7 Implementation of the Plan

There is a logical sequence of steps to follow in responding to emergencies, which should be followed by site personnel. This sequence involves identifying the emergency, investigating the extent of the emergency, deciding on the proper initial course of action, taking corrective action to rectify the situation, and following up with a post-emergency investigation.

Equipment breakdowns, power failures, injuries, and natural disasters are usually rather dramatic and will capture the individual's attention immediately upon occurrence. In other cases, the individual may have prior warning of impending emergencies through weather reports in the case of natural disasters and trends in equipment performance in the case of some breakdowns.

Some emergency situations exist long before the operator is aware that an emergency exists. These cases may produce situations, which then become immediate and obvious. For example, unattended equipment may have minor breakdowns which go unnoticed; further operation thus leading to complete breakdown of the equipment resulting in possible injury to the unwary bystander.

In the event of a fire, explosion, accidental material release, or any other emergency, response activities will be initiated following the evaluation of the event. An assessment of the situation will be performed by the SSHO immediately upon notification. The Superintendent/SSHO is authorized to commit resources to the extent detailed in this plan. If it is determined that an emergency situation exists, he will then implement the appropriate emergency response activities.

In the event that a medical emergency or accident occurs in the Exclusion Zone, all personnel responding to the emergency should be outfitted in the Personal Protective Equipment appropriate for the situation. As a general rule, personnel should not enter the Exclusion Zone without donning the minimal level of PPE required. In the event that a worker is overcome or disabled for an unknown reason, the Superintendent/SSHO must make a determination as to the level of respiratory protection, which is appropriate. Specifically, a determination must be made as to whether Supplied Air Respirators are necessary for the protection of the responders.

10.7.1 Conditions for Implementation

The contingency plan will be activated by the Superintendent/SSHO immediately in the event of a fire or explosion, or emissions of toxic chemicals in excess of limits set forth by Federal, State, and local agencies. In the event of a spill or material release, it will be up to the Superintendent/SSHO to make a determination as to when emergency conditions exist, as opposed to routine maintenance of the site. His determination will depend upon the location of the spill, the size of the spill, weather conditions and the proximity of the release to workers, the community and environmental receptors.

Once it becomes apparent that an emergency situation exists or that a disaster is impending, the Project Superintendent or his designee should immediately be notified and an immediate investigation conducted. Assessment of the emergency should include assessing the severity of the situation and collecting enough information to make an initial action decision.

Assessing the emergency should include identifying injured persons (if any), damage to buildings and equipment, noting potential impending damage if corrective action is not taken immediately, and itemizing resources required to correct the situation.

10.7.1.1 Fire or Explosion

Although the potential for fire or explosion is minimal, sources of risk do exist. These sources include welding gases, gasoline for portable equipment, diesel fuel for the heavy equipment and combustible debris. In the event of an explosion, possible emergency conditions would exist. Unless extinguished immediately, a fire or explosion will trigger implementation of these procedures.

10.7.1.2 Material Spills

Material Spills could occur during truck loading and from vehicle accidents. Additionally, equipment fueling operations could produce spills. Ultimately, a spill could contaminate receiving surface water or cause a release of vapors to the air. A spill of fuel could also ignite. A small spill should be cleaned up immediately, but should not trigger activation of these procedures. Should an onsite spill occur, the immediate response will include closing off the source of the spill, if possible, application of the sorbent material or sand bagging, and street sweeping, as appropriate. Any spill that results in a discharge to offsite surface water will be contained with sorbent booms as needed. All spills will be investigated and reported to the Chemours Site Representative, and a written report will be provided to the regulatory agencies in accordance with applicable regulations.

10.7.1.3 Severe Weather

In the event of severe weather, the Site Superintendent and/or the SSHO have the authority to stop operations and direct evacuation procedures, if conditions warrant. All equipment will be secured and grounded. After the storm, a visual inspection will be performed by the Superintendent and/or the SSHO to check for damage and hazards. These will be performed before any work is resumed. If damage or hazards are noted, the designated or other Sevenson personnel will evaluate the conditions and implement corrective actions to repair the damage or eliminate the hazard. These actions will begin as soon as possible and will take precedence over other site activities.

10.7.2 Initial Action

Once the extent of the emergency is known, the Superintendent and the SSHO will make an immediate decision as to what initial steps should be taken to remedy the emergency situation. This first action, in the case of large-scale emergencies, usually consists of notifying responsible authorities and/or calling for the necessary assistance in order of priority.

The individual(s) should not unduly endanger him or herself or others by attempting tasks for which the proper equipment is not available or with which he or she is unfamiliar. In all cases, if in doubt, wait until qualified help arrives before taking action.

10.7.3 Corrective Action

When help arrives, the site superintendent/SSHO should immediately inform those called of the pertinent details of the situation. Corrective action should be continued until the situation is either under control or completely rectified. If corrective actions will take considerable time, a long-term effort to complete the task should be developed.

10.7.4 Follow-Through

After the situation is corrected, the cause of the emergency event is to be determined and review of the corrective actions taken, etc. In the case of equipment failure, if negligence was not a factor, then revising maintenance procedures would be the most likely first preventive step. For natural disasters that cannot be prevented from recurring, the procedures followed in dealing with them can be reviewed to develop more effective action plans. The entire event, along with all of the responses, will be thoroughly documented for review by management and project supervisory personnel.

10.8 Spill Response and Control Plan

The purpose of this section is to define practices and procedures for the prevention, containment, and cleanup of accidental discharges of hazardous substances during the project. These substances include both the contaminated material encountered as a result of the construction project, such as contaminated soils and decontamination liquids, and construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc.

Spill prevention applies to all types of spills and can be described as the first and simplest approach to spill control. Human error is a major contributing factor to spills and releases. An awareness of spill consequences, preventive measures, and countermeasures will greatly reduce spill occurrences. A sound prevention program includes careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, proper containment and cleanup procedures must then be followed in order to reduce the effect of the spill.

All site vehicles including barges and skiffs shall have a spill kit. These spill kits shall be appropriate for the size of the vehicle and should act as a first response kit until supplemental spill supplies can be retrieved from larger spill kits staged around the site. All fuel/oil storage and transfer stations shall be

equipped with large spill kits. A map shall be developed to identify spill kit locations and shall be updated as necessary to reflect current site conditions and locations.

10.8.1 Prevention

Prevention of unnecessary spills is of first priority. Prevention measures include:

- When fueling equipment the fuel hose must be attended at all times. The fueling nozzle shall be equipped with an auto shut off mechanism to prevent overfilling the tank. The filling nozzle shall not be held open by tools, blocks, or locks.
- Bulk fuel storage areas will be equipped with dual containment or be placed inside a secondary containment structure.
- Operators and drivers will exercise extreme caution when transporting material around the site.
- When removing hoses from machines an appropriate and adequate supply of absorbents will be on hand. A supply of the following absorbents will be kept on-site, oil sorbent booms, rolls and pillows, universal towels and sheets, and vermiculite.
- Hoses will be capped when not connected to their appropriate fitting.
- All containers will be inspected daily for decay. No open container will be exposed to rainfall, snowfall, etc. without being emptied and cleaned of residue.
- All equipment will be inspected for leaks before and after service.
- Storage of material such as fuels, oils, and solvents on-site will be limited to the minimum required. All fluids will be stored in individual fluid containers appropriate and approved for the material. Most of the individual fluids containers will be further secured by storage in large, locked tool and equipment storage containers. Drums or other containers too large to be stored in containers will be stored raised off the ground on a liner and covered by plastic.

10.8.2 Reporting

All spills will be reported immediately to appropriate field and office management personnel. The sequence of reporting will be as follows:

- Notification by workers to the Project Superintendent or SSHO.
- The Project Superintendent or SSHO will immediately notify Chemours regardless of the size of the spill.
- Sevenson and Chemours will jointly determine the nature of the spill, its size, direction of travel, if anyone has been injured as a result of the spill and whether it requires immediate notification to regulatory agencies.
- Chemours will have primary responsibility for notifying the regulatory agencies. Sevenson will have follow-up responsibility to verify that the notification is made in a timely manner. A full list of emergency contacts and telephone numbers is included this plan. This list includes Sevenson personnel, as well as federal, state and local authorities. This list will be posted in all trailers on-site.

Upon notification of a spill, all project activity will be immediately suspended and all necessary equipment and personnel will be diverted to spill control and containment. In the event of a spill, and regardless of the size, a Spill Incident Report will be submitted to Chemours within 48 hours of the incident. Sevenson shall not submit any documentation to any agency without the written direction of Chemours.

10.8.3 Spill Response Equipment

Given the nature of this project, all the necessary equipment and personnel necessary to deal with a release of hazardous substances will be available on site. In addition to the heavy equipment and personal protective equipment, which is critical to spill control, Sevenson will have on hand an ample amount of sorbent materials, UN1A2 open top drums and overpacks.

10.8.4 Confinement and Containment

Prior to entering a spill area, all workers must be protected from any adverse effects of the spilled material. No one will enter any spill area alone. The SSHO will determine the level of protection required for response activities. To the extent practicable, the area will immediately be cordoned off and, if appropriate, exclusion, contamination reduction, and support zones will be established.

The decision to use confinement techniques such as diversion, diking and retention, are generally based on time, personnel, equipment, and supplies. As mentioned above, all necessary resources will be available on-site at all times. To the extent the nature of the material is known, the decision should be made based upon a review of the harmful effects of the material. In the event of a large migrating spill, an unlikely circumstance, diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, will be implemented first. Subsequently, diking techniques, such as using material such as sand covered with liner material (PVC, hypalon) should be implemented.

10.8.5 Cleanup

Once a spill has been contained and the source of the spill corrected and controlled, cleanup can begin. Spill cleanup can proceed at the same time as containment if feasible. Supervisory personnel will determine the appropriate cleanup methods. The SSHO will determine the appropriate level of protection depending upon the nature of the material.

- The first action will be to absorb free liquids with absorbent pads, booms, pillows, or clay. The absorbent material will be placed in drums and moved to an appropriate storage location. Subsequent to the removal of free liquids, soil believed to be contaminated will be excavated and containerized in drums or stockpiled on poly sheeting and covered for further testing.
- Dry spills, while posing less of a risk of migration, will still require appropriate and immediate action. The nature of the spilled material will be ascertained. The spilled material will be recovered for reuse if appropriate. Material which cannot be recovered, and residual contaminated soil will be shoveled into 55-gallon drums, placed in the drum storage area, and sampled and analyzed for waste characterization and disposal.
- Once containerized, Sevenson will provide for the appropriate sampling and analysis for waste characterization and disposal facility acceptance. Results of waste characterization analysis, waste profiles, and manifests will be provided to Chemours for review.
- All spilled material and visually contaminated soil will be excavated and containerized in the initial spill response. If there appears to be a possibility that contaminants have migrated into the surrounding soil, post-construction sampling will be initiated. Soil samples will be taken from the areas of suspected contamination and analyzed for the compounds, which were released.

Personnel Decontamination - In general, all spill response operations will be performed in accordance with the provisions of the approved HASP.

10.9 Report/Review

A Chemours Unexpected Occurrence Report will be prepared and submitted to Chemours in accordance with the Chemours Unexpected Occurrence procedure once the situation has been stabilized. In addition, all key personnel will have a meeting within two working days of the incident

to discuss and critique all of the aspects of the Emergency Contingency Plan according to new site conditions and lessons learned.

11.0 Inspection and Reporting

11.1 Safety and Health Inspections

Safety and Health inspections will be conducted to discover, through specific, methodical auditing, checking, or inspection procedures, conditions and work practice that lead to job accidents and illnesses.

The Health and Safety Manager shall be responsible for ensuring that inspections are conducted at the frequency stated, reviewing the Daily Safety and Inspection Logs for completeness, thoroughness, and trends; performing monthly project inspections; and training site personnel on proper inspection techniques. The SSHO shall be responsible for ensuring that daily inspections are conducted, reviewing the inspections findings and corrective actions for applicability and thoroughness, and providing the site management personnel with a summary of inspection findings each month.

11.2 Daily Safety and Inspections Log

The SSHO will insure that all aspects of the HASP are complied with on a daily basis. Only one warning will be given to individuals not complying with the HASP. If deficiencies are noted, they will be recorded on the Daily Safety and Inspection Log and will be corrected immediately. The Daily Safety and Inspection Log will be attached to the Daily Quality Control Report. The Daily Safety and Inspection Log will include the date, work area, employees present at the work area, PPE and work equipment in each area, specific safety and health issues, and notes and the signature of the preparer. Refer to ***Attachment 2 – Safety and Health Forms for the Daily Safety and Inspection Log.***

11.3 Certification of Worker/Visitor Acknowledgment

A Certification of Worker/Visitor Acknowledgment will be submitted to Chemours prior to initial entry onto the Site. The certification/acknowledgment will include both formal, field and site-specific training received, personal protective equipment supplied and trained in use, and medical certification. Certificates and Medical certification will be kept on file at the site. Refer to ***Attachment 2 – Safety and Health Forms for the Certificate of Worker/Visitor Acknowledgement.***

11.4 Incident Reports

Incident reporting will ensure an immediate report on all incident/accidents and provide an effective follow-up for corrective action in order to eliminate unsafe practices and unsafe conditions. An **Incident/Accident Form** must be completed within 24 hours of the Incident/Accident. This report is utilized in the event of injuries, off-site releases, utility breaks, or accidents. Immediately following the incident/accident, the Site Superintendent and the SSHO will initiate an Incident/Accident Investigation. An Accident Report will be completed and submitted to Chemours within two working days. ***Refer to Attachment 2 – Safety and Health Forms for the Incident/Accident Form.***

"Near misses" will be documented by the SSHO and discussed at the morning safety briefings to educate the work force to potentially hazardous operations or practices.

11.5 Daily Air Monitoring Report

The Daily Air Monitoring Report will be prepared by the SSHO. The Report will include all air monitoring data collected including real-time monitoring, personal monitoring within the Exclusion Zone, and perimeter monitoring. **Refer to *Attachment 2 – Safety and Health Forms for the Daily Air Monitoring Report***

11.6 Weekly Safety Meeting/Daily Tool Box Talks

As part of Sevenson's Corporate Health and Safety Program, a Weekly Safety Meeting is conducted on Monday mornings in conjunction with Daily Toolbox Talks. This safety meeting outlines current industry safety issues and allows for discussion of job-specific issues. In addition, a daily site briefing will be held to discuss current work activities and hazards for the day along with the air monitoring results from the previous day. The SSHO/Superintendent will conduct Daily Tool Box Talks and Weekly Safety Meetings with ALL on-site personnel Refer to ***Attachment 2 – Safety and Health Forms for Daily Toolbox Talks and Weekly Safety Meetings.***

In addition to the daily toolbox talks and the weekly safety meeting, Sevenson will conduct monthly project management safety meetings. All site management, including sub-contractor personnel, are required to attend. Topics of discussion will include hazards identified and abated during the previous month, any outstanding action, new tasks to be performed, site concerns etc. 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.

11.7 Monthly Exposure Report

A Monthly Exposure Report will be prepared by the Safety and Health Manager and submitted to Chemours. This report will include a compilation of man-hours worked each month for the project (both Sevenson and subcontractors), the number of accidents, severity, class of accident, and lost time for each month.

11.8 Safe Plan of Action

Prior to the start of the job, an activity hazard analysis will be performed by the Health and Safety Department or SSHO. The health and safety hazards for each operation will be noted, then the appropriate control(s) for each hazard will be recommended. Prior to the start of any operation, the tasks, possible hazards, and their associated control techniques will be discussed with the affected employees through the Safe Plan of Action Program.

Safe Plan of Action Program

As part of Sevenson's Activity Hazard Analysis program a daily Safe Plan of Action or SPA is to be completed for job tasks assigned during the day. This program is to supplement, not replace the Activity Hazard Analysis already prepared prior to work assignments. The SPA is to be completed by the supervisor assigning the work and the personnel who are to perform the work. The Activity Hazard Analysis may be used as a generic templet to complete the SPA but should not be the SPA. The expectation of the SPA is for the worker and supervisor to identify each specific hazard present, determine how to minimize the hazard, resources required to minimize the hazard, and where to find those resources.

Example, the Activity Hazard Analysis identifies pinch points as a hazard associated with the job task. The supervisor and worker(s) will evaluate the work area and identify the pinch point such as drill being used near an object where the torque on the drill could cause pressure to place on the fingers or hand between the drill and the object.

Once all specific hazards have been identified and written on the SPA form a pre job briefing can occur to ensure all affected personnel understand the hazards present. The SPA may be modified at any time during the day as new hazards develop. Refer to ***Attachment 2 –Safe Plan of Action form***

11.9 Job Safety Enhancement Program (JSEP)

JSEP is a tool used at Sevenson projects to identify behaviors and unsafe work place conditions. These reports are reviewed and discussed by the Project Manager, Site Superintendent, Quality Control

Manager, and the SSHO to determine if corrective actions are required. Each report is recorded on a tracking matrix to ensure the report has been reviewed, responsible person for corrections properly closed out and discussed with the affected site personnel. Sevenson encourages all personnel involved in a project to complete a JSEP Form. Refer to ***Attachment 2 –JSEP Form.***

Attachment 1
Activity Hazard Analysis

SEVENSON ENVIRONMENTAL SERVICES, INC.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Mobilization/Demobilization		

Task	Potential Hazards	Control Measures (include references and specify equipment and/or training requirements)
Mobilization and demobilization of Office Trailers, Dredge System, Desanding System, Solidification System, Wastewater Treatment Plant, Heavy Equipment and Supplies	Slip/Trip/Fall	▪ Work Areas and means of access shall be maintained safe and orderly. ▪ Even terrain will be utilized as unloading areas. ▪ Tripping and poor footing hazards will be repaired as they are discovered or clearly identified. ▪ Fall protection required over 6 feet. ▪ Portable ladders on 1:4 pitch.
	Vehicular Traffic/Problems	▪ Spotters will be used when backing up trucks and moving equipment. ▪ When off loading a boat, never back the vehicle so far into the water that the back tail pipe is under water. ▪ Ensure you have sufficient power to pull the boat out of the water once it is trailered. ▪ A layout/staging plan for deliveries will be established at the site.
	Cold/Heat Stress	▪ Personnel will be instructed in heat stress/cold stress recognition and prevention. ▪ Personnel must notify the SSHO if symptoms of cold/heat stress are perceived in any member of the crew, including self. ▪ Cold/Heat stress management will be conducted in accordance with Sevenson Cold/Heat stress program (Temperature Extremes). ▪ Work/rest regimes and personnel monitoring for workers will be instituted per the SSHO based on ambient conditions and condition of personnel. ▪ Air temperature and humidity and wind will be monitored. ▪ Drinking liquids will be available and used for rehydration during breaks. ▪ Work will be conducted during warmer/cooler hours of the day, if possible.
	Back Injuries	▪ Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting. ▪ Mechanical devices will be utilized when possible to reduce manual handling of materials. ▪ Team lifting will be used when mechanical devices.are not appropriate for use.
	Dropped Objects	▪ Steel toe boots with metatarsal guards meeting ANSI Standard Z-41 will be worn. ▪ Secure all radios, cell phones and equipment. ▪ Tools and parts will be lifted or carried, not tossed. ▪ All rigging (slings, cables, chokers, etc.) will be inspected prior to use. ▪ Engineered lifting lugs or appropriate slings shall be used for lifting.
	Overhead Hazards	▪ Personnel will wear hard hats that meet ANSI Standard Z-89.1. ▪ All ground personnel will stay clear of suspended loads. Work areas will be barricaded and/or posted showing the limits of overhead hazards. ▪ All overhead hazards will be identified prior to commencing work operations. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling objects.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Mobilization/Demobilization		

	Noise	▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers.
	Eye Injury	▪ Safety glasses with side shields that meet ANSI Standard Z-87 will be worn. ▪ Eye protection with the appropriate shade will be worn during welding and cutting operations. ▪ Face shields shall be worn during power washing.
	Struck By/Against	▪ Personnel will understand and review hand signals. ▪ All personnel will wear ANSI type II high visibility vests. ▪ Personnel will keep out of the swing radius of heavy equipment. The swing radius will be barricaded or delineated as appropriate. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Eye contact with operators will be made before approaching equipment. ▪ Caution will be used offloading dredge or boat from the trailer-clear the area of all non-essential personnel. ▪ Ensure there is sufficient room to drive through when trailering the boat on narrow streets. ▪ All machines will be equipped with working backup alarms adequate for the background noise. ▪ Tag lines will be used to help control suspended loads. ▪ Workers will be made aware of potential pinch points during offloading and assembly of equipment (bolting flanges, process piping, etc) and keep hands free from potential pinch points.
	Electrical	▪ All electrical tools and equipment will be equipped with GFCI. ▪ Electrical cords will not be laid across roads where vehicular traffic may damage the cord. ▪ All extension cords will have a three blade-grounding plug. ▪ All electrical work and repairs will be conducted by a licensed electrician. ▪ All equipment will stay a minimum of 20 feet from overhead energized electrical lines (50kV or less). The distance will increase 4 feet for each additional 10kV above 50kV ▪ Perform Lockout/Tagout procedures. ▪ Heat plate for HDPE fusion welders will be placed in secure holders when not in use.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Mobilization/Demobilization		

Task	Potential Hazards	Control Measures (Include references and specify equipment and/or training requirements)
Dredge and Boat (Watercraft) Movement	Falling Overboard and/or Stranding	▪ Slips trips and falls while offloading dredge and barge at water. ▪ All persons on board will remain seated, except when working. ▪ All personnel shall wear United States Coast Guard (USCG) Approved Type I or II Life Preservers at all times while on the water. ▪ Non-slip surfaces will be provided on all working decks, stair treads, ship ladders, platforms, catwalks, and walkways. ▪ All means of boat access shall be properly secured, guarded, and maintained free of slipping and tripping hazards. ▪ A Coast Guard approved Type IV flotation device (life ring) will be maintained on each dredge/boat ▪ Maximum weight capacity for watercraft will not be exceeded. ▪ Dredges will be equipped with perimeter guardrails. ▪ Watercraft will not be operated without a minimum of two personnel on board. ▪ Watercraft will not be used without shore support personnel. ▪ Personnel on board watercraft must be in constant radio contact with shore personnel.
	Water Craft Operation	▪ All dredge and boat pilots shall be familiar with the “Rules of the Road” that regulate movement of boat traffic. ▪ Watercraft will be operated only by those personnel who have successfully completed the required boating safety course. ▪ Locations of rocks, ledges and manmade surface obstructions will be noted within the work area. ▪ All watercraft must have required Coast Guard approved lighting and signaling devices.
	Sinking Boat/Dredge Damage	▪ The load ratings of dredges/boats will be strictly adhered to; overloading of vessels is prohibited. ▪ Oil absorbent booms will be kept on board in the event of a spill. No unnecessary fuel cans will be onboard.
	Struck By/Against	▪ Personnel will understand and review hand signals. ▪ Watch for other boats in area, avoid close calls or collisions. ▪ Watch for wake from other boats. ▪ Ensure the air horn on each boat used is in proper work order.
	Severe Weather	▪ National weather forecasts will be monitored daily for predicted inclement weather. The field he area, work will cease at the direction of Sevenson’s Supervisor or SSHO, and will not proceed further until return to work permit is issued. ▪ All office trailers will be securely anchored.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Mobilization/Demobilization		

		▪ All personnel shall be aware of the forecast and keep an "eye to the sky." Unforecasted storms may also occur without warning. ▪ Work will be postponed in the event of strong winds, high seas, or at times of very poor visibility. ▪ In the event of lightning in the area, work will cease at the direction of Sevenson's Supervisor or SSHO, and will not proceed further until return to work is issued.

Equipment To Be Used	Inspection Requirements	Training Requirements
Dredge Railing Systems	▪ Daily inspections will be conducted unless damage is suspected	▪ Personnel will be informed of the rail systems requirements.
Dredge	▪ Daily inspection checklist thereafter.	▪ Personnel will be trained in inspection checklist use.
Fire Extinguishers	▪ Monthly inspections will be performed.	▪ Personnel will be given instructions on proper use of fire extinguishers.
Spill Control materials	▪ Daily Safety inspection of spill control materials will be conducted.	▪ Personnel will be given training on how to respond to spilled materials.
Dredge Deck/Working Surfaces	▪ Daily inspections for oil/grease buildup will be conducted	▪ Requirements for house keeping will be reviewed
Tender Boat Engines	▪ Daily maintenance (fueling, oil, grease) will be conducted.	▪ Operators/pilots will be trained in engine maintenance.
Lighting/Signaling Systems	▪ Daily inspections will be made.	▪ Operators will be trained in proper use of these safety systems.
Tender Boats and Skiffs	▪ Initial review/training prior to commencement of field activities.	▪ Operators will be familiar with Coast Guard regulations for intercoastal watercraft.
35-50 Ton Cherry Picker, 8,000 lb Lull All Terrain Forklift, Pickup Trucks, Backhoe, Dozer, Loader	▪ Inspections will be performed on equipment prior to each use. ▪ Load and capacity calculations done prior to lift ▪ Daily crane inspections ▪ Pre-lift checklist	▪ Qualified operators will be used for equipment operation. ▪ Document calculations, inspections and checklist.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Maintenance and Repair of Dredging Equipment	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Tasks	Potential Hazards	Control Measures
Maintenance and repair of: Hydraulic dredge augur Diesel engine Booster pumps Dredge travel control system Barge lights and navigational lights on floating pipeline	Slip/Trip/Fall	▪ Work Areas and means of access shall be maintained safe and orderly. ▪ Tripping and poor footing hazards will be repaired as they are discovered or clearly identified. ▪ Fall protection will be used when working at unprotected heights greater than 6'. ▪ Standard railings will be installed on all process equipment decks greater than 4'.
	Vehicular Traffic/Problems	▪ Spotters will be used when backing up trucks and moving equipment. ▪ Heavy equipment will be equipped with back-up alarms. ▪ When work areas impact vehicle ways, traffic control markings and/or a flagman will be used.
	Inclement Weather	▪ Personnel will be instructed in heat stress/cold stress recognition and prevention. ▪ Personnel must notify the SSHO if symptoms of cold/heat stress are perceived in any member of the crew, including self. ▪ Cold/Heat stress management will be conducted in accordance with Sevenson Cold/Heat stress program (Temperature Extremes). ▪ Work/rest regimes and personnel monitoring for workers will be instituted per the SSHO based on ambient conditions and condition of personnel. ▪ Air temperature, humidity and wind will be monitored; controls will be implemented per ACGIH guidelines as necessary. ▪ Drinking liquids will be available and used for rehydration during breaks. ▪ Work will be conducted during warmer/cooler hours of the day, if necessary and feasible. ▪ Hoisting activities will be suspended during the following weather conditions: Sustained winds at or above 25 mph, freezing rain, lightning.
	Back Injuries	▪ Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting. ▪ Mechanical devices will be utilized when possible to reduce manual handling of materials. ▪ Team lifting will be used when mechanical devices are not appropriate for use. ▪ Proper paths of travel will be noted and followed during manual material handling.
	Dropped Objects	▪ Steel toe boots meeting ANSI Standard Z-41 will be worn. ▪ Hard hats meeting ANSI Standard Z-89 will be worn by all personnel in the work area. ▪ All radios, cell phones and equipment will be secured. ▪ Tools and parts will be lifted or carried, not tossed ▪ Personnel will not climb ladders while carrying equipment in hand..
	Overhead Hazards	▪ All overhead hazards will be identified prior to commencing work operations. ▪ Personnel will wear hard hats that meet ANSI Standard Z-89.1.
	Noise	▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Maintenance and Repair of Dredging Equipment	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Tasks	Potential Hazards	Control Measures
	Eye/Face Injury	▪ Safety glasses with side shields meeting ANSI Standard Z-87 will be worn. ▪ Faceshields will be worn over safety glasses during grinding, wire wheel work or other activities posing face hazards. ▪ Proper guards will be used on all equipment such as grinders, cut-off wheels and saws.
	Struck By/Against	▪ Personnel will understand and review hand signals. ▪ All personnel will wear ANSI type II high visibility vests. ▪ Workers will be made aware of potential pinch-points during repair and maintenance of equipment (bolting flanges, process piping, etc) and keep hands free from potential pinch points. ▪ Proper lockout procedures will be followed when personnel are required to work on mechanical equipment. Equipment will be reduced to a zero energy state prior to workers removing guards, entering or placing bodies within areas of operation. ▪ When necessary, equipment will be blocked, chocked or supported to prevent movement while workers are in danger areas.
	Electrical	▪ All electrical tools and equipment will be equipped with GFCI ▪ All Electrical work will be done by licensed electricians ▪ Electrical equipment will be properly locked out during equipment installation and connection. ▪ Each worker involved in lockout will have his or her own uniquely keyed lock installed on the lockout device. ▪ Equipment will not be energized until it has been verified that all connections are properly secured and all personnel have removed their own locks from the lockout device. ▪ Tags will not be used in lieu of lockout devices. ▪ Electrical cords will not be laid across roads where vehicular traffic may damage the cord. ▪ All extension cords will have a three blade-grounding plug, all outlets will accommodate a 3-prong plug. ▪ Portable generators will placed on solid ground prior to starting, generators will not be run from the back of trucks unless properly grounded.
	Hot work/fire	▪ All flammable and combustible liquids will be stored in appropriate metal containers with self closing lids. ▪ Fire extinguishers will be made available. ▪ Internal hot work permits will be issued by the SSHO. ▪ A fire watch will remain in the vicinity during hot work and for at least 30 minutes after hot work has been completed. ▪ Flammables will remain at least 50’ away from hot work activities, combustibles at least 35’. ▪ Fire extinguishers will be inspected at least monthly and re-certified annually. ▪ Hot work will not occur in confined spaces without SSHO approval. ▪ Proper flammable storage areas will be utilized as necessary.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Maintenance and Repair of Dredging Equipment	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Tasks	Potential Hazards	Control Measures
	Spills	▪ Secondary containment will be utilized for all fuel/chemical storage areas. ▪ Appropriate spill kits will be available; consideration will be taken for spills on water. ▪ All spills will be reported to the SSHO or appropriate designee. Verification will be made that spill volume does not exceed reportable quantities. ▪ Spills will be promptly controlled, contained and cleaned. Contaminated materials will be properly containerized and labeled while awaiting disposal. ▪ Disposal will be in accordance with appropriate local, state and federal regulations.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Maintenance and Repair of Dredging Equipment	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Task	Potential Hazards	Control Measures
	Falling Overboard and/or Stranding	▪ All persons on board will remain seated, except when working. ▪ All personnel shall wear United States Coast Guard (USCG) Approved Personal Flotation Devices. ▪ Non slip surfaces will be provided on all working decks, stair treads, ship ladders, platforms, catwalks, and walkways. ▪ All means of boat access shall be properly secured, guarded, and maintained free of slipping and tripping hazards. ▪ An adequate number of throw rings will be maintained on each watercraft. All throw rings will be U.S. Coast Guard approved. ▪ Maximum weight capacity for watercraft will not be exceeded. ▪ Dredges and barges will be equipped with perimeter guardrails. ▪ Watercraft will not be used without shore support personnel. ▪ Personnel on board watercraft must be in radio contact with shore personnel. ▪ All personnel working on watercraft will be trained in man overboard emergencies. Drills will be conducted to verify personnel are aware of their responsibilities.
	Water Craft Operation	▪ All dredge and boat pilots shall be familiar with the "Rules of the Road" that regulate movement of boat traffic in the river. ▪ Watercraft will be operated only by those personnel who have successfully completed the required boating safety course. ▪ All boating regulations will be strictly observed. ▪ All watercraft must have required Coast Guard approved lighting and signaling devices.
	Sinking Boat/Dredge Damage	▪ The load ratings of dredges/boats will be strictly adhered to; overloading of vessels is prohibited. ▪ Oil absorbent booms will be kept on board in the event of a spill. No unnecessary fuel cans will be onboard.
	Severe Weather	▪ National weather forecasts will be monitored daily for predicted inclement weather. The field investigations lead will call for local conditions and forecast each morning. ▪ All personnel shall be aware of the forecast and keep an "eye to the sky." ▪ Work will be postponed and dredge secured in the event of strong winds, high seas, or at times of very poor visibility. ▪ In the event of lightning in the area, work will cease at the direction of Sevenson's Supervisor or SHSO, and will not proceed further until return to work permit is issued.
	Medical Emergencies	▪ Medical emergencies will be handled as onshore ▪ Emergency skiff will be available for transport

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Maintenance and Repair of Dredging Equipment	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Equipment To Be Used	Inspection Requirements	Training Requirements
Dredge Railing Systems	▪ Daily inspections will be conducted unless damage is suspected	▪ Personnel will be informed of the rail systems requirements.
Dredge	▪ Initial inspection by a Registered Marine Surveyor. ▪ Daily inspection checklist thereafter.	▪ Personnel will be trained in inspection checklist use.
Spill Control materials	▪ Daily Safety inspection of spill control materials will be conducted.	▪ Personnel will be given training on how to respond to spilled materials.
Dredge Deck/Working Surfaces	▪ Daily inspections for oil/grease buildup will be conducted	▪ Requirements for house keeping will be reviewed
Tender Boat Engines	▪ Daily maintenance (fueling, oil, grease) will be conducted.	▪ Operators/pilots will be trained in engine maintenance.
Lighting/Signaling Sys.	▪ Daily inspections will be made.	▪ Operators will be trained in proper use of these safety systems.
Tender Boats and Skiffs	▪ Initial review/training prior to commencement of field activities.	▪ Operators will be familiar with Coast Guard regulations for inter-coastal watercraft. ▪ Personnel will have successfully completed the boating safety course.
Fire Extinguishers	▪ Monthly inspections will be performed. ▪ Annual re-certification will be performed.	▪ Personnel will be given instructions on proper use of fire extinguishers.
Rigging	▪ Daily inspections for all rigging. Hoisting chains must have a documented inspection at least annually	▪ Personnel will be trained in proper rigging techniques and rigging inspection protocol

SEVENSON ENVIRONMENTAL SERVICES, INC.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Upland Soil Excavation		

Task	Potential Hazards	Control Measures
Access Road Construction Excavation using long stick excavator Stockpile excavated soil Load soil into MOXY Transport to processing area Treat soil Transport to loading pad Off-site disposal	Slip/Trip/Fall	▪ Work Areas and means of access shall be maintained safe and orderly. ▪ Even terrain will be utilized as unloading areas. ▪ Tripping and poor footing hazards will be repaired as they are discovered or clearly identified. ▪ Three points of contact when entering/exiting equipment
	Vehicular Traffic/Problems	▪ Spotters will be used when backing up trucks and moving equipment.
	Cold/Heat Stress	▪ Personnel will be instructed in heat stress/cold stress recognition and prevention. ▪ Personnel must notify the SSHO if symptoms of cold/heat stress are perceived in any member of the crew, including self. ▪ Cold/Heat stress management will be conducted in accordance with Sevenson Cold/Heat stress program (Temperature Extremes). ▪ Work/rest regimes and personnel monitoring for workers will be instituted per the SSHO based on ambient conditions and condition of personnel. ▪ Air temperature and humidity and wind will be monitored. ▪ Drinking liquids will be available and used for re-hydration during breaks. ▪ Work will be conducted during warmer/cooler hours of the day, if possible.
	Back Injuries	▪ Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting ▪ Mechanical devices will be utilized when possible to reduce manual handling of materials. ▪ Team lifting will be used when mechanical devices are not appropriate for use.
	Dropped Objects	▪ Steel toe boots with metatarsal guards meeting ANSI Standard Z-41 will be worn. ▪ Secure all radios, cell phones and equipment. ▪ Tools and parts will be lifted or carried, not tossed. ▪ All rigging (slings, cables, chokers, etc.) will be inspected prior to use. ▪ Engineered lifting lugs or appropriate slings shall be used for lifting.
	Overhead Hazards	▪ Personnel will wear hard hats that meet ANSI Standard Z-89.1. ▪ All ground personnel will stay clear of suspended loads (steel sheet piles, HDPE pipe). Work areas will be barricaded and/or posted showing the limits of overhead hazards. ▪ All overhead hazards will be identified prior to commencing work operations. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling objects.
	Noise	▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Upland Soil Excavation		

	Eye Injury	▪ Safety glasses with side shields that meet ANSI Standard Z-87 will be worn. ▪ Chemical goggles when working with injection system. ▪ Eye protection with the appropriate shade will be worn during welding and cutting operations.
	Struck By/Against	▪ Personnel will understand and review hand signals. ▪ All personnel will wear ANSI type II high visibility vests. ▪ Personnel will keep out of the swing radius of heavy equipment. The swing radius will be barricaded or delineated as appropriate. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Eye contact with operators will be made before approaching equipment. ▪ All machines will be equipped with working backup alarms adequate for the background noise. ▪ Workers will be made aware of potential pinch points during offloading and assembly of equipment (bolting flanges, process piping, etc) and keep hands free from potential pinch points.
	Electrical	▪ All electrical tools and equipment will be equipped with GFCI. ▪ All Electrical work will be done by licensed electricians. ▪ Electrical cords will not be laid across roads where vehicular traffic may damage the cord. ▪ All extension cords will have a three blade-grounding plug. ▪ All equipment will stay a minimum of 20 feet from overhead, energized electrical lines (50kV or less). The distance will increase 4 feet for each additional 10kV above 50kV.
	Exposure to contaminated material and reagents	▪ Air monitoring to determine proper level of personal protective equipment ▪ Personal decontamination prior to consumption of food, beverage, or tobacco

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Upland Soil Excavation		

Equipment To Be Used	Inspection Requirements	Training Requirements
Fire Extinguishers	▪ Monthly inspections will be performed.	▪ Personnel will be given instructions on proper use of fire extinguishers.
Spill Control Materials	▪ Daily Safety inspection of spill control materials will be conducted.	▪ Personnel will be given training on how to respond to spilled materials.
Long stick excavator; MOXY trucks	▪ Inspections will be performed on equipment prior to each use.	▪ Qualified operators will be used for equipment operation.

SEVENSON ENVIRONMENTAL SERVICES, INC.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Sheet Pile Installation		

Task	Potential Hazards	Control Measures
Unloading sheet pile; installation of upland sheet pile	Slip/Trip/Fall	▪ Work Areas and means of access shall be maintained safe and orderly. ▪ Even terrain will be utilized as unloading areas. ▪ Tripping and poor footing hazards will be repaired as they are discovered or clearly identified.
	Vehicular Traffic/Problems	▪ Spotters will be used when backing up trucks and moving equipment.
	Cold Stress	▪ Personnel will be instructed in cold stress recognition and prevention. ▪ Personnel must notify the SSHO if symptoms of cold/heat stress are perceived in any member of the crew, including self. ▪ Cold stress management will be conducted in accordance with Sevenson Cold/Heat stress program (Temperature Extremes). ▪ Work/rest regimes and personnel monitoring for workers will be instituted per the SSHO based on ambient conditions and condition of personnel. ▪ Air temperature and humidity and wind will be monitored. ▪ Drinking liquids will be available and used for re-hydration during breaks. ▪ Work will be conducted during warmer/cooler hours of the day, if possible.
	Back Injuries	▪ Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting ▪ Mechanical devices will be utilized when possible to reduce manual handling of materials. ▪ Team lifting will be used when mechanical devices are not appropriate for use.
	Dropped Objects	▪ Steel toe boots with metatarsal guards meeting ANSI Standard Z-41 will be worn. ▪ Secure all radios, cell phones and equipment. ▪ Tools and parts will be lifted or carried, not tossed. ▪ All rigging (slings, cables, chokers, etc.) will be inspected prior to use. ▪ Engineered lifting lugs or appropriate slings shall be used for lifting.
	Overhead Hazards	▪ Personnel will wear hard hats that meet ANSI Standard Z-89.1. ▪ All ground personnel will stay clear of suspended loads (steel sheet piles, HDPE pipe). Work areas will be barricaded and/or posted showing the limits of overhead hazards. ▪ All overhead hazards will be identified prior to commencing work operations. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling objects.
	Noise	▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers.
	Eye Injury	▪ Safety glasses with side shields that meet ANSI Standard Z-87 will be worn. ▪ Chemical goggles when working with injection system. ▪ Eye protection with the appropriate shade will be worn during welding and cutting operations.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Sheet Pile Installation		

	Struck By/Against	▪ Personnel will understand and review hand signals. ▪ All personnel will wear ANSI type II high visibility vests. ▪ Personnel will keep out of the swing radius of heavy equipment. The swing radius will be barricaded or delineated as appropriate. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Eye contact with operators will be made before approaching equipment. ▪ All machines will be equipped with working backup alarms adequate for the background noise. ▪ Tag lines will be used to help control suspended loads. ▪ Workers will be made aware of potential pinch points during offloading and assembly of equipment (bolting flanges, process piping, etc) and keep hands free from potential pinch points. ▪ Hand signals only by DESIGNATED worker ▪ Only authorized personnel in work area
	Electrical	▪ All electrical tools and equipment will be equipped with GFCI. ▪ All Electrical work will be done by licensed electricians. ▪ Electrical cords will not be laid across roads where vehicular traffic may damage the cord. ▪ All extension cords will have a three blade-grounding plug. ▪ All equipment will stay a minimum of 20 feet from overhead, energized electrical lines (50kV or less). The distance will increase 4 feet for each additional 10kV above 50kV.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Sheet Pile Installation		

Equipment To Be Used	Inspection Requirements	Training Requirements
Fire Extinguishers	▪ Monthly inspections will be performed.	▪ Personnel will be given instructions on proper use of fire extinguishers.
Spill Control Materials	▪ Daily Safety inspection of spill control materials will be conducted.	▪ Personnel will be given training on how to respond to spilled materials.
Lull All Terrain Forklift, Pickup Trucks, Air Compressor, Loader; PC 300 excavator; MOVAC vibratory hammer; flexifloats; barge	▪ Inspections will be performed on equipment prior to each use. ▪ Load and capacity calculations done prior to lift ▪ Daily equipment inspection to include vibratory head attachment ▪ Inspect hydraulic hoses on hammer before use	▪ Qualified operators will be used for equipment operation. ▪ Document calculations, inspections and checklist.
Solidiification System: Mix Tanks, Pumps, Polymer Injection System, Desanders, Filter Presses, Filtrate Tanks, Conveyor System	▪ Daily inspections.	▪ Workers will be trained in operation and maintenance.
Wastewater Treatment: Pumps, Chemical Injection Ports, Bag and Sand Filters, Carbon Absorption System	▪ Daily inspections.	▪ Workers will be trained in operation and maintenance.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Installation of HDPE Pipeline	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Tasks	Potential Hazards	Control Measures
Welding of HDPE Pipe Installing HDPE Pipe in water and on land Installing silt curtains and oil booms	Slip/Trip/Fall	▪ Work Areas and means of access shall be maintained safe and orderly. ▪ Tripping and poor footing hazards will be repaired as they are discovered or clearly identified. ▪ Fall protection will be used when working at unprotected heights greater than 6'. ▪ Standard railings will be installed on all process equipment decks greater than 4'.
	Inclement Weather	▪ Personnel will be instructed in heat stress/cold stress recognition and prevention. ▪ Personnel must notify the SSHO if symptoms of cold/heat stress are perceived in any member of the crew, including self. ▪ Cold/Heat stress management will be conducted in accordance with Sevenson Cold/Heat stress program (Temperature Extremes). ▪ Work/rest regimes and personnel monitoring for workers will be instituted per the SSHO based on ambient conditions and condition of personnel. ▪ Air temperature, humidity and wind will be monitored; controls will be implemented per ACGIH guidelines as necessary. ▪ Drinking liquids will be available and used for rehydration during breaks. ▪ Work will be conducted during warmer/cooler hours of the day, if necessary and feasible. ▪ Hoisting activities will be suspended during the following weather conditions: Sustained winds at or above 25 mph, freezing rain, lightning.
	Back Injuries	▪ Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting. ▪ Mechanical devices will be utilized when possible to reduce manual handling of materials. ▪ Team lifting will be used when mechanical devices are not appropriate for use. ▪ Proper paths of travel will be noted and followed during manual material handling.
	Dropped Objects	▪ Steel toe boots meeting ANSI Standard Z-41 will be worn. ▪ Hard hats meeting ANSI Standard Z-89 will be worn by all personnel in the work area. ▪ All radios, cell phones and equipment will be secured. ▪ Tools and parts will be lifted or carried, not tossed ▪ Personnel will not climb ladders while carrying equipment in hand..
	Overhead Hazards	▪ All overhead hazards will be identified prior to commencing work operations. ▪ Personnel will wear hard hats that meet ANSI Standard Z-89.1.
	Noise	▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Installation of HDPE Pipeline	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Tasks	Potential Hazards	Control Measures
	Eye/Face Injury	▪ Safety glasses with side shields meeting ANSI Standard Z-87 will be worn. ▪ Faceshields will be worn over safety glasses during grinding, wire wheel work or other activities posing face hazards.. ▪ Proper guards will be used on all equipment such as grinders, cut-off wheels and saws.
	Struck By/Against	▪ Personnel will understand and review hand signals. ▪ All personnel will wear ANSI type II high visibility vests. ▪ Workers will be made aware of potential pinch-points during repair and maintenance of equipment (bolting flanges, process piping, etc) and keep hands free from potential pinch points.
	Electrical	▪ All electrical tools and equipment will be equipped with GFCI ▪ Electrical cords will not be laid across roads where vehicular traffic may damage the cord. ▪ All extension cords will have a three blade-grounding plug, all outlets will accommodate a 3-prong plug. ▪ Portable generators will placed on solid ground prior to starting, generators will not be run from the back of trucks unless properly grounded. ▪ Heat plate for HDPE fusion welder will be placed in a secure holder when not in use
	Hot work/fire	▪ Fire extinguishers will be made available. ▪ Cover exposed skin with protective clothing and gloves. ▪ Hot work done under permit system
	Spills	▪ Appropriate spill kits will be available; consideration will be taken for spills on water. ▪ All spills will be reported to the SSHO or appropriate designee. Verification will be made that spill volume does not exceed reportable quantities. ▪ Spills will be promptly controlled, contained and cleaned. Contaminated materials will be properly containerized and labeled while awaiting disposal. ▪ Disposal will be in accordance with appropriate local, state and federal regulations.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Installation of HDPE Pipeline	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Task	Potential Hazards	Control Measures
	Falling Overboard and/or Stranding	▪ All persons on board will remain seated, except when working. ▪ All personnel shall wear United States Coast Guard (USCG) Approved Personal Flotation Devices. ▪ Non slip surfaces will be provided on all working decks, stair treads, ship ladders, platforms, catwalks, and walkways. ▪ All means of boat access shall be properly secured, guarded, and maintained free of slipping and tripping hazards. ▪ An adequate number of throw rings will be maintained on each watercraft. All throw rings will be U.S. Coast Guard approved. ▪ Maximum weight capacity for watercraft will not be exceeded. ▪ Dredges and barges will be equipped with perimeter guardrails. ▪ Watercraft will not be used without shore support personnel. ▪ Personnel on board watercraft must be in radio contact with shore personnel. ▪ All personnel working on watercraft will be trained in man overboard emergencies. Drills will be conducted to verify personnel are aware of their responsibilities.
	Water Craft Operation	▪ All dredge and boat pilots shall be familiar with the "Rules of the Road" that regulate movement of boat traffic in the river. ▪ Watercraft will be operated only by those personnel who have successfully completed the required boating safety course. ▪ All boating regulations will be strictly observed. ▪ All watercraft must have required Coast Guard approved lighting and signaling devices.
	Sinking Boat/Dredge Damage	▪ All watercraft not subject to USCG inspection and certification or not having a current American Bureau of Shipping classification will be inspected by a Registered Marine Surveyor. ▪ The load ratings of dredges/boats will be strictly adhered to; overloading of vessels is prohibited. ▪ Oil absorbent booms will be kept on board in the event of a spill. No unnecessary fuel cans will be onboard.
	Severe Weather	▪ National weather forecasts will be monitored daily for predicted inclement weather. The field investigations lead will call for local conditions and forecast each morning. ▪ All personnel shall be aware of the forecast and keep an "eye to the sky." ▪ Work will be postponed and dredge secured in the event of strong winds, high seas, or at times of very poor visibility. ▪ In the event of lightning in the area, work will cease at the direction of Sevenson's Supervisor or SSHO, and will not proceed further until return to work permit is issued.
	Medical Emergencies	▪ Medical emergencies will be handled as onshore ▪ Emergency skiff will be available for transport

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Installation of HDPE Pipeline	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Equipment To Be Used	Inspection Requirements	Training Requirements
Dredge	▪ Daily inspection checklist thereafter.	▪ Personnel will be trained in inspection checklist use. ▪ Personnel will have successfully completed the boating safety course.
Spill Control materials	▪ Daily Safety inspection of spill control materials will be conducted.	▪ Personnel will be given training on how to respond to spilled materials.
Tender Boats and Skiffs	▪ Initial review/training prior to commencement of field activities.	▪ Operators will be familiar with Coast Guard regulations for inter-coastal watercraft.
Fire Extinguishers	▪ Monthly inspections will be performed. ▪ Annual re-certification will be performed.	▪ Personnel will be given instructions on proper use of fire extinguishers.
HDPE Welder	▪ Inspect electrical cord and hydraulic lines for cracks/cuts ▪ Insure heating plate cradle in place	▪ Personnel will be trained in proper use of HDPE welding machine

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Operation of Hydraulic Dredging System	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Tasks	Potential Hazards	Control Measures
Start up and Shut down of Hydraulic Dredge 1) Boarding Dredge 2) Starting diesel engine 3) Engaging the auger 4) Starting the booster pumps	Slip/Trip/Fall	• Work Areas and means of access shall be maintained safe and orderly. • Tripping and poor footing hazards will be repaired as they are discovered or clearly identified. • Boats, barge & dredge will be properly secured before personnel attempt boarding
	Inclement Weather	• Personnel will be instructed in heat stress/cold stress recognition and prevention. • Personnel must notify the HSO if symptoms of cold/heat stress are perceived in any member of the crew, including self. • Cold/Heat stress management will be conducted in accordance with Sevenson Cold/Heat stress program (Temperature Extremes). • Work/rest regimes and personnel monitoring for workers will be instituted per the HSO based on ambient conditions and condition of personnel. • Air temperature, humidity and wind will be monitored; controls will be implemented per ACGIH guidelines as necessary. • Drinking liquids will be available and used for rehydration during breaks. • Work will be conducted during warmer/cooler hours of the day, if necessary and feasible.
	Back Injuries	• Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting. • Mechanical devices will be utilized when possible to reduce manual handling of materials. • Team lifting will be used when mechanical devices are not appropriate for use. • Proper paths of travel will be noted and followed during manual material handling.
	Dropped Objects	• Steel toe boots meeting ANSI Standard Z-41 will be worn. • Hard hats meeting ANSI Standard Z-89 will be worn by all personnel in the work area. • Personnel will not climb ladders while carrying equipment in hand..
	Overhead Hazards	• All overhead hazards will be identified prior to commencing work operations. • Personnel will wear hard hats that meet ANSI Standard Z-89.1.
	Noise	• Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers
	Eye/Face Injury	• Safety glasses with side shields meeting ANSI Standard Z-87 will be worn.
	Struck By/Against	• Personnel will understand and review hand signals. • All personnel will wear ANSI type II high visibility vests. • Workers will be made aware of potential pinch-points during operation of equipment and keep hands free from potential pinch points.
	Electrical	• All electrical tools and equipment will be equipped with GFCI

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Operation of Hydraulic Dredging System	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Tasks	Potential Hazards	Control Measures
	Fire	• All flammable and combustible liquids will be stored in appropriate metal containers with self-closing lids. • Fire extinguishers will be made available.
	Spills	• Secondary containment will be utilized for all fuel/chemical storage areas. • Appropriate spill kits will be available; consideration will be taken for spills on water. • All spills will be reported to the HSO or appropriate designee. Verification will be made that spill volume does not exceed reportable quantities. • Spills will be promptly controlled, contained and cleaned. Contaminated materials will be properly containerized and labeled while awaiting disposal. • Disposal will be in accordance with appropriate local, state and federal regulations.
	Potential Exposure to Site Contaminants	• Air monitoring, Level D personal protective equipment, with PFD, will be worn as a minimum. Modified Level D will be worn if there is a potential for contact with contaminated sediments, respiratory protection based on air monitoring • HAZWOPER training • Hazard communication program

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Operation of Hydraulic Dredging System	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Task	Potential Hazards	Control Measures
Dredging of sediments 1) Operation of Hydraulic Dredge 2) Operation and repositioning of Dredge Travel Control System 3) Fuel Transfer 4) Towing or Pushing Vessels 5) Oversized debris removal	Falling Overboard and/or Stranding	• All persons on board will remain seated, except when working. • All personnel shall wear United States Coast Guard (USCG) Approved Personal Flotation Devices. Non-slip surfaces will be provided on all working decks, stair treads, ship ladders, platforms, catwalks, and walkways. • All means of boat access shall be properly secured, guarded, and maintained free of slipping and tripping hazards. • An adequate number of throw rings will be maintained on each watercraft. All throw-rings will be U.S. Coast Guard approved. • Maximum weight capacity for watercraft will not be exceeded. • Dredges and barges will be equipped with perimeter guardrails. • Watercraft will not be used without shore support personnel. • Personnel on board watercraft must be in radio contact with shore personnel. • All personnel working on watercraft will be trained in man overboard emergencies. Drills will be conducted to verify personnel are aware of their responsibilities.
	Water Craft Operation	• All dredge and boat pilots shall be familiar with the "Rules of the Road" that regulate movement of boat traffic in the river. • Only those personnel who have successfully completed the required boating safety course will operate watercraft. • Charts of the dredge areas, with depths for mean low water, will be obtained and watercraft pilots will be familiar with their use. • Locations of rocks, ledges and manmade surface obstructions will be noted within dredge area. These will be given a wide berth. • All river boating regulations will be strictly observed. • All watercraft must have required Coast Guard approved lighting and signaling devices. • Float plan will be filled out and reviewed by crew.
	Sinking Boat/Dredge Damage	• The load ratings of dredges/boats will be strictly adhered to; overloading of vessels is prohibited. • Oil absorbent booms will be kept on board in the event of a spill. No unnecessary fuel cans are to be onboard.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Operation of Hydraulic Dredging System	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Task	Potential Hazards	Control Measures
	Struck By/Against	• Personnel will understand and review hand signals. • Watch for other boats in area avoid close calls or collisions. • Watch for wake from other boats. • Watch for (know their locations or mark with buoys) objects hidden under water i.e., pilings, islands, anchor lines. • Never pitch-pole or broach any waves. • Ensure the air horn on each boat used is in proper work order. • Properly mark all equipment (floating pipe, etc) to minimize likelihood of watercraft striking installed equipment. • Personnel operating positioning winches will be protected from whip-back in the event of line failure • Personnel to stay out of swing radius of heavy equipment
	Severe Weather	• National weather forecasts will be monitored daily for predicted inclement weather. The field investigations lead will call for local conditions and forecast each morning. • All personnel shall be aware of the forecast and keep an "eye to the sky." • Work will be postponed and dredge secured in the event of strong winds, high seas, or at times of very poor visibility. • In the event of lightning in the area, work will cease at the direction of Sevenson's Supervisor or HSO, and will not proceed further until return to work permit is issued.
	Spills	• Appropriate spill kits will be available; consideration will be taken for spills on water. • All spills will be reported to the SSHO or appropriate designee. Verification will be made that spill volume does not exceed reportable quantities. • Spills will be promptly controlled, contained and cleaned. Contaminated materials will be properly containerized and labeled while awaiting disposal. • Disposal will be in accordance with appropriate local, state and federal regulations.
	Medical Emergencies	• Medical emergencies will be handled as onshore • Emergency skiff will be available for transport

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Operation of Hydraulic Dredging System	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Task	Potential Hazards	Control Measures
	Potential Exposure to Site Contaminants	• Air monitoring as per Task Specific HASP • Level D personal protective equipment, with PFD, will be worn as a minimum. Modified Level D will be worn if there is a potential for contact with contaminated sediments. Respiratory protection as indicated by air monitoring • Material Safety Data Sheets reviewed by site personnel • HAZWOPER training • Hazard communication program

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta Activity/Phase of Work: Operation of Hydraulic Dredging System	Location: Pompton Lakes, New Jersey	Date: November 16, 2011

Equipment To Be Used	Inspection Requirements	Training Requirements
Dredge Railing Systems	• Daily inspections will be conducted unless damage is suspected	• Personnel will be informed of the rail systems requirements.
Dredge	• Initial inspection by a Registered Marine Surveyor. • Daily inspection checklist thereafter.	• Personnel will be trained in inspection checklist use.
Spill Control materials	• Daily Safety inspection of spill control materials will be conducted.	• Personnel will be given training on how to respond to spilled materials.
Dredge Deck/Working Surfaces	• Daily inspections for oil/grease buildup will be conducted	• Requirements for house keeping will be reviewed
Tender Boat Engines	• Daily maintenance (fueling, oil, grease) will be conducted.	• Operators/pilots will be trained in engine maintenance.
Lighting/Signaling Sys.	• Daily inspections will be made.	• Operators will be trained in proper use of these safety systems.
Tender Boats and Skiffs	• Initial review/training prior to commencement of field activities.	• Operators will be familiar with Coast Guard regulations for inter-coastal watercraft. • Personnel will have successfully completed the boating safety course.
Excavator & scow	• Inspections will be performed on equipment prior to each use	• Qualified operators will be used for equipment operation
Fire Extinguishers	• Monthly inspections will be performed. • Annual re-certification will be performed.	• Personnel will be given instructions on proper use of fire extinguishers.
Wind, weather instruments	• Annual calibration	• Site safety personnel will review equipment specifications and manufacturer's documentation prior to using weather monitoring equipment
Rigging	• Daily inspections for all rigging. Hoisting chains must have a documented inspection at least annually	• Personnel will be trained in proper rigging techniques and rigging inspection protocol

SEVENSON ENVIRONMENTAL SERVICES, INC.

ACTIVITY HAZARD ANALYSIS		
Pompton Lake Acid Brook Delta Eco-Layer Placement	Location Pompton Lakes, New Jersey	Date: November 16, 2011

Task	Potential Hazards	Control Measures (include references and specify equipment and/or training requirements)
Mixing sand slurry and pumping to placement barge	Slip/Trip/Fall	• Work Areas and means of access shall be maintained safe and orderly. • Even terrain will be utilized as unloading areas. • Tripping and poor footing hazards will be repaired as they are discovered or clearly identified.
	Vehicular Traffic/Problems	• Spotters will be used when backing up trucks and moving equipment. • When off loading a boat, never back the vehicle so far into the water that the back tail pipe is under water. • Ensure you have sufficient power to pull the boat out of the water once it is trailered. • A layout/staging plan for mixing area will be established at the site.
	Cold Stress	• Personnel will be instructed in cold stress recognition and prevention. • Personnel must notify the SSHO if symptoms of cold stress are perceived in any member of the crew, including self. • Cold stress management will be conducted in accordance with Sevenson Cold Stress Program • Work/rest regimes and personnel monitoring for workers will be instituted per the SHSO based on ambient conditions and condition of personnel. • Air temperature and wind will be monitored. • Additional change of clothes for waterborne crew.
	Back Injuries	• Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting. • Mechanical devices will be utilized when possible to reduce manual handling of materials. • Team lifting will be used when mechanical devices.are not appropriate for use.
	Dropped Objects	• Steel toe boots with metatarsal guards meeting ANSI Standard Z-41 will be worn. • Secure all radios, cell phones and equipment. • Tools and parts will be lifted or carried, not tossed. • All rigging (slings, cables, chokers, etc.) will be inspected prior to use. • Engineered lifting lugs or appropriate slings shall be used for lifting.
	Overhead Hazards	• Personnel will wear hard hats that meet ANSI Standard Z-89.1. • All ground personnel will stay clear of suspended loads. Work areas will be barricaded and/or posted showing the limits of overhead hazards. • All overhead hazards will be identified prior to commencing work operations. • All equipment will be provided with guards, canopies or grills to protect the operator from falling objects.
	Noise	• Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers • Noise control for the public see section 3.2.1.5.2 of the HASP.

ACTIVITY HAZARD ANALYSIS		
Pompton Lake Acid Brook Delta Eco-Layer Placement	Location Pompton Lakes, New Jersey	Date: November 16, 2011

	Struck By/Against	• Personnel will understand and review hand signals. • All personnel will wear ANSI type II high visibility vests. • Personnel will keep out of the swing radius of heavy equipment. The swing radius will be barricaded or delineated as appropriate • Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times. • Ground personnel will not stand directly behind heavy equipment when it is in operation. • Eye contact with operators will be made before approaching equipment. • All machines will be equipped with working backup alarms adequate for the background noise.
	Electrical	• All electrical tools and equipment will be equipped with GFCI. • Electrical cords will not be laid across roads where vehicular traffic may damage the cord. • All extension cords will have a three blade-grounding plug. • All electrical work and repairs will be conducted by a licensed electrician. • All equipment will stay a minimum of 20 feet from overhead energized electrical lines (50kV or less). The distance will increase 4 feet for each additional 10kV above 50kV
	Vehicular Traffic	• Established routes • Observe plant speed limit • Flag personnel where necessary
	Working on or near water	• All persons on board will remain seated, except when working • All personnel shall wear United States Coast Guard (USCG) approved Personal Flotation Devices. • All means of boat access shall be properly secured, guarded, and maintained free of slipping and tripping hazards. • An adequate number of throw rings will be maintained on each watercraft and will be U.S. Coast Guard approved. • Maximum weight capacity for watercraft will not be exceeded. • Watercraft will not be used without shore support personnel. • Personnel on board watercraft must be in radio contact with shore personnel

ACTIVITY HAZARD ANALYSIS		
Pompton Lake Acid Brook Delta Eco-Layer Placement	Location Pompton Lakes, New Jersey	Date: November 16, 2011

Task	Potential Hazards	Control Measures (Include references and specify equipment and/or training requirements)
Boat and Barge Movement	Falling Overboard and/or Stranding	• Slips, trips and falls. • All persons on board will remain seated, except when working. • All personnel shall wear United States Coast Guard (USCG) Approved Type I or II Life Preservers at all times while on the water. • Non-slip surfaces will be provided on all working decks, stair treads, ship ladders, platforms, catwalks, and walkways. • All means of boat access shall be properly secured, guarded, and maintained free of slipping and tripping hazards. • A Coast Guard approved Type IV flotation device (life ring) will be maintained on each dredge/boat. • Maximum weight capacity for watercraft will not be exceeded. • Watercraft will not be operated without a minimum of two personnel on board. • Watercraft will not be used without shore support personnel. • Personnel on board watercraft must be in constant radio contact with shore personnel. • Follow Man Overboard procedure.
	Water Craft Operation	• All boat pilots shall be familiar with the “Rules of the Road” that regulate movement of boat traffic. • Watercraft will be operated only by those personnel who have successfully completed the required boating safety course. • Locations of rocks, ledges and manmade surface obstructions will be noted within the work area. • All watercraft must have required Coast Guard approved lighting and signaling devices.
	Sinking Boat/Barge Damage	• The load ratings of boats will be strictly adhered to; overloading of vessels is prohibited. • Oil absorbent booms will be kept on board in the event of a spill. No unnecessary fuel cans will be onboard.
	Struck By/Against	• Personnel will understand and review hand signals. • All machines will be equipped with backup alarms. • Watch for other boats in area, avoid close calls or collisions. • Watch for wake from other boats. • Watch for (know their locations or mark with buoys) objects hidden under water. • Ensure the air horn on each boat used is in proper work order.

ACTIVITY HAZARD ANALYSIS		
Pompton Lake Acid Brook Delta Eco-Layer Placement	Location Pompton Lakes, New Jersey	Date: November 16, 2011

	Severe Weather	• National weather forecasts will be monitored daily for predicted inclement weather. The field investigations lead will call for local conditions and forecast each morning. • All personnel shall be aware of the forecast and keep an "eye to the sky." Unforecasted storms may also occur without warning. • Work will be postponed in the event of strong winds, high seas, or at times of very poor visibility. • In the event of lightning in the area, work will cease at the direction of Sevenson's Supervisor or SSHO, and will not proceed further until return to work permit is issued. • Suspend work if the NOAA issues a Small Craft Advisory.

ACTIVITY HAZARD ANALYSIS		
Pompton Lake Acid Brook Delta Eco-Layer Placement	Location Pompton Lakes, New Jersey	Date: November 16, 2011

Equipment To Be Used	Inspection Requirements	Training Requirements
Fire Extinguishers	• Monthly inspections will be performed.	• Personnel will be given instructions on proper use of fire extinguishers.
Spill Control materials	• Daily Safety inspection of spill control materials will be conducted.	• Personnel will be given training on how to respond to spilled materials.
Boat Deck/Working Surfaces	• Daily inspections for oil/grease buildup will be conducted	• Requirements for house keeping will be reviewed.
Tender Boat Engines	• Daily maintenance (fueling, oil, grease) will be conducted.	• Operators/pilots will be trained in engine maintenance.
Lighting/Signaling Systems	• Daily inspections will be made.	• Operators will be trained in proper use of these safety systems.
Tender Boats and Skiffs	• Initial review/training prior to commencement of field activities.	• Operators will be familiar with Coast Guard regulations for intercoastal watercraft.
Dump Trucks, Truck Excavators, Loaders	• Inspections will be performed on equipment prior to each use.	• Qualified operators will be used for equipment operation. • Document calculations, inspections and checklist.
Scow and Tugboats	• Daily inspection of vessels.	• Operators of boats must complete a boating safety course.

SEVENSON ENVIRONMENTAL SERVICES, INC.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Solidification		

Task	Potential Hazards	Control Measures
Installation of Solidification components, wastewater treatment plant and electrical power. Operation of Solidification equipment and wastewater treatment plant	Slip/Trip/Fall	▪ Work Areas and means of access shall be maintained safe and orderly. ▪ Even terrain will be utilized as unloading areas. ▪ Tripping and poor footing hazards will be repaired as they are discovered or clearly identified.
	Vehicular Traffic/Problems	▪ Spotters will be used when backing up trucks and moving equipment.
	Cold/Heat Stress	▪ Personnel will be instructed in heat stress/cold stress recognition and prevention. ▪ Personnel must notify the SSHO if symptoms of cold/heat stress are perceived in any member of the crew, including self. ▪ Cold/Heat stress management will be conducted in accordance with Sevenson Cold/Heat stress program (Temperature Extremes). ▪ Work/rest regimes and personnel monitoring for workers will be instituted per the SSHO based on ambient conditions and condition of personnel. ▪ Air temperature and humidity and wind will be monitored. ▪ Drinking liquids will be available and used for re-hydration during breaks. ▪ Work will be conducted during warmer/cooler hours of the day, if possible.
	Back Injuries	▪ Site personnel will be instructed in and use proper lifting techniques including stretching prior to lifting ▪ Mechanical devices will be utilized when possible to reduce manual handling of materials. ▪ Team lifting will be used when mechanical devices are not appropriate for use.
	Dropped Objects	▪ Steel toe boots with metatarsal guards meeting ANSI Standard Z-41 will be worn. ▪ Secure all radios, cell phones and equipment. ▪ Tools and parts will be lifted or carried, not tossed. ▪ All rigging (slings, cables, chokers, etc.) will be inspected prior to use. ▪ Engineered lifting lugs or appropriate slings shall be used for lifting.
	Overhead Hazards	▪ Personnel will wear hard hats that meet ANSI Standard Z-89.1. ▪ All ground personnel will stay clear of suspended loads (steel sheet piles, HDPE pipe). Work areas will be barricaded and/or posted showing the limits of overhead hazards. ▪ All overhead hazards will be identified prior to commencing work operations. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling objects.
	Noise	▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85dBA (ear muffs or plugs). All equipment will be equipped with manufacturer's required mufflers.
	Eye Injury	▪ Safety glasses with side shields that meet ANSI Standard Z-87 will be worn. ▪ Chemical goggles when working with injection system. ▪ Eye protection with the appropriate shade will be worn during welding and cutting operations.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Solidification		

	Struck By/Against	▪ Personnel will understand and review hand signals. ▪ All personnel will wear ANSI type II high visibility vests. ▪ Personnel will keep out of the swing radius of heavy equipment. The swing radius will be barricaded or delineated as appropriate. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Eye contact with operators will be made before approaching equipment. ▪ All machines will be equipped with working backup alarms adequate for the background noise. ▪ Tag lines will be used to help control suspended loads. ▪ Workers will be made aware of potential pinch points during offloading and assembly of equipment (bolting flanges, process piping, etc) and keep hands free from potential pinch points.
	Electrical	▪ All electrical tools and equipment will be equipped with GFCI. ▪ All Electrical work will be done by licensed electricians. ▪ Electrical cords will not be laid across roads where vehicular traffic may damage the cord. ▪ All extension cords will have a three blade-grounding plug. ▪ All equipment will stay a minimum of 20 feet from overhead, energized electrical lines (50kV or less). The distance will increase 4 feet for each additional 10kV above 50kV.

ACTIVITY HAZARD ANALYSIS		
Project Identification: Pompton Lake Acid Brook Delta	Location: Pompton Lakes, New Jersey	Date: November 16, 2011
Activity/Phase of Work: Solidification		

Equipment To Be Used	Inspection Requirements	Training Requirements
Fire Extinguishers	▪ Monthly inspections will be performed.	▪ Personnel will be given instructions on proper use of fire extinguishers.
Spill Control Materials	▪ Daily Safety inspection of spill control materials will be conducted.	▪ Personnel will be given training on how to respond to spilled materials.
Crane, Cherry Picker, Lull All Terrain Forklift, Pickup Trucks, Backhoe, Air Compressor, Loader	▪ Inspections will be performed on equipment prior to each use. ▪ Load and capacity calculations done prior to lift ▪ Daily crane inspections ▪ Pre-lift checklist ▪ Inspect air hoses for proper rating before use ▪ Shut off valves in use on compressor ▪ Safety pins/chains in use on hoses	▪ Qualified operators will be used for equipment operation. ▪ Document calculations, inspections and checklist.
Solidification System: Mix Tanks, Pumps, Polymer Injection System, Desanders, Filter Presses, Filtrate Tanks, Conveyor System	▪ Daily inspections.	▪ Workers will be trained in operation and maintenance.
Wastewater Treatment: Pumps, Chemical Injection Ports, Bag and Sand Filters, Carbon Absorption System	▪ Daily inspections.	▪ Workers will be trained in operation and maintenance.

Attachment 2
Safety and Health Forms

Job No. _____

Job Address _____

_____

Sevenson Environmental Services, Inc.

Report of Accident, Injury, or Illness

Instructions: Please print. Fill in all blanks. When completed, return this form to Sharon Lee at the main office.

Name _____ Sex:_____ Age: _____

Social Security Number _____ Birth Date: _____

Address _____ Phone Number _____

Marital Status: ☐ Single; ☐ Married; ☐ Separated; ☐ Divorced; ☐ Widowed

# of Dependents _____ Date of Accident _____ Time _____ AM/PM

Date Employee notified employer: _____ Who was notified: _____

Employment Start Date:	Wage Rate:
Occupation:	Average Hours Worked:
Date Last Worked:	Average Days Per Week:
Time Shift Began:	Was worker paid for day of injury?
Name of Witness:	Did salary continue?
Describe how the accident happened:	
What was employee doing when injured?	
Describe the injury in detail and indicate part of body affected:	
Name of object or substance that directly injured the employee:	
Date & Time medical attention was sought:	

Name, address and phone number of hospital or doctor:
Was employee involved in any other incidents/accidents? If yes, describe:
Any history of work accidents, absenteeism, and/or disciplinary problems:
Substance abuse test administered:___ Yes, ___ No – if no, why not?
Medical release obtained:
Corrective Action Taken:

Supervisor _____ Date _____

Safety Officer _____ Date _____

Comments:_____

_____

_____

_____

Report of Accident, Injury, or Illness

Sevenson Environmental Services, Inc.

Acknowledgment of Site Safety and Health Plan

I certify that I have received a Site orientation and have been given the opportunity to read and ask questions on the contents of the Site Safety and Health Plan to include emergency response actions and the contaminates of concern for the project.

DATE	NAME (please print)	SIGNATURE

Safe Plan Of Action

Project No. _____
Job/Task _____ **Work Area** _____ **Date** _____

Steps of Task	Hazard/Reaction to Change	Safe Plan	Resources

Team Members' Signatures

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

The signature of the supervisor confirms the completion of the hazard assessment and Safe Plan of Action by the crew.

Supervisors Signature: _____ Date_____

Instructions: 1. Write name of job or task in space provided. 2. Conduct walk-through survey of work area. 3. Write the steps of the task in a safe sequence. 4. List all possible hazards involved in each step and reaction to change. 5. In the Safe Plan column, state actions that will be taken to prevent the hazards or injury from reaction to change. 6. In Resources column, list equipment, tools, etc. needed to do the job. 8. Ask each team member, who helped develop and will use this SPA, to sign in spaces provided. 9. Review the SPA at the end of the task for improvements.

Work shall stop when conditions change, the job changes, or a deficiency in the plan is discovered, and the current SPA will be modified or a new SPA created.

Project No. _____

Job/Task _____ **Work Area** _____ **Date:** _____

Team Member Signature Sheet Continuation

Review checklist while completing front page of SPA. Check all that apply.

A new SPA is required if the job scope or work conditions change.

Required Permits	Hazards	Safe Plan
☐ Confined Space	☐ Overhead Utilities	☐ Power de-energization required ☐ Insulation blankets required ☐ Wire watcher required
☐ Critical Lift		☐ Required clearance distance = _____Ft. ☐ Safe work zone marked
☐ Hot Work	☐ Crane or other	☐ Signalman assigned ☐ Tag lines in use ☐ Area around crane barricaded
☐ Lock Out/Tag Out	Lifting Equipment	☐ Lifting equipment inspected ☐ Personnel protected from overhead load
☐ Soil Disturbance (Over 12")	☐ Underground Utilities	☐ Reviewed as-builts ☐ Subsurface surveys ☐ Received dig permit
☐ Utility Clearance		☐ Required clearance distance = _____ Ft. ☐ Safe work zone Marked
Required PPE	☐ Electrical	☐ Lock Out/Tag Out/Try Out ☐ Permit required? ☐ Confirm that equipment is de-energized
☐ Hard Hat, Class C		☐ Reviewed electrical safety procedures
☐ Hard Hat, Class E *(Elect. Protect)*	☐ Excavations	☐ Permits ☐ Inspected prior to entering ☐ Proper sloping/shoring
☐ Ear Plugs/Ear Muffs		☐ Barricades provided ☐ Access/egress provided ☐ Protection from accumulated water
Eye Protection:	☐ Fire Hazard	☐ Hot Work Permit ☐Fire Extinguishers ☐ Fire watch
☐ Safety Glasses		☐ Adjacent area protected ☐ Unnecessary flammable material removed
☐ Face Shield	☐ Vehicular Traffic or	☐ Traffic Barricades ☐ Cones ☐ Signs ☐ Flagmen ☐ Lane closure
☐ Chemical Goggles	Heavy Equipment	☐ Communication with equipment operator
☐ Welding Hood	☐ Noise >85 dB	Hearing protection is required: ☐ Ear plugs ☐ Ear Muffs ☐ Both
Hand Protection:	☐ Hand & Power Tools:	☐ Inspect general cond. ☐ GFCI in use ☐ Identified PPE required for each tool
☐ Cut Resistant Gloves		☐ Reviewed safety requirements in operators manual(s) ☐ Guarding OK
☐ Welders Gloves	☐ Hand Hazards	List sharp tools, material, equipment: _____
☐ Nitrile Gloves		☐ PPE gloves, etc. ☐ Protected sharp edges as necessary
☐ Surgical Gloves	☐ Manual Lifting	☐ Reviewed proper lifting tech. ☐ Identified material requiring lifting equipment
☐ Rubber Gloves		☐ Hand protection required ☐ Back support belts
☐ Elect. Insulated Gloves	☐ Ladders	☐ Inspect general cond. before use ☐ Ladder inspected with in last quarter
☐ Arm Sleeves		☐ Ladder tied off or held ☐ Proper angle and placement ☐ Reviewed ladder safety
Foot Protection:	☐ Scaffolds	☐ Inspect general condition before use ☐ Tags in place ☐ Properly secured
☐ Sturdy Work Boots		☐ Toe boards used ☐ Footings adequate ☐ Materials properly stored on scaffold
☐ Safety Toe Boots	☐ Slips, Trips Falls	☐ Inspect for trip hazards ☐ Hazards marked ☐ Tools & material properly stored
☐ Rubber Boots		☐ Extension cords properly secured ☐ Work zone free of debris
☐ Rubber Boot Covers	☐ Pinch Points	List potential pinch points: _____
☐ Dielectric Footwear		☐ Working near operating equipment ☐ Hand/Body positioning
Respiratory. Protection:	☐ Working w/ Chemicals	☐ List specific chemicals involved and list hazards and precaution on front side.
☐ Dust Mask		☐ Reviewed MSDS ☐ Exposure Monitoring required ☐ Have proper containers and labels.
☐ Air Purifying Respirator	☐ Asbestos or Lead Paint	☐ Identified proper PPE (respirators, clothing, gloves, etc.)
☐ Supplied Air Respirator	Potential	☐ Areas to be worked may contain asbestos or lead paint ☐ Asbestos controls incorporated
☐ SCBA	☐ Heat Stress Potential	☐ Lead based point controls in place ☐ Exposure monitoring conducted.
☐ Emergency Escape Respirator		☐ Heat stress monitoring (>85°) ☐ Liquids available ☐ Cool down periods
Special Clothing:	☐ Cold Stress Potential	☐ Sun Screen ☐ Reviewed Heat Stress symptoms
☐ Tyvek ®	☐ Environmental	☐ Proper clothing (i.e.. gloves, coat, coveralls) ☐ Wind chill <32°
☐ Poly Coated Tyvek ®		☐ Reviewed Cold Stress symptoms ☐ Warm up periods
☐ Fire Resistant Coveralls	☐ Natural or Site Hazards	☐ Air emissions ☐ Water discharge ☐ Hazardous wastes ☐ Other wastes
☐ Rain Suit		☐ Pollution prevention ☐ Waste minimization
☐ Safety Vest	☐ Adjacent Work/Processes	☐ Weather ☐ Terrain ☐ Adjacent operations or processes ☐ Biological hazards
Fall Protection:		☐ Animals/reptiles/insects hazards
☐ Harness	☐ Barricades/covers	☐ Notified them of our presents ☐ Other workers adjacent, above, or below.
☐ Double Lanyard Required		☐ Coordinated with adjacent supervisor/customer/operator ☐ Need barriers between.
☐ Anchorage Point Available		☐ Caution barricade tape required ☐ Danger barricade tape required ☐ Rigid railing required
☐ Additional Anchorage Connector Needed e.g. Cross Arm Strap, etc.		☐ Covers over opening ☐ Warning signs required
☐ Retractable Device Needed	**Additional Information:**	
☐ Horizontal Life Line System Req'd.		
☐ Fall Clearance Distance Adequate		
☐ Fall Rescue/Retrieval Plan Set Up		

Sevenson Environmental Services, Inc.

CONFINED SPACE PERMIT

Date_____ Time of Issue_____ Length of Permit_____
Location _____ Equipment ID_____
Purpose of Entry & Description of Work _____
_____
_____
Authorized Entrant(s)_____
Will "HOT" Work be authorized for this Entry? ☐ No; ☐ Yes (describe)_____
_____

HAZARDOUS IDENTIFICATION

Indicate ALL potential Hazards of this Permit Space:	YES	N/A
a. Contains or may contain a hazardous atmosphere	☐	☐
b. Contains a material for potential engulfment	☐	☐
c. Has an internal configuration for potential entrapment	☐	☐

If "Yes", describe _____
_____

d. Contains the following serious safety or health Hazards:_____

PRE-ENTRY PREPARATION

		YES	N/A	Done			Removed		
				Date	Time	By	Date	Time	By
1. Lines broken and/or blanked:									
Line Contents	Location								
a.									
b.									
c.									
2. Drain or at a workable level									
3. Purge - flush and vent									
4. Force air to bottom & vent									
5. Lock out power feeds:									
Equip/Location of Lock out									
a.									
b.									
6. Shut-off heating systems									
7. Other:									

TEST TO BE TAKEN

	P.E.L.	Time Tester Yes	Time Tester N/A	Time Tester Results	Time Tester Results	Time Tester Results
% of Oxygen	19.5% to 23%					
% of LEL	Any % over 10					
Carbon Monoxide	25 ppm					
Hydrogen Sulfide	10 ppm					
VOC						
Temperature	< 110ºF/43ºC					

PREVENTION OF UNAUTHORIZED ENTRY

	YES
1. Have Worker(s) to enter been trained for this specific entry?	☐
2. Have Attendants been trained for this specific space?	☐
3. Post "WORKER IN CONFINED SPACE" Sign	☐

4. Set-up the following additional barriers:

_____

_____

MANDATORY SAFETY EQUIPMENT REQUIRED

	YES	N/A
1. Fire Extinguisher	☐	☐
2. Retrieval Lines	☐	☐
3. Respirator	☐	☐
4. Goggles	☐	☐
5. Hearing Protection	☐	☐
6. Protective Clothing	☐	☐
7. Special Boots or Shoes	☐	☐
8. Gloves	☐	☐
9. Other Safety Equipment Required	☐	☐

_____ _____

_____ _____

_____ _____

_____ _____

COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY

(Verify that chosen equipment is in place and operation.)

Verified by:

1._____ _____

2._____ _____

RESCUE EQUIPMENT TO BE PROVIDED ON-SITE

		YES	N/A
a.	Two chest harnesses or two wristlets	☐	☐
b.	Two five minute supplied air escape respirators	☐	☐
c.	One 30 minute S.C.B.A.	☐	☐
d.	One emergency siren	☐	☐
e.	Man basket	☐	☐
f.	Retrieval wench	☐	☐
g.	Other necessary Rescue Equipment	☐	☐

_____

_____

_____

IN CASE OF EMERGENCY

Rescue Service	Phone Number or Ext.
1._____	_____
2._____	_____
3._____	_____

Confined Space Entry Supervisor or designee must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

Authorization of Entry

Signature (if not CSE Supervisor, add title)	Date	Time

Termination of Entry

Signature	Date	Time

Daily Air Monitoring Report

Project Number:	**Project Name:**	**Project Supervisor**

Date:	**Duration of Monitoring**

Work Location and Task:

Instrument:		**Instrument:**		**Instrument:**	
Reading	**Time**	**Reading**	**Time**	**Reading**	**Time**
Calibration:		**Calibration:**		**Calibration:**	

Perimeter Samples Collected:

Personnel Samples Collected:

Perimeter and Personnel Sample Results from Previous Day (Provide Data when Received):

Comments:

Name:	**Title:**
Signature:	**Date:**

Daily Air Monitoring Report (Cont.)

Project Number:		**Project Name:**		**Project Supervisor**	
Instrument:		**Instrument:**		**Instrument:**	
Reading	**Time**	**Reading**	**Time**	**Reading**	**Time**
Calibration:		**Calibration:**		**Calibration:**	
Signature:			**Date:**		

Sevenson Environmental Services, Inc.
Daily Safety Meeting

DATE: **DAY:**	**JOB NAME:** **& NUMBER:**

TOPIC:

PRINT	SIGNATURE:

Sevenson Environmental Services, Inc.
DAILY SAFETY REPORT

DATE:

WORK PERIOD COVERED:

WEATHER CONDITIONS:

SUMMARY OF DAY'S WORK ACTIVITY:

EQUIPMENT UTILIZED BY SAFETY MONITORS:

PROTECTIVE CLOTHING AND EQUIPMENT BEING USED BY TASK:

PHYSICAL CONDITION OF WORKERS (any heat or cold stress or other medical problems):

ACCIDENTS OR BREACH OF PROCEDURES:

DESCRIPTION OF MONITORING AND AIR SAMPLES TAKEN:

TYPE AND NUMBER OF PERMITS ISSUED:

SUMMARY OF TRAINING AND SAFETY MEETING:

NAME:	TITLE: Site Health and Safety Officer
SIGNATURE:	

Sevenson Environmental Services, Inc.

Incoming Trailer Inspection and Off Loading Plan

Truck and Trailer Id# _____ Date:_____

Cargo:_____

Is load properly secured? ☐ YES ☐ NO

If load is not properly secured, is it stable? ☐ YES ☐ NO ☐ N/A

If load is not properly secured, can it be unloaded safely? ☐ YES ☐ NO ☐ N/A

If the load can not be unloaded safely at the site, the load must be rejected.

Methods for removing the load

Equipment	Personnel
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Steps to remove load

1. _____
2. _____
3. _____
4. _____
5. _____

List responsibilities of personnel by name

1. _____
2. _____
3. _____
4. _____
5. _____

Critical Lift Plan required? ☐ YES ☐ NO

Pre Job Briefing Held? ☐ YES ☐ NO

Signature of attendance

1. _____
2. _____
3. _____
4. _____
5. _____

Sevenson Environmental Services, Inc.

EMPLOYEE & VISITOR LOG

DATE:

PRINT NAME	SIGNATURE	COMPANY	Time In	Time Out

Sevenson Environmental Services, Inc.
Equipment Decontamination Log

Project Number:	Project Name:	Project Supervisor:

Equipment Description	Equipment Number	Date Decontaminated	Date Demobilized

Comments:

Site Safety and Health Officer	**Signature**

DAILY EXCAVATION CHECKLIST

Location of Excavation: _____

Name of Qualified Person: _____

Date of Inspection: _____ Utility Locate No.: _____

Soil Type: ☐ Stiff Clay ☐ Firm Clay ☐ Dry Granular ☐ Wet Granular ☐ Saturated Granular ☐ Running

Hydrostatic Conditions: ☐ Dry ☐ Wet ☐ Saturated

Weather Conditions: ☐ Sunny ☐ Overcast ☐ Rain

Angle of Repose: (width and height) _____

Unsupported Wall Height: (measurement required) _____

Protection Required: ☐ Trench Box ☐ Shoring ☐ Sheeting ☐ Benching ☐ Sloping

Personal Protection Requirements: (list) _____

_____

Egress/Ingress: (identify) _____

Ladders/Ramps Location: _____

Location of Spoils: _____

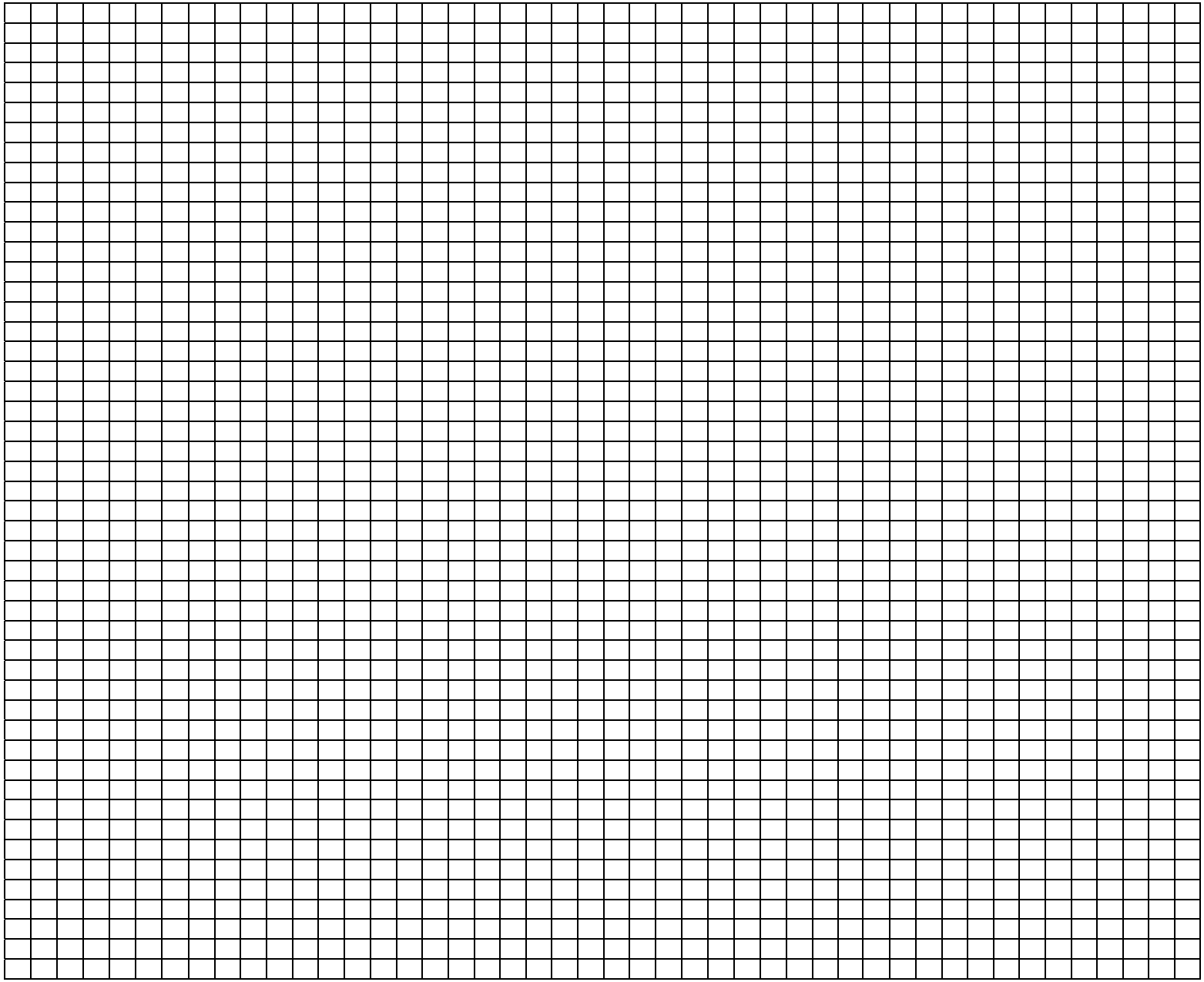
Location of Overhead Lines: _____

Name of Spotter for Overhead Lines: _____

Sketch excavation plan on reverse side and retain in file for 3 years.

EXCAVATION SITE PLAN

LOCATION



ABOVE GROUND CONSIDERATIONS

- ☐ Building Overhangs
- ☐ Electrical Lines
- ☐ Canopies
- ☐ Tree Overhangs
- ☐ Traffic Lights
- ☐ Street Lights

GROUND LEVEL CONSIDERATIONS

- ☐ Buildings
- ☐ Manholes
- ☐ Trees
- ☐ Hydrant
- ☐ PIVs
- ☐ Parking Lots
- ☐ D-Islands
- ☐ Curbs
- ☐ Ditches/ Drains
- ☐ Towers
- ☐ Shrubs
- ☐ Fences
- ☐ Signs
- ☐ Lamp Posts
- ☐ Guard Posts
- ☐ Gate Arms
- ☐ TV Cameras
- ☐ Walls

BELOW GROUND CONSIDERATIONS

Site Prints

- ☐ Site Lightings
- ☐ Comm. Duct Bank
- ☐ 13.2 kV Electricity
- ☐ Fire Line
- ☐ Water
- ☐ Natural Gas
- ☐ Lawn Irrigation
- ☐ Chilled Water
- ☐ Steam
- ☐ Sanitary

Building Prints

- ☐ Fuel Lines
- ☐ Electricity for Gate Arms
- ☐ Electricity for TV Cameras
- ☐ UST (Tanks)

Sevenson Environmental Services, Inc.

HOT WORK PERMIT

Job Description: ☐ **Welding;** ☐**Torch/oxy/acetylene;** ☐ **Grinding/Cut saw;** ☐**Maintenance;**
☐ **Heating Operation;** ☐ **Other:**_____

Permit Duration: ☐ **4 hrs;** ☐ **8 hrs;** ☐ **10 hrs;** ☐ **12 hrs**

Person(s) Performing Hot Work: _____

Fire Watch Required? ☐ **Yes;** ☐ **No**

If yes, Fire Watch Attendant:_____

Air Monitoring Required? ☐ **Yes;** ☐ **No** **Respiratory Protection Required?** ☐ **Yes;** ☐ **No**

MONITORING
(Acceptable Levels)

DATE	TIME	O_2 (19.5-22.0%)	LEL (0-10%)	ORGANIC VAPOR* (0-25ppm)

FIRE PROTECTION

Fire extinguisher present: YES ☐; **Area cleared of combustibles: YES** ☐; **Are operations in compliance with OSHA Regulations: YES** ☐;

Activity Hazard Analysis attached and reviewed by affected personnel: YES ☐

Requirements for Performing Hot Work

- **Flame retardant gloves, coat, and proper eye protection (glasses or shield with welding/cutting rated glass lens)**
- **Respirators will be required when welding/cutting/heating areas that cannot be decontaminated or when welding on stainless steel (Cr-VI) or galvanized metal (metal fume fever).**
- **Use fire blankets when necessary to protect material or areas where removing combustibles is not practical.**
- **Inspect welder, lead lines, and ensure unit is properly grounded.**
- **Maintain a 50 ft diameter clearance for flammables (i.e., fuel cans, vapors) an/or 25 ft diameter clearance for combustibles (i.e., wood, rags, debris)**
- **Oxygen & Acetylene bottles are secure with regulators removed and caps installed prior to moving or unattended during breaks**
- **Inspect all hoses, torch, tips and regulators for defects and ensure flash suppressors are installed**
- **Properly store all empty and full cylinders from vicinity and protect from hot work activities**
- **Barricade walkway under any overhead work**
- **If welding shields are not available, barricade and delineate all work areas when using a torch or welder with a minimum distance of 75 feet.**
- **When normal fire prevention precautions are not sufficient, a qualified fire watch is required. The fire watch shall be instructed in anticipated fire hazards and shall perform assigned duties to 30 minutes after hot work was stopped.**
- **At completion of work activity, disassemble all hoses and regulators and properly store**
- **Toxic surface coatings must be removed prior to welding, cutting or heating. A minimum of 4-inches must be cleared from each side of the weld, cut, or heated area.**
- ***If working with fuel oil the PID for organic vapors will be used to determine the LEL due to the poor LEL sensor response to heavy hydrocarbons. Acceptable PID readings for ensuring vapors are less than 10% LEL will be less than 250 ppm VOCs.**

Health and Safety Officer:_____ **DATE:**_____

Job Safety Enhancement Program

JSEP Form

"You can force compliance, you have to earn commitment"

☐ Safety Observation ☐ Task Improvement ☐ Hazard Identification

Description:_____

Recommendations:_____

Submitted By:_____ Date:_____

JESP Number:_____

Follow up or Corrective Action (if required):_____

Person Responsible for Follow up or Corrective Action:_____

Estimated Completion Date:_____ Actual Completion Date:_____

Person responsible for verification:_____ Date:_____

Sevenson Environmental Services, Inc.

Figure 1: Lift Plan - Load and Capacity Calculations

Lift Load and Capacity Calculations (Page 1 of 3)							
Lift Description:							
A. Weight of Load (Equipment) – Live Load							
1. Load/Equipment Condition New	( )		Used	( )			
2. Weight of Load/Equipment Empty		Lbs.					
3. Weight of Attachments		Lbs.					
a. Platforms and Ladders		Lbs.					
b. Piping and Accessories		Lbs.					
c. Liquids Inside		Lbs.					
d. Dirt and Debris		Lbs.					
e. Internal Trays or Liners		Lbs.					
f. Other		Lbs.					
		Lbs.					
4. Total Amount of Load/Equipment Weight (A2 through A3f)		Lbs.					
B. Total Lifted Weight (load and/or equipment + rigging + main crane deductions)							
1. Load and/or equipment weight plus contingency*		%	7. Wt. Jib Erected		Lb		
2. Amount of Equipment Weight		Lb	7a. Wt. Of Jib Stowed		Lb		
3. Weight of Headache Ball		Lb	8. Wt. Of Jib Headache Ball		Lb		
4. Weight of Main Block		Lb	9. Wt. Of Cable (Load Fall)		Lb		
5. Weight of Spreader Bar		Lb	10. Auxiliary Boom Head		Lb		
6. Weight of Slings and Shackles		Lb	11. Other:		Lb		
*Use 100% plus some percentage (example +10%) to multiply times number in A 4 to allow for contingency to compute B2.							
TOTAL LIFTED WEIGHT (Sum B2 thru B11)		Lbs.					
Source of Load Weight (A2):							
(Name Plate, Drawings, Calculated, Weighed, etc.)							
Weights and Calculations By:			Date:				
Weights and Calculations Verified By:			Date:				
(See page 2)							

Load and Capacity Calculations (Page 2 of 3)					
C. Capacities of the (Main) Crane					
Make & Model of Crane					
2. Counter Weight Size:		Type of Boom:			
3. Lifting Arrangement					
a. Max. Radius During Lift		Ft.			
b. Length of Boom		Ft.			
c. Angle of Boom at Pick		Deg.			
d. Angle of Boom at Set		Deg.			
Rated Capacity Under Most Severe Conditions					
1. Over Rear		Lbs.			
2. Over Front		Lbs.			
3. Over Side		Lbs.			
f. Rated Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side or….)		Lbs.			
4. Jib					
a. Is the Jib to be used	Yes	No			
b. Length of Jib		Ft.			
c. Jib Angle		Deg.			
d. Rated Jib Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or…)		Lbs.			
5. Load Line/Fall Cable					
a. Is Main Block to be used?	Yes	No			
b. Number of Parts of Cable					
c. Size of Cable		Ø inches			
d. Maximum Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or ….)		Lbs.			
D. Percent of Cranes Capacity (>85% requires High Hazard Lift Approvals)					
	Total Lifted Weight X 100 = Rated Capacity	%			
E. Size of Slings					
1. Sling Selection					
a. Type of Arrangement		(Spreader, Vertical Slings, etc.			
b. Number of Slings to Hook	Ø	Capacity	Lbs.		
c. Sling Size		Ø			
d. Sling Length		Ft.			
e. Sling Capacity (At angle used)		Lbs.			
f. Number of Slings to Load		#			
g. Total Rigging capacity (e x f)		Lbs.			
Comments:					
Sketch of rigging arrangement available	Yes	No	See Page ( )		
End of Standard Lift Plan Paperwork (					

Comments and Signatures (Page 3 of 3)			
Comments:			
Sketch of rigging arrangement available	**Yes**	**No**	**See Page ( )**
Reviewed by (*additional reviews required for high hazard lifts*):			
Safety Officer:			
Lift Supervisor:			
Rigging Supervisor:			
Crane Operator:			

Figure 2: Pre-Lift Checklist

		Yes	No
1.	Crane operator meets company qualification requirements?	☐	☐
2.	Lift calculations and rigging plan completed?	☐	☐
3.	Are lift equipment swing & travel requirements & clearances known?	☐	☐
4.	Are all required approvals/permits signed?	☐	☐
5.	Crane inspections up to date (Annual/Monthly/Daily)?	☐	☐
6.	Weather conditions and wind speed acceptable?	☐	☐
7.	Has the stability of the ground been assured by soil bearing analysis?	☐	☐
8.	Location and size of underground facilities are known?	☐	☐
9.	Matting and/or outrigger pads inspected and approved?	☐	☐
10.	Electrical equipment and power lines at required distance?	☐	☐
11.	Rigging Inspected for defects?	☐	☐
12.	Engineered lifting lugs fabricated and installed correctly?	☐	☐
13.	Connecting/disconnecting means been developed?	☐	☐
14.	Have the safety precautions been reviewed?	☐	☐
15.	Is survey equipment required?	☐	☐
16.	Lift Hold Point of ≥_____ lbs communicated to crew?	☐	☐
17.	Signal person(s) assigned?	☐	☐
18.	Safe Plan of Action (SPA) Completed?	☐	☐
19.	Pre-Lift Meeting/Task Safety Awareness Meeting (TSA) held?	☐	☐
20.	Hoist area & load path cleared of non-essential personnel?	☐	☐
21.	Crane set up per the lift plan (radius, configuration, etc)?	☐	☐
22.	Rigging equipment and tag line(s) installed per plan?	☐	☐

Completed By Signature: Name Printed: Date:

Sevenson Environmental Services, Inc.

Sevenson Environmental Servicies, Inc.

Job Safety Enhancement Program

NEAR MISS REPORT

A near miss is a potential hazard or incident that has not resulted in any personal injury . Unsafe working conditions, unsafe employee work habits, improper use of equipment or use of malfunctioning equipment have the potential to cause work related injuries. It is everyone's responsibility to report and /or correct these potential accidents/incidents immediately. Please complete this form as a means to report these near-miss situations.

Location _____ Date: _____

Time _____ ☐ am ☐ pm

Please check all appropriate conditions:

☐ Unsafe Act ☐ Equipment: Defective, broken, damaged

☐ Unsafe Condition ☐ Improper use of equipment ☐ Complacency

Description of incident or potential hazard : _____

_____

_____

Employee Signature _____ Date _____

(*optional*)

NEAR MISS INVESTIGATION

Description of the near-miss condition: _____

_____

Causes (primary & contributing) _____

_____

Corrective action taken (Remove the hazard, replace, repair, or retrain in the proper procedures for the task)

_____

_____

_____

Signed: _____ Date Completed _____

Not completed for the following reason: _____

Management _____ Date _____

Near Miss Report Number:_____

Sevenson Environmental Services, Inc.

TRAINING ACKNOWLEDGMENT FORM

NAME:

ADDRESS:

SOCIAL SECURITY NO.: XXX-XX-

EMPLOYER:

I have completed and understand the training program for work to be carried out during work at the Site, including the following topics:

a. Work Rules and Safety Requirements
b. Personal Protection Equipment
c. Potentially Hazardous Chemicals
d. Emergency Equipment and Plan
e. Reporting Injuries and Illnesses
f. Emergency Procedures
g. Job Assignment
h. Personal Hygiene
i. Medical Tests
j. Standard Operating Procedures
k. Applicable Rules and Regulations
l. Respiratory Protection
m. Site Safety and Health Plan was reviewed

Site Personnel Signature: _____	Date:_____

I certify that the above has received adequate safety training and instruction and that this person is proficient in the use of protective clothing and equipment and knowledgeable in all aspects of the Health and Safety Plan.

Safety Officer Signature: _____	Date: _____

Attachment 3
Confined Space Program

Confined Space Program

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305

TABLE OF CONTENTS

1.0 Purpose

The purpose of Confined Space Entry Program is to protect the health and safety of employees who enter confined spaces and/or are assigned to serve as attendants or rescue personnel. This program is also intended to ensure compliance with 29 CFR 1910.146 and EM 385-1-1 Section 34.

2.0 Application

This program applies to:

2.1. All employees, who are authorized to enter a confined space

2.2. All employees assigned to serve as attendants

2.3. Provide assistance during a confined space emergency rescue

2.4. Employees who serve as Confined Space Entry Supervisors or Confined Space Entry Program Administrators.

3.0 Definitions

3.1. ACCEPTABLE ENTRY CONDITIONS - conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space can safely enter and perform work.

3.2. ATTENDANT - an individual stationed outside the permit-required confined space who had specific training and monitors the authorized entrants inside the space.

3.3. AUTHORIZED ENTRANT - employee who is authorized to enter a permit-required space.

3.4. BLANKING OR BLINDING - absolute closure of a pipe, line, or duct by fastening across its bore a solid plate that completely covers the bore and can withstand the maximum upstream pressure.

3.5. CONFINED SPACE - a space that meets <u>all</u> the following criteria:

1) is large enough and so configured that an employee can bodily enter and perform assigned work;

2) has limited means of entry and egress; and

3) is not designed for continuous employee occupancy.

Examples may include tanks, silos, boilers, pits, bins, manholes electrical vaults, degreasers, and hoppers.

3.6. ENGULFMENT - surrounding and effective capture of a person by a liquid or finely divided solid substance (i.e sand, corn. grain, sawdust etc).

3.7. ENTRY - a person's intentional passing through an opening into a permit-required confined space.

3.8. ENTRY PERMITS - a written or printed document that allows and controls entry into a permit space.

3.9. ENTRY SUPERVISOR - person responsible for:

1) determining if acceptable conditions are present before entering a permit space;

2) for authorizing entry;

3) coordinating and supervising all entry operations; and

4) terminating entry.

3.10. HAZARDOUS ATMOSPHERE - an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes

1) Flammable gas, vapor or mist in excess of 10% of its Lower Explosive Limit (LEL).

2) Airborne combustible dust at a concentration that meets or exceeds its LEL.

3) Atmospheric oxygen concentration below 19.5 percent or above 23.0 percent (22% for USACE sites)

4) Atmosphere concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environment Control, or in Subpart Z, Toxic and Hazardous Substances, of 29 CFR 1910 and which could result in employee exposure in excess of its dose or PEL

5) Any other atmospheric condition that is immediately dangerous to life or health.

3.11. HOT WORK PERMIT – employer's written authorization to perform operations (for riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

3.12. IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) - any condition that poses an immediate threat to life, or a delayed threat to life, or that would cause irreversible adverse health effects, or interfere with an individual's ability to escape unaided from a permit space.

3.13. ISOLATION - process by which a permit space is removed from service and completely protects against the release of hazardous energy or material into the space.

3.14. LOWER EXPLOSIVE LIMIT (LEL) - the lowest concentration of gas or vapor, expressed in percent by volume in air, that burns or explodes if an ignition source is present at room temperature.

3.15. LINE BREAKING - intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas or any fluid at a volume, pressure, or temperature capable of causing death or serious physical harm.

3.16. NON PERMIT CONFINED SPACE- A confined space that does not contain or have the potential to contain an atmospheric hazard or any other serious safety or health hazard.

3.17. OXYGEN DEFICIENT ATMOSPHERE - an atmosphere containing less than 19.5% oxygen.

3.18. OXYGEN ENRICHED ATMOSPHERE - an atmosphere containing more than 23.0% oxygen (22% for USACE sites).

3.19. PERMISSIBLE EXPOSURE LIMIT (PEL) - the airborne concentration of a hazardous material that must not be exceeded over a specified time. This value is established by the Occupational Safety and Health Administration (OSHA).

3.20. PERMIT-REQUIRED CONFINED SPACE - a confined space that has one or more of the following characteristics:

1) Contains or has a reasonable potential for hazardous atmospheres.

2) Contains a material that has the potential for engulfment.

3) Is internally configured so an employee could become trapped or asphyxiated by inwardly converging walls or a floor that slopes downward into a smaller cross-section.

4) Contains any other recognized serious safety or health hazard.

3.21. PROHIBITED CONDITION - any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

3.22. RESCUE SERVICE - personnel designated to rescue employees from permit spaces.

3.23. RETRIEVAL SYSTEM - equipment used for a non-entry rescue of persons from permit spaces (i.e., tripod).

3.24. TESTING - process by which hazards that may affect entrants of a permit space are identified and evaluated.

3.25. THRESHOLD LIMIT VALUE (TLV) - the airborne concentration of a hazardous material that should not be exceeded over a specified time. This value is established by the American Conference of Governmental Industrial Hygienists (ACGIH).

3.26. WELDING/CUTTING PERMIT - written authorization to perform operations that can provide a source of ignition (e.g., welding, cutting, burning, or heating) or a hazardous atmosphere.

4.0 Responsible for Compliance

4.1. The Confined Space Entry Program Administrator is the SSHO, or Superintendent if a SSHO is not assigned to the project.

The responsibilities of this individual shall include:

1) Conducting/coordinating hazard assessments.

2) Determining the classification (permit required/non permit space and location of each confined space.

3) Coordinating the posting of appropriate danger/caution signs by each confined space.

4) Supervising the selection and use of respirators in conjunction with the Respiratory Protection Program Administrator.

5) Coordinating the medical screening of respirator users.

6) Conducting/coordinating supervisory and employee training (including attendants) and maintaining all training records.

7) Conducting an annual evaluation of the overall program to determine its continued effectiveness.

8) Consulting employees and their authorized union representatives on the development and implementation of the Confined Space Entry Program.

4.2. Managers and Supervisors

The responsibilities for these people shall include:

1) Actively supporting the Confined Space Entry Program and providing funding to purchase equipment when needed.
2) Ensuring all assigned personnel are knowledgeable of all aspects of the Confined Space Entry Program.
3) Ensuring their employees comply with all elements of Confined Space Entry Program.
4) Ensuring appropriate PPE and equipment is properly utilized and maintained.

4.3. Confined Space Entry Supervisor is the Superintendent.

The responsibilities of this individual shall include:

1) Providing confined space entry personnel with a copy of the most current Confined Space Entry Program and any future changes.
2) Knowing the hazards that may be encountered during entry and informing the entrants about the hazards, including information on the mode, signs, or symptoms and consequences of exposure.
3) Verifying that the proper atmospheric tests have been conducted and that all procedures and equipment, mentioned in the permit, are in place before signing the Confined Space Entry Permit.
4) Assuring that the Confined Space Entry Permit is completed prior to each entry.
5) Terminating the entry and canceling the permit when needed.
6) Verifying that rescue or other emergency personnel are available and that the means for summoning them are operable in the event that an emergency occurs.
7) Removing unauthorized individuals who have entered or who attempt to enter the confined space.
8) Determining whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, and that entry operations remain consistent with terms of the entry permit.
9) Maintaining completed entry permits and equipment calibration records.
10) Providing employees and their authorized union representative(s) an opportunity to observe the atmospheric testing of the confined space.

NOTE: The Confined Space Entry Supervisor may also serve as an attendant or as an authorized entrant providing that person is properly trained and equipped. The duties of the Confined Space Entry Supervisor may also be passed from one individual to another during the course of an entry operation as long as the alternate is qualified.

4.4. Authorized Entrants

All authorized entrants shall be responsible for:

1) Knowing and recognizing the hazards that may be faced during entry including

information on the mode, signs, or symptoms and consequences of exposure.

2) Using and maintaining the proper PPE and other equipment.

3) Communicating with the attendant as necessary.

4) Alerting the attendant when hazardous conditions are detected, identified, or suspected.

5) Exiting the confined space immediately whenever:

   a. Ordered to do so by other entrants, the attendant or the Confined Space Entry Supervisor.

   b. Warning signs/symptoms are identified,

   c. Prohibited conditions are identified,

   d. An evacuation alarm is activated.

6) Complying with all other aspects of the Confined Space Entry Program

4.5. Attendants (Standby persons)

All authorized attendants shall be responsible for:

1) Knowing the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

2) Knowing the possible behavioral effects of the hazard exposure in the authorized entrants.

3) Maintaining an accurate count of authorized entrants in the confined space and ensures that the means used to identify the authorized entrants accurately identifies who is in the space.

4) Remaining outside the confined space during entry operations until relieved by another attendant.

Note: Attendants may enter a confined space to attempt a rescue if they have been trained and equipped for rescue operations and if they have been properly relieved.

5) Communicating with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the confined space.

6) Monitoring activities inside and outside the confined space to determine if it is safe for authorized entrants to remain in the space and order the authorized entrants to evacuate the space immediately under any of the following conditions:

   a. If the attendant detects a prohibited condition.

   b. If the attendant detects a behavioral effect of the hazard exposure in an authorized entrant.

   c. If the attendant detects a situation outside the confined space that could endanger the authorized entrants; or

   d. If the attendant cannot effectively and safely perform all the duties required.

7) Summoning rescue and other emergency services as soon as the attendant determines that entrants need assistance to escape from the confined space hazards.

8) Taking the following actions when an unauthorized person(s) approach or enter a confined space while entry is underway:

   a. Warn the unauthorized person(s) that they must stay away from the confined space.

   b. Advise the unauthorized person(s) that they must exit immediately if they have entered the confined space.

   c. Inform the authorized entrants and the entry supervisor if an unauthorized person(s) have entered the confined space.

   d. Performing non-entry rescues as specified in Section 6.8.2.

9) Performing no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

5.0 Permit System

5.1. Permit

Before entry is authorized, an entry permit shall be prepared in order to document the completion of safety measures required (as discussed in section 6.0 of this Program). The completed permit shall be made available to all authorized entrants or their authorized representatives, at the time of entry, by posting it at the entry portal or by any other equally effective means.

1) The Confined Space Entry Supervisor shall sign a completed Confined Space Entry Permit or in his absence another member of the health and safety staff (if properly trained) to authorize entry into a permit-required confined space.

2) The Confined Space Entry Supervisor shall ensure that the permit specifies the location, type of work, personal protective measures, authorized entrants, monitoring equipment, hazards of the permit space, hazard control measures and any required rescue equipment. The procedure for contacting rescue services will also be included on the permit.

3) The permit shall be dated and carry an expiration time limiting the work to one shift.

4) The duration of the permit may not exceed the time required to complete the assigned task or job.

5) The Confined Space Entry Supervisor shall terminate the permit if a potential hazardous situation occurs which exceeds the conditions authorized on the permit or the entry operations, documented on the permit have been completed.

6) Cancelled entry permits shall be retained for at least 1 year.

7) The permit must be available at the work area outside the confined space entry point.

8) All confined space entry permits must be given to the Confined Space Entry Supervisor after the work is completed.

9) Hot work (potential ignition sources) must be authorized on a separate hot work permit that is attached and noted on the confined space entry permit.

10) Individuals authorizing entry into a permit required confined space may serve as entrants or attendants if they have received the proper training.

5.2. Entry Procedure

Supervisors, attendants and authorized employees must complete the general requirements, discussed in the next section. Entry procedure to permit required confined space are as follows:

1) The Confined Space Entry Supervisor shall be notified prior to the time that an entrant enters a permit-required confined space.

2) A Confined Space Entry Permit shall be properly completed and signed by the Confined Space Entry Supervisor or in their absence another member of the health and safety staff (if properly trained) prior to entry into the permit-required confined space.

3) Only properly trained and authorized individuals will be allowed to enter a permit required confined space. Authorized entrants will maintain contact with the attendant either visually or verbally.

4) Each individual entering a permit-required confined space will, whenever practical, have a safety or retrieval line attached to a body harness or wristlets. The other end of the line must be secured to a secure anchor point or lifting device (i.e., tripod) outside the entry portal. **Note: The anchor point shall not be secured to a motor vehicle in a manner that would pull the line out of the space if the vehicle moved unless proper Lockout/Tagout controls are in place.** A retrieval line is not required if:

    a. A permit space has obstructions or turns that would prevent pull on the retrieval line from being transmitted to the entrant, or

    b. A permit space from which an employee being rescued with the retrieval system has projections which would injure the employee if forcefully removed,

    c. A permit space when entered by an entrant using an air supplied respirator and retrieval lines could pose an entanglement hazard, or

    d. A permit required excavation other than a trench.

5) A properly trained individual shall test the atmosphere for oxygen content, flammable gases, and potential toxic air contaminants prior and during entry. Each entrant shall be required to wear an air-monitoring instrument if the confined space is large enough and/or has a potentially hazardous atmosphere, excavations are exempt from this requirement unless working with unknown drums or containers.

6) During any confined space entry, all safety rules and procedures shall be followed.

7) At least one attendant should be provided outside the permit space into which entry is authorized for the duration of entry operations.

8) Personal protective equipment, including respirators, shall be provided to entrants as necessary for safe entry into the confined space and used properly.

   a. All PPE must be approved by the Confined Space Entry Supervisor.

   b. An atmosphere supplied breathing apparatus shall be used for entry into an unknown atmosphere. The Rescue Team, with self-contained breathing apparatus (SCBA) must be present on-site and immediately available if entry is into an atmosphere that is actually or potentially immediately dangerous to life or health.

9) Electrical equipment used in the confined space shall be appropriate for the hazard and meet the requirements of the National Electric Code if a hazardous atmosphere is present.

10) Any condition making removal of an entrance cover unsafe (i.e. pressured differential, physical obstacles, etc.) shall be eliminated before the cover is removed.

   a. When the cover has been removed, the opening(s) shall be promptly guarded to prevent accidental fall into the opening and prevent objects from falling into the opening.

   b. Appropriate vehicle and pedestrian barriers shall be used to protect workers.

11) Metal ladders shall not be used when working around electrical equipment.

12) Any use of chemicals or welding, soldering, or cutting operations must be approved by the Confined Space Entry Supervisor.

6.0 General Requirements

6.1. Workplace Evaluation

The Confined Space Program Administrator will coordinate/conduct an evaluation of the workplace to determine if confined spaces are present. A detailed assessment will be made of each space in order to determine type and location of each space, its dimensions and number of exits, the reason(s) for entry, actual or potential health and safety hazards, and its classification (permit or non-permit). The assessment will also specify the equipment and personal protective equipment (PPE) required for entry and any special precautions that must be followed for safe entry and work in the confined space. The results of the assessment will be recorded on a Confined Space Hazard Assessment Form (See Form I - Part 1 and 2). It is required that all affected employees be trained for their respective duties, prior to their entry

6.2. Identification of Confined Spaces

Effective means of identifying confined spaces (i.e. training, etc.) may be used to prevent unauthorized entry.

1) Warning Signs and Posting

   a. When using warning signs or placards for the identification of Confined Spaces, all types shall be printed both in English and (if applicable) in the predominant language of any non-English reading employees.

b. Where confined space entry symbols are established, they shall also be used in conjunction with a warning sign.

c. Signs shall include, but not necessarily be limited to, the following information:

   i. **DANGER: PERMIT REQUIRED CONFINED SPACE - DO NOT ENTER UNLESS AUTHORIZED**

d. The following statements shall be added in large letters to the warning sign when a specific work practice must be performed or when specific safety equipment is necessary:

   i. Respirator Required For Entry

   ii. Lifeline Required For Entry

   iii. Hot Work Permit-Required

e. Signs are <u>not required</u> at manholes, or any other entry, located in public traffic areas.

6.3. Atmospheric Requirements Prior to Entry:

The atmosphere in the confined space within the entrant's immediate area may be continuously monitored for oxygen and combustible gas and any other hazardous substance which the employer has reason to believe may be present in the confined space. Excluding excavations greater the 4 feet in depth which will be checked initially and then periodically thereafter unless determined otherwise by the Confined Space Entry Supervisor.

Before entering a confined space, the following atmospheric conditions <u>must</u> be met:

1) The oxygen level is between 19.5% and 23.0% (22% for USACE sites).

2) The concentrations of flammable gas, vapors, or mists are below 10% of their Lower Explosive Limits (LEL).

3) The level of airborne hydrogen sulfide (H_2S) is below 10 parts per million (ppm).

4) Toxic air contaminates are less than the OSHA Permissible Exposure Limit (PEL). **Note:** If the substance does not have a PEL, use the Threshold Limit Value (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH).

5) Atmospheric concentrations of toxic substances are below what is considered as the IDLH.

6) The level of carbon monoxide (CO) is less than 35 ppm.

Entry into a confined space is **not** allowed if monitoring indicates deficiency in any of these categories. Respirators or a self-contained breathing apparatus (SCBA) shall not to be used to allow entry into deficient atmospheres unless specifically approved in writing by Sevenson's Safety and Health Manager (and the USACE Contracting Officer's Representative on USACE sites).

In order to achieve and maintain a safe atmosphere, <u>one or more actions</u> may have to be

taken to render the space safe for human occupancy. This could include:

1) Isolation - precautions taken to prevent release of material and/or energy into the space. This can be achieved through blinding, blanking, disconnecting, lockout/tagout, or removal of incoming pipes or related energy sources.

2) Ventilation - purging, inserting, flushing, or otherwise ventilating the space with fresh air. The replacement air will displace the contaminated air allowing for safe entry. This can be accomplished by removing ports and openings or by mechanically ventilating the vessel.

3) Separation - where there is a possibility of external hazards, the space may require barricades to protect the entrants from falling objects or from unauthorized entry.

6.4. Ventilation

If a confined space being entered is found to contain a hazardous atmosphere, forced ventilation may be provided for a period of time in order to bring the air quality within the acceptable limits. Once the determined ventilation period expires, employees shall monitor the confined space according to subsection entitled "Air Monitoring". If the sampling shows that a hazard still exists, then additional ventilation and sampling may be required.

Note: Control of atmospheric hazards through forced ventilation does not constitute elimination of hazards.

If the hazard still exists after repeated ventilation steps, the confined space shall then be considered a permit-required confined space and the Confined Space Entry Team (entrant, attendant, and Confined Space Entry Supervisor) must follow the proper procedures for permit-required confined space entry.

Note: Forced ventilation may not be used in lieu of monitoring. Consideration must also be given to the possibility of static discharge that could be a source of ignition.

Forced air ventilation should be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees leave.

Whenever ventilation is used, employees shall:

1) Keep the blower controls at least 10 feet from the confined space, and out of the wind or downwind from the entrance to the confined space.

2) Use a ventilation blower that is designed to be intrinsically safe if the possibility of an explosive atmosphere could exists.

3) Ensure that the exhaust systems are designed and placed so that they protect employees in the surrounding area from being contaminated.

4) Ensure that the ventilation system is fully operational and air is supplied from a clean source.

5) Ensure that contaminated air is not recirculated into the confined space.

6) Purge the ventilation hose outlet for at least one-minute (at street or blower level if possible) before inserting the hose into the confined space.

7) Maintain continuous local ventilation when toxic atmospheres are being produced as part of a work procedure (i.e., welding, painting or cleaning operations).

6.5. Lockout/Isolation

Each confined space (if applicable) shall have its own specific written lockout/isolation procedures. These procedures will be posted above and/or next to the entrance of the confined space, where feasible.

1) Electrical Isolation: In order to prevent employees from being exposed to activation of moving parts, or from being exposed to energized objects, authorized entrants shall lockout circuit breakers and/or the disconnect in the open (off) position with a key-type lock. If more than one authorized entrant is to be inside the confined space, each employee must place his/her own lock on the circuit breaker or disconnect.

2) Mechanical Isolation: All equipment with moving mechanical parts that could unexpectedly rotate or move will be blocked in such a way that there can be no accidental rotation or movement. Isolation of mechanical parts can be performed by disconnecting linkages or removing drive belts and/or chains.

3) Blanking: A solid plate or cup capable of withstanding the maximum pressure of the gas or liquid inside the pipe may be placed across a pipe or duct to prevent unexpected release of the contents.

4) Line Isolation: Lines can be isolated by 1) double blocking and bleeding the line or 2) by blocking two closed in-line valves or 3) blocking or bleeding open to the outside atmosphere the drawn or the bleed-in line between the two closed valves.

6.6. Air Monitoring

Before any permit required confined space may be entered by any employee, the entry supervisor (or designee if qualified) must monitor the atmosphere of the confined space to determine that the characteristics of the air for all levels and all areas within the confined space are safe. The atmosphere within the authorized entrant's immediate area should be continuously monitored for oxygen, combustible gases and any other hazardous substance.

When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

Note: Authorized entrants and/or their authorized representatives shall be provided an opportunity to observe the atmospheric testing of the confined space that is conducted prior to entry and subsequent testing. Reevaluation of the permit space shall be done in presence of the authorized entrant or employee's authorized representative who requests the reevaluation.

Sampling Devices

1) A direct readout sampling device which can simultaneously test for oxygen, hydrogen sulfide and/or carbon monoxide and combustible gas without manual switching shall be used to sample the atmosphere of the confined space.

2) The sampling device shall be equipped with an audible and visible warning device that warns the entrant and/or attendant of the hazardous atmosphere in the permit space.

3) Sampling devices shall be calibrated relative to the oxygen content of the ambient air at the time of sampling. Calibration of the sampling device relative to the oxygen content shall be performed where the 20.9% natural content of oxygen in the air is most likely to occur.

Note: Oxygen calibration should not be performed near a confined space opening.

4) A sampling device, which has a zero set, shall be zeroed in a clean atmosphere before each sampling. Calibration of a sampling device shall be conducted daily before each use.

5) Non-sparking Equipment: When sampling the atmosphere of a confined space, the sampling device shall have an attached non-sparking probe.

6) Manhole Sampling: When a confined space entry is by means of a manhole, a probe shall be inserted through the pick hole of the manhole cover, or the manhole cover shall be preyed open on the downwind side to allow just enough room for insertion of the probe or other sampling device.

7) Intrinsically Safe: When the confined space to be entered is expected to have combustible vapors present, employees shall be required to use an approved explosion-proof or intrinsically safe sampling device.

6.7. Assessment of Additional Hazards

Before entering a confined space, the Confined Space Entry Supervisor or in his absence another member of the health and safety staff, shall conduct an assessment of any additional hazards which the entrant may encounter during the confined space entry. This assessment shall include, but is not limited to, a review of the following additional hazards:

1) Thermal hazards due to extremes in hot and cold temperatures.

2) Engulfment Hazards due to loose, granular materials, such as sand, coal, or ash, stored in bins or hoppers.

3) Noise hazards, which can affect hearing and emergency communications.

4) Slick/wet surfaces, which can increase the risk to slips and falls. Wet surfaces also increase the risk and effects of shocks from electrical tools, machinery, and circuitry.

5) Falling Objects from work being performed above an employee or by objects falling through open confined space entrances.

6) Mechanical equipment that is required to be operating during the entry.

7) Electrical Hazards from exposed wires, power lines, etc.

8) Fall Hazards.

9) Biological Hazards.

6.8. Emergency Rescue

Note: The OSHA Confined Space Standard allows two options for rescue operations. The Confined Space Administrator and Confined Space Entry Supervisor must select one of the following types of rescue for each permit required confined space identified at the Site.

6.8.1. Emergency Service Confined Space Rescue

Prior to utilizing a rescue service/contractor, the Confined Space Program Administrator shall:

1) Evaluate the prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified.

   Note: What is considered "timely" will vary according to the specific hazards involved in each entry;

2) Evaluate the prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;

3) Select a rescue team or service that has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified, and is equipped for and proficient in performing the needed rescue services;

4) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and

5) Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

   Note: OSHA 29 CFR 1910.146 Appendix F contains examples of criteria that employers can use in evaluating prospective rescuers.

6.8.2. On-site Confined Space Rescue

In the event that a confined space related emergency is expected, all employees involved in the rescue shall be provided with the proper emergency rescue training, PPE, and rescue equipment needed in order to make a safe rescue attempt, at no cost to the employees.

1) Before a confined space rescue attempt is made, the following equipment must be available near the entrance of the confined space:

   a. Personal Protective Equipment

      1. Fully charged SCBA with at least a 30-minute air supply or a Type C airline respirator with an emergency escape air tank.
      2. Protective clothing/gloves, if needed
      3. Head protection, if needed
      4. Hearing protection, if needed

5. Eye protection
6. Communication devices

b. Retrieval equipment

1. Full body harness and lifeline

Note: Wristlets may be used in lieu of the full body harness if the employer can demonstrate that the use of a full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest way and most effective alternative.

2. Winch/hoist fully capable of retrieving personnel from a vertical type confined space more than five feet deep.

Retrieval line shall be attached at the center of the entrants back near shoulder level, above the entrants head, or at another point which presents a profile small enough for the successful removal of the entrant. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.

3. Ladders.

c. Emergency equipment:

1. First aid kit
2. Fire extinguisher(s) appropriate for the situation

2) Duties of Rescuing Attendants - (Non-Fire Emergency)

In the event that either a non-permit or permit-required confined space non-fire related emergency rescue occurs, rescuing attendants shall follow the following procedures:

a. Alert the employees in the confined space to immediately vacate the space and verify that the employees understood these instructions.

b. Notify the following personnel via a two-way radio or telephone with detailed information about the emergency.

1. Rescue Service
2. Confined Space Entry Supervisor and SSHO

Note: The Confined Space Entry Supervisor or area supervisor will then request assistance from the Local Fire Department if medical attention is needed.

c. Begin emergency extraction from outside of the confined space:

1. Verify that all employees are exiting the confined space. If not, then perform the following:
2. Notify the Confined Space Entry Supervisor that the employee(s) are disabled.

3. Begin winching/hoisting employee(s) from the confined space.
4. Do **not** enter the confined space until help arrives**.**

3) Duties of Rescuing Attendants - Fire Emergency

a. **No attempt should be made to enter a burning confined space.**

b. Standby personnel shall immediately call 911 and will indicate that a fire emergency is involved and the location of the confined space.

c. The attendant(s) shall attempt to remove the employee or employees via the hoist/winch from outside the confined space.

4) Rescue Attempt. Upon arriving at the confined space, the rescue service shall;

a. Sample the air in the confined space.

Note: Entry is **not** permitted if the air quality in the confined space is outside the acceptable limit for combustible gas. If the combustible gas content is more than 10% of the LEL, the confined space must be ventilated and/or the source of the combustible gas shut off or removed before entry is permitted.

b. Assess the potential hazards that rescue personnel could encounter by entering the space.

c. If entry conditions are determined safe, enter the confined space with the proper retrieval equipment, personal protective equipment, and a fully charged SCBA or a supplied airline respirator equipped with an emergency air tank.

d. Search for the disabled employee(s).

e. Assess the type of accident/injuries.

f. Administer proper first aid/CPR, if needed.

g. Begin extraction procedures, taking care not to cause further injury.

5) Substance Information. If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other written information is required to be kept at the work site, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

7.0 Employee Training

All employees who are required to enter a Permit Required Confined Space or serve as an attendant shall be trained and properly equipped to recognize, understand, and control hazards that may be encountered in the confined space. Training records (certification) shall be available for inspection by employees and their authorized representative.

7.1. Training shall be provided to each affected employee:

1) Before the employee is first assigned duties under this section.

2) Before there is a change in assigned duties.

3) When there is a change in the permit space operations that present a hazard

about which an affected employee has not previously been trained.

4) Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.

7.2. Confined Space Entry

All employees who are required to either enter a confined space or serve, as attendants shall receive training in the following areas:

1) Associated safety and health hazards of the confined space entry
2) Duties of entrants and attendants
3) Air monitoring and attendants
4) Respiratory protection
5) Emergency rescue procedures
6) Lockout isolation procedures

Training shall be provided to each affected employee:

1) Before the employee is first assigned confined space entry duties.
2) Before there is a change in assigned duties.
3) Whenever there is change in confined space operations that presents a hazard about which the employee has been previously trained.

7.3. Personal Protective Equipment (PPE)

All employees who are required to either enter a confined space and/or serve as attendants, shall receive training on the proper use of any PPE needed to perform the job safely, such as, protective clothing and suits, gloves, respiratory protection; confined space rescue equipment, body harnesses, hearing protection, and eye/face, hand, foot and head protection.

7.4. Emergency Rescue Training

An emergency rescue employee(s) who is designated to provide permit space rescue and emergency services shall be trained in the following measures with an adequate level of proficiency shown in:

1) The use of personal protective equipment (PPE) needed to conduct permit space rescues safely.
2) The assigned rescue duties (same as entrants).
3) Basic first aid and CPR - At least one member of the rescue team or emergency service shall hold a current certification in first aid and CPR.

Emergency rescue personnel shall perform a permit space rescue at least once every 12 months by means of simulated rescue operations in which dummies, manikins, or actual persons are removed from the actual permit spaces or from representative permit spaces.

Representative permit spaces shall, with respect to opening size, configuration, and

accessibility, simulate the types of permit spaces from which rescue is to be performed.

8.0 Work Involving Subcontractors

8.1. When the Site Superintendent arranges to have employees of a subcontractor perform work that involves confined space entry, the Confined Space Entry Program Administrator or the Confined Space Entry Supervisor shall:

1) Inform the contractor that the workplace contains permit spaces and the permitted space entry is allowed only through compliance with a permit space program that complies with CFR 1910.146.

2) Inform the contractor of the hazards identified and Sevenson's experience with the confined space that made the space in question a confined space.

3) Coordinate entry operations with the subcontractor when personnel from both employers will be working in or near the confined space.

4) Verify that the subcontractor has an appropriate Confined Space Entry program.

8.2. Debrief the contractor at the conclusion of the confined space entry operation(s) regarding the permit space entry procedures that were followed (if applicable) and the hazards that were confronted or created during entry operations.

9.0 Non- Permit Required Confined Space Entry

9.1. No employee shall enter or work in a non-permit confined space unless the following steps have been performed:

1) Obtains permission to enter the confined space from the Confined Space Entry Supervisor, or in their absence another member of the health and safety staff.

2) Obtains and uses the proper PPE, tools and other equipment.

3) Complies with all other applicable confined space entry procedures

Note: Atmospheric testing of a non-permit confined space is not required by the OSHA Confined Space standard. However, testing the atmosphere for toxic gases and oxygen deficiency prior to entering the confined space is recommended if a suitable, and properly calibrated, sampling devise is available. The OSHA Standard also does not require an attendant for entry into a non-permit required confined space, however having an attendant present (if practical) is again strongly recommended. Other OSHA standards (i.e. Personal Protective Equipment, Respiratory Protection, etc.) still apply to entry into all confined spaces.

10.0 Reclassification of a Permit Required Confined Space to Non-Permit Confined Space

10.1. A permit required confined space may be entered as a non-permit confined space if the permit space contains no actual or potential atmospheric hazard, and all other hazards within the space can be eliminated without entry into the space. Hazards may be eliminated, for example, by:

1) Following all designated lockout/tagout procedures for the space in question;

2) Emptying a vessel to remove an engulfment or other content hazard;

3) Draining chemical tanks of their contents, purging any residual chemicals with

water, and ventilating the space after purging is complete;

4) Shutting boilers down, opening all access ports to allow for temperature reduction and natural ventilation, and by taking all appropriate safety measures (i.e. locking out machines, etc.) to render the space safe for entry.

If the hazards arise within a permit space that has been declassified to a non-permit space, each employee in the space shall exit the space as soon as possible. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions.

11.0 Reclassification of a Non-Permit confined Space to a Permit Required Confined Space

11.1. When there are changes in the use of a non-permit confined space that may increase the hazards, the space shall be reevaluated and classified as a permit-required space if necessary. Reclassification would be required, for situations such as:

1) During application of solvents, paints chemicals or other materials that could potentially create a hazardous atmosphere in a confined space.

2) During welding, cutting, brazing, or soldering in some confined spaces with limited ventilation.

11.2. The Confined Space Entry Supervisor shall reevaluate and reclassify confined spaces as necessary depending upon the work activities to be performed in these spaces.

12.0 Other Safety Rules and Work Practices

12.1. In order to protect the safety and health of all employees associated with the confined space entry, employees (and supervisors) shall comply with the following safety rules and work practices:

1) General Safety Rules

a. All employees within the confined space and those employees assigned to serve, as attendants shall be in constant two-way communication.

b. All employees required to wear respiratory protection must properly use and maintain properly the respirator in accordance with 29 CFR 1910.134 and the specific instructions provided to them by their supervisor and during training.

c. Smoking is not permitted within the confined space or within a 10 feet radius of the entrance of a confined space.

d. All employees shall comply with the requirements and limitations on the confined space entry permit, including the maximum number of employees permitted to work in the confined space.

2) Underground and Aboveground Storage Tanks

Before any employee enters a boiler or any other vessel type confined space, the following safety precautions shall be implemented:

a. Ensure there is only residual material left in the bottom of the underground storage tank (UST) before an entry.

b. Ensure that all lines leading into and away from the tank(s) are blanked, blinded, and/or double blocked and bled before an entry is allowed.

c. Ensure that all employees entering a tank are secured by a lifeline to a winch or other retrieval device outside the confined space.

d. Treat all boilers and other vessel-type confined space in a manner consistent with that of other confined spaces.

Note: If a confined space entry is required for fuel oil (diesel fuel) tank the LEL must be determined with a Photoionization Detector (PID). This is due to LEL sensor[1] technology and its response to heavy hydrocarbon fuels is unreliable. The PID reading must be less then 250 ppm for entry into the tank in Level C PPE with OVA cartridges.

3) Traffic Safety

a. Entrances to confined spaces that are located in streets shall be guarded in accordance with the following requirements:

1. Employees shall activate the following warning lights

a. Vehicle's beacon light

b. Four-way hazard flashers

b. Employees shall park the vehicle used to transport their confined space equipment in such a way that the vehicle does not obstruct the normal traffic flow and shall, when possible, use the vehicle to provide protection for the employees.

c. Employees shall park the vehicle in such a manner that the vehicles exhaust fumes cannot accumulate in the confined space. If this is not possible, the vehicle's exhaust pipe shall be extended away from the confined space.

d. Employees shall properly place traffic safety cones around the manhole and any vehicle in accordance with state and federal traffic ordinances to adequately warn oncoming traffic.

e. Traffic safety cones shall be visible to traffic in all directions and in such a manner as to protect the employees from the traffic flow. Traffic cones should also be placed far enough form the confined space to give drives adequate notice.

When working on the street or an easement surface, all standby and flag person employees shall at all times wear a traffic safety vest or the equivalent. A flag person(s) shall be added to the Confined Space Entry Team when the need arises. The flag person(s) shall not be considered as the required attendant for a permit required confined space.

4) Cleaning purposes

When a confined space entry is required for cleaning purposes, the Confined Space Entry Supervisor or in their absence another member of the health and

[1] Application Note AP-219, "*Using PID for 10% of LEL Decisions*" Revision 1, RAE Systems, Inc., San Jose, CA,

safety staff, shall review and authorize the procedures and processes to be used while cleaning the confined space before entry can take place.

The following specific cleaning methods shall be used depending upon the product or products in the space:

a. Flammable/Combustible Atmosphere: The atmosphere within the confined space shall be purged with an inert gas if the atmosphere is above the upper flammable limit to remove the flammable and/or combustible substance before forced ventilation of the space. Initial cleaning shall be done, if possible, from outside the tank.

b. Cleaning Process Hazards: When additional hazards are created by the cleaning process, the Confined Space Entry Supervisor shall develop additional safety procedures to address the newly created hazards. These special procedures shall be developed before a confined space cleaning process takes place.

5) Use of equipment and tools inside the confined space

When the confined space entry requires the use of equipment and tools inside the space, this equipment shall be inspected and must meet the following requirements:

a. Hand tools must be in good repair and be kept clean.

b. Portable electrical tools, equipment, and lighting shall be listed Class I, Division I, Group D. All grounds must be checked before electrical equipment is used in a confined space. **Note:** Ground Fault Protectors should be used whenever possible to protect employees from electrical shock when working in damp or wet locations.

c. All electrical cords, tools, and equipment must be constructed of a heavy-duty, double-insulated cord and equipped with a 3-prong plug. Note: double insulated tools with a 2-prong pug may be appropriate in some cases.

d. All electrical cords, tools, and equipment must be visually inspected for defects before being used in a confined space. If found defective, they will be replaced, repaired, or destroyed before any employee enters the confined space.

e. Cylinders of compressed gases must never be taken into a confined space and will be turned off at the cylinder valve when not in use. Exempt from this rule are cylinders that are part of SCBA or resuscitation equipment.

f. Ladders must be adequately secured or of a permanent type which provides the same degree of safety. Note: Permanent ladders must be inspected for rust or corrosion and repaired or replaced if necessary.

All equipment that may be used in a flammable atmosphere shall be approved as either explosion proof or intrinsically safe for the atmosphere and shall be approved by a recognized testing laboratory (i.e., UL, FM).

13.0 Recordkeeping

13.1. The following records will be maintained on file for at least one year:

1) Employee Training Records - including dates and the names of attendees.
2) Confined Space Entry Equipment Inspections - including dates, results, and corrective action.
3) Monitoring Equipment Calibration/Servicing Reports - indicating calibration dates and any service conducted by the manufacturer.
4) Confined Space Permits - for all Permit Required confined space entries.

14.0 Annual Review

14.1. The Confined Space Entry Program Administrator shall review the Confined Space Program at least annually using cancelled Confined Space Permits and other available information and records in order to determine if:

1) Changes should be made to improve the program's overall effectiveness;
2) Additional hazards have been identified within a given space;
3) Additional measures should be taken to protect the entrants;
4) Additional confined spaces should be included within the program; and
5) Some locations can be removed from the program.

CONFINED SPACE HAZARD ASSESSMENT FORM

PART I

Hazard Codes:

1. Atmosphere is within acceptable limits.
2. Contains or has a potential to contain a hazardous atmosphere.
3. Contains a material that has the potential for engulfing an entrant (i.e. soil, sand)
4. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
5. Contains moving parts or machinery.
6 Contains any other recognized health or safety hazard.

Confined Space (Tank, Manhole, etc)	Location	Reason(s) for Entry	Classification (Permit Required/Non Permit)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

CONFINED SPACE HAZARD ASSESSMENT FORM
PART II

Confined Space (Part I)	Tools/Equipment Required for Entry	PPE Required for Entry	Special Precautions Required for Entry
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Assessment Performed By _____ Title _____ Date _____

Sevenson Environmental Services, Inc.

CONFINED SPACE PERMIT

Date_____ Time of Issue_____ Length of Permit_____
Location _____ Equipment ID_____
Purpose of Entry & Description of Work _____
_____
_____
Authorized Entrant(s)_____
Will "HOT" Work be authorized for this Entry? ☐ No; ☐ Yes (describe)_____
_____

HAZARDOUS IDENTIFICATION

Indicate ALL potential Hazards of this Permit Space:	YES	N/A
a. Contains or may contain a hazardous atmosphere	☐	☐
b. Contains a material for potential engulfment	☐	☐
c. Has an internal configuration for potential entrapment	☐	☐

If "Yes", describe _____
_____

d. Contains the following serious safety or health Hazards:_____

PRE-ENTRY PREPARATION

		YES	N/A	Done			Removed		
				Date	Time	By	Date	Time	By
1. Lines broken and/or blanked:									
Line Contents	Location								
a.									
b.									
c.									
2. Drain or at a workable level									
3. Purge - flush and vent									
4. Force air to bottom & vent									
5. Lock out power feeds:									
Equip/Location of Lock out									
a.									
b.									

c.								
6. Shut-off heating systems								
7. Other:								

TEST TO BE TAKEN

	P.E.L.	Time		Time	Time	Time
		Tester		Tester	Tester	Tester
		Yes	N/A	Results	Results	Results
% of Oxygen	19.5% to 23%					
% of LEL	Any % over 10					
Carbon Monoxide	25 ppm					
Hydrogen Sulfide	10 ppm					
VOC						
Temperature	< 110ºF/43ºC					

PREVENTION OF UNAUTHORIZED ENTRY

	YES
1. Have Worker(s) to enter been trained for this specific entry?	☐
2. Have Attendants been trained for this specific space?	☐
3. Post "WORKER IN CONFINED SPACE" Sign	☐

4. Set-up the following additional barriers:

_____

_____

MANDATORY SAFETY EQUIPMENT REQUIRED

	YES	N/A
1. Fire Extinguisher	☐	☐
2. Retrieval Lines	☐	☐
3. Respirator	☐	☐
4. Goggles	☐	☐
5. Hearing Protection	☐	☐
6. Protective Clothing	☐	☐
7. Special Boots or Shoes	☐	☐
8. Gloves	☐	☐
9. Other Safety Equipment Required	☐	☐

_____ _____

_____ _____

_____ _____

_____ _____

COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY

(Verify that chosen equipment is in place and operation.)

	Verified by:
1._____	_____
2._____	_____

RESCUE EQUIPMENT TO BE PROVIDED ON-SITE

		YES	N/A
a.	Two chest harnesses or two wristlets	☐	☐
b.	Two five minute supplied air escape respirators	☐	☐
c.	One 30 minute S.C.B.A.	☐	☐
d.	One emergency siren	☐	☐
e.	Man basket	☐	☐
f.	Retrieval wench	☐	☐
g.	Other necessary Rescue Equipment	☐	☐

_____

_____

_____

IN CASE OF EMERGENCY

Rescue Service	Phone Number or Ext.
1._____	_____
2._____	_____
3._____	_____

Confined Space Entry Supervisor or designee must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

Authorization of Entry

Signature (if not CSE Supervisor, add title)	Date	Time

Termination of Entry

Signature	Date	Time

Attachment 4
Fall Protection Program

Sevenson Environmental Services, Inc.

FALL PROTECTION PROGRAM

Table of Contents

Attachments

1.0 Introduction

The objective of this Fall Protection Program is to identify and evaluate fall hazards to which employees will be exposed and to provide specific training as required by the Occupational Safety and Health Administration (OSHA) Fall Protection Standard, 29 CFR 1926, Subpart M and the USACE Health and Safety Manual EM 385-1-1, Section 21**.**

2.0 Policy

It is the policy of Sevenson Environmental Services, Inc. (Sevenson) to protect its employees and sub contractors from occupational injuries by implementing and enforcing safe work practices and appointing a competent person(s) to manage the Fall Protection Program. This Fall Protection Program shall comply with OSHA and USACE requirements. A copy of the EM 385-1-1 and OSHA Fall Protection Standards shall be made available to all employees, and may be obtained from the Site Safety and Health Officer(s) (SSHO).

This Fall Protection Program covers the use of Personal Fall Arrest Systems at a number of areas at the Site. These areas are:

1. Working at heights greater than 6 feet or leading edge work
2. Working in aerial/man lifts
3. Securing of ladders

3.0 Definitions

Anchorage – means a secure point of attachment for lifelines, lanyards or deceleration devices.

Basic rescue – means providing rescue services for a fallen employee(s) who does not require immediate emergency medical services and can be performed with a ladder or aerial lift man basket.

Body harness – means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

Deceleration device – means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance – means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body harness attachment point at the moment of activation (at the onset of fall arrest forces)

of the deceleration device during a fall, and the location of the attachment point after the employee comes to a full stop.

Guardrail system – means a barrier erected to prevent employees from falling to lower levels.

Infeasible – means that it is impossible to perform the construction work using conventional fall protection systems (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of the these systems to provide fall protection.

Lanyard – means a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

Personal Fall Arrest System – means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Positioning device system – means a body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Self-retracting lifeline/lanyard – means a deceleration device contained in a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Unprotected sides and edges – means any side or edge (except entrances to point of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches high.

4.0 Duties and Responsibilities

1. Sevenson

   It is the responsibility of Sevenson to provide fall protection to affected employees, and to ensure that all employees understand and adhere to the procedures of this plan and follow the instructions of Site Safety and Health Officer (SSHO) or Competent Person.

2. Program Manager – Mr. Eric Tschudi

   It is the responsibility of SSHO as the Fall Protection Program Manager to implement this program by:

   1. Performing routine safety checks of work operations;
   2. Enforcing Site safety policy and procedures;
   3. Correcting any unsafe practices or conditions immediately;
   4. Training employees and supervisors in recognizing fall hazards and the use of fall protection systems;

5. Maintaining records of employee training, equipment issue, and fall protection systems used at the Site; and
6. Investigating and documenting all incidents that result in employee injury.

3. Competent Person

   Is it the responsibility of the Competent Person to:

   1. Understand the hazards posed by falls.
   2. Calculate fall forces.
   3. Understand the methods of fall protection.
   4. Assist in the implementation of the Fall Protection Program.
   5. Select, inspect and maintain the fall arrest equipment.
   6. Ensure Site personnel are properly trained in the use and limitation of fall protection.

4. Employees

   It is the responsibility of all employees to:

   1. Understand and adhere to the procedures outlined in this Fall Protection Program;
   2. Follow the instructions of the SSHO or Competent Person;
   3. Bring to management's attention any unsafe or hazardous conditions or practices that may cause injury to either themselves or any other employees; and
   4. Report any incident that causes injury to an employee, regardless of the nature of the injury.

5.0 Description of Tasks

(Examples – Specific tasks to be entered once idenditified)

1. Working at heights greater than 6 feet for construction activities or leading edge work

   Workers may be exposed to falling greater than six feet from either working at heights or working near the edge of a drop off.

2. Working in aerial/man lifts

   Workers may utilize aerial lifts at the Site to perform maintenance on equipment or systems. Any time a person is in the basket of an aerial lift they will utilize a restraining system.

3. Securing ladders

   Workers may have to utilize ladders at the Site to perform assigned job tasks. Any time a person utilizes a straight ladder that must be secured a Fall

Protection Plan will be completed to ensure a safe plan has been developed to protect workers.

6.0 Training Requirements

All employees who may be exposed to fall hazards are required to receive training on how to recognize such hazards, and how to minimize their exposure to them. Employees shall receive training as soon after employment as possible, and before they are required to work in areas where fall hazards exist.

A record of employees who have received training and training dates shall be maintained by the SSHO. Training of employees shall include:

1. Nature of the fall hazards employees may be exposed to.
2. Correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems.
3. Use and operation of controlled access zones, guardrails, personal fall arrest systems, safety nets, warning lines, and safety monitoring systems.
4. Limitations of the use of mechanical equipment during roofing work on low-slope roofs (if applicable).
5. Correct procedures for equipment and materials handling, and storage and erection of overhead protection.
6. Requirements of the OSHA Fall Protection Standard, 29 CFR 1926, Subpart M and the USACE EM 385-1-1 Section 21, “Fall Protection”.
7. Sevenson and USACE requirements for reporting incidents that cause injury to an employee.
8. Documented training for personnel utilizing an aerial lift.

Additional training shall be provided on an annual basis, or as needed when changes are made to this Fall Protection Program, the EM 385-1-1 (pertaining to fall protection), or the OSHA Fall Protection Standard.

7.0 Anticipated Hazards

Prior to the use of a personal fall arrest system a Fall Protection Plan, a Fall Hazard Analysis (FHA), and an Activity Hazard Analysis (AHA) will be completed for the associated task. The Fall Protection Plan (Attachment 1) will be completed by the SSHO or his designee. The Fall Protection Plan, FHA, and AHA will identify the anticipated hazards and the controls to be implemented to reduce or eliminate these hazards.

Some of the anticipated hazards at the Site include leading edge work at the Reservoir, the use or aerial lifts, erection of the sediment treatment equipment, and work from ladders.

8.0 Fall Hazard Prevention and Control

<u>Engineering Controls</u>

This should always be the first option for selection whenever possible (i.e., light bulb changing, telescoping arm, changing valve, relocate at ground level).

Guardrails

For all work areas, only guardrails made from steel, wood, and wire rope will be acceptable. All guardrail systems will comply with the current OSHA and EM 385-1-1 standards (i.e., withstand 200 pounds of force, 42-inch high hand rail, midrail, and toeboard). These guardrails will be placed in the following areas if necessary or feasible based on job location or requirements:

1. On all open sided floors.
2. Around all open excavations or pits.
3. On leading edges of roofs or decking.

Personal Fall Protection Systems

All employees that will be required to wear a personal fall arrest or restraint system will follow these guidelines:

1. A full body harness will be used at **all** times.
2. **All personal fall arrest systems will be inspected before each use by the employee.** Any deteriorated, bent, damaged, impacted and/or harness showing excessive wear will be removed from service.
3. Connectors will be inspected to ensure they are drop forged, pressed, or formed steel or are made of equivalent materials **and** that they have a corrosion resistant finish as well as that all surfaces and edges are smooth to prevent damage to interfacing parts of the system.
4. Verify that D rings and snap hooks have a minimum tensile strength of 5,000 lbs and that the D rings and snap hooks are proof tested to a minimum tensile load of 3,600 lbs without cracking, breaking, or taking permanent deformation.
5. Only shock absorbing lanyards or retractable lanyards are to be used so as to keep impact forces at a minimum on the body (fall arrest systems).
6. Only nylon rope or nylon straps with locking snaphooks are to be used for restraints.
7. All lanyards will have self-locking snaphooks.
8. Snap hooks are not engaged in the following manners:
    a. To a tie off adapter D ring to which another snap hook or other connector is attached;
    b. In a manner that would result in a load on the gate;
    c. In a false engagement, where features that protrude from the snap hook or carabiner catch on the anchor and without visual confirmation seems to be fully engaged to the anchor point;
    d. To each other;

e. Directly to webbing or rope lanyard or tie-back unless the manufacturer's instructions for both the lanyard and the connector specifically allow such a connection;

f. To any object which is shaped or dimensioned such that the snap hook or carabiner will not close and lock, or that rollout could occur.

9. The maximum free fall distance is not to exceed **6 feet**. Consideration must be given to the total fall distance. The following factors can affect total fall distance:

    a. Length of connecting means (i.e., lanyard length, use of carabiners, snaphooks, etc.).

    b. Position and height of anchorage relative to work platform/area (always keep above head whenever possible).

    c. Position of attachment and D-ring slide on the full body harness.

    d. Deployment of shock absorber (max 42-inches).

    e. Movement in lifeline.

    f. Initial position of worker before free fall occurs (i.e., sitting, standing, etc.).

Calculating Total Fall Distance

Knowing how to calculate Total Fall Distance is as important as picking the proper harness, lanyard, and anchorage system. Total Fall Distance (TFD) is defined as the sum of the Free Fall Distance (FFD), Deceleration Distance (DD), Harness Effect (HEFF), Vertical Elongation (VEL), and Safety Factor (SF) of at least one foot. The TFD can be calculated by:

TFD = FFD+DD+HEFF+VEL+SF

Where:

- TFD Total Fall Distance or the vertical distance a worker travels between the onset of a fall till the fall event is completed.
- FFD Free Fall Distance or the vertical distance a worker travels between the onset of a fall until just prior to the point where the Fall Arrest System begins to arrest the fall.
- DD Deceleration Distance or the vertical distance a worker travels between the activation of the Fall Arrest System and the final fall arrest. (Federal OSHA limits this distance to 3.5-feet or less. This distance is determined by the manufacturer and can be found on the product label.)
- HEFF Harness Effect Distance or the stretch of a harness during a fall arrest. (This is typically one foot or less for a properly fitted harness. However, some harnesses use elastic-type webbing that

can increase the harness effect to two feet or more. Check manufacturer's information to determine this distance.)

- VEL Vertical Elongation Distance or the stretch in the lifeline of the Personal Fall Arrest System. Vertical Elongation is measured on the part of the lifeline that is under tension during deceleration and final fall arrest. This variable will change drastically depending upon the type of Fall Arrest System. For example, most shock-absorbing lanyards are designed to have a maximum deceleration distance of 3.5 feet, which includes the vertical elongation of the lanyard. However, if you are using a rope grab system or a horizontal lifeline, vertical elongation must be calculated based on the stretch of the vertical or horizontal lifelines in those systems. You will need to check the specific manufacturers' product information for exact stretch percentages.
- SF Safety Factor Distance is an additional factor of safety to ensure that you have the required clearance below your working surface. This should be at least one foot but can reflect any number with which you feel comfortable.

Example:

- Full body harness
- 6-foot shock absorbing lanyard
- Fixed, ridged anchor point (such as a D-plate bolted to a structural I-beam)
- Figure , provides visual for example

Figure 1- Example for Calculating Fall Distance

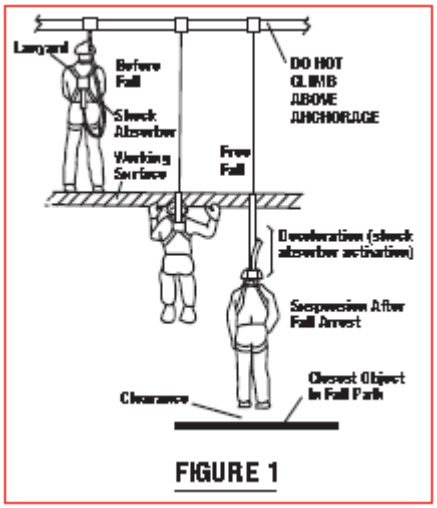


FIGURE 1

In Figure 1 we see a worker with a 6-foot shock absorbing lanyard on an elevated platform. In this example, let's assume the anchor point is 2-feet about the back D-ring of the harness. For every 1-foot the lanyard attachment point is above the harness back D-ring, 1-foot is deducted from the FFD. For every 1-foot the

lanyard attachment point is below the harness back D-ring, 1-foot is added to the FFD. In this example, if the worker falls, the FFD will equal 4-feet since the lanyard attachment point is 2-feet above the back D-ring of the harness. So the formula looks like this:

- TFD = 4 feet + DD + HEFF + VEL + SF

The next value to consider is Deceleration Distance or the DD. Federal OSHA requires that this distance not exceed 3.5-feet. Since all manufacturers' products are slightly different, you will have to read the label or product specification sheet to determine the maximum DD that a product will permit and use that value for your calculation. In this example, the maximum deceleration distance will be 3.5-feet.

- TFD = 4 feet + 3.5 feet + HEFF + VEL + SF

The Harness Effect or HEFF variable is relatively constant at less than 1-foot. This will vary slightly due to the adjustment of the harness, so we generally use 1-foot to account for these slight differences. However, elastic type harnesses can have more than 1-foot of stretch, possibly 2-feet or more, and that additional distance must be accounted for in your calculation. In this example, we are using a non-elastic harness.

- TFD = 4 feet + 3.5 feet + 1 foot + VEL + SF

Most manufacturers design their shock absorbing lanyards so that the vertical elongation of the lanyard is included in the OSHA mandated 3.5-feet maximum DD. However, if we were using a rope grab or vertical life line, or if you were attaching to a non-ridged anchorage connector, the VEL would need to be based on the specifications of those components in the Fall Arrest System. Since this example uses a ridged anchor point and a 6-foot shock absorbing lanyard and the VEL is already considered in the lanyard design the VEL for our equation will be zero (0).

- TFD = 4 feet + 3.5 feet + 1 foot + 0 feet + SF

The final variable of the formula is the safety factor or SF. It is always a good idea to include at least 1-foot, however, that safety factor could reflect any number that makes you comfortable with your calculation. If you are using a non-ridged system it would not be uncommon to see a SF of 3-feet or more.

- TFD = 4 feet + 3.5 feet + 1 foot + 0 feet + 1-foot

We can now solve for Total Fall Distance or TFD. The TFD for this example would be 9.5-feet. So, you will need a minimum of 9.5-feet clearance from the workers feet to the next level or object below.

NOTE: Some people calculate the TFD from the anchor point, to modify this equation to reflect the distance from the anchor point you would add the distance from the working surface to the workers D-ring and add it to the equation.

Example: Let's use the same example from above. The distance from the working level (the level the worker is standing on) to the distance the harness D-ring is from

that surface is 5-feet. You would add 5-feet to 9.5 feet for a total distance of 14.5-feet from the anchor point to the lower level or object.

Engineered Lifeline

Lifeline systems must be designed and approved by an engineer or qualified person.

Lifeline systems must be engineered to have appropriate anchorages, strength of line designed to hold X number of individuals connected to it, line strength to aid in the arrest of a fall, and durability to hold a fallen employee(s) suspended until rescue can occur.

Warning Line System

All flat roofs greater than 50 feet wide (i.e., roof with less than 4/12 slope) where work is performed 6 feet or further back from the edge of the roof can be completed by installing a Warning Line and using a safety monitor. Warning Lines will consist of the following:

1. Will be erected 6 feet from the edge of the roof.
2. Be constructed of stationary stanchions capable of resisting without tipping over a force of at least 16 pounds applied horizontally against the stanchion.
3. Wire, chain, or rope shall be rigged and supported in such a way that at its lowest point (including sag) is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches for the walking/working surface.
4. Wire, chain, or rope will be flagged at no more than 6-foot intervals with high visibility material. The rope, wire or chain shall have a minimal tensile strength of 500 pounds.
5. The warning line will guard the entire perimeter of the roof where work is being performed.

If an employee must access an area within 6 feet of the roof edge for reasons *other than* exiting the roof via a ladder or fixed industrial ladder, another employee must monitor that individual and warn him/her of any dangers. If another employee is not available to act as a safety monitor, then the employee must don a full body harness and attach a fall restraint lanyard to an anchor point to prevent reaching the edge of the roof.

9.0 Rescue Plan and Procedure

The height of the work to be performed at the Site requiring the use of personal fall arrest systems is less than 20 feet.

An employee who falls must be rescued within 15 minutes to avoid permanent physical harm. Site personnel will be responsible for performing basic rescue for persons involved in a fall arrest situation when no life threatening injuries are present. If a situation occurs where the fallen person receives injuries that require immediate emergency medical attention, local emergency services will be summons via 911.

The following basic rescue equipment will be made available at the Site where personal fall arrest systems are employed:

- A straight or folding ladder tall and strong enough to reach the maximum height an individual may be suspended from.
- In the absence of a suitable ladder, an aerial lift with a man basket may be used.

Basic rescue equipment shall be located and inspected prior to work being performed. During the rescue, ladders will be properly positioned and either held in place or secured in place to prevent the ladder from sliding or falling. If a fallen worker cannot access the ladder under their own power, 911 will be immediately called for rescue assistance. At no time will the ladder weight restriction be compromised to perform a basic rescue.

If injuries are involved where the worker cannot be moved or should not be moved, 911 will be immediately called for rescue assistance.

A medical professional must evaluate and clear any worker involved in a fall arrest stop for suspension trauma before being allowed to resume work duties.

10.0 Designs of Personal Fall Arrest Systems

Personal fall arrest systems will be designed by a professional engineer and installed as directed by the manufacturer. All equipment used in a personal fall arrest system shall meet the requirements set forth in ANSI/ASSE Z359.1-2007. Full body harnesses labeled to meet the requirements of ANSI A10.14 shall not be used. The SSHO shall ensure all personal fall arrest system equipment meets these standards by showing proof from the manufacturer. The proof can be presented by the manufacturer in either as built drawings/specifications or affixed tags to the system parts.

11.0 Inspection, Maintenance, and Storage of Fall Protection Equipment

The following criteria will be utilized to maintain all equipment in good working condition.

Full Body Harnesses

1. Inspect before each use.
    - Closely examine all of the nylon webbing to ensure there are no burn marks, which could weaken the material.
    - Verify there are no torn, frayed, broken fibers, pulled stitches, or frayed edges anywhere on the harness.
    - Examine D-ring for excessive wear, pits, deterioration, or cracks.
    - Verify that buckles are not deformed, cracked, and will operate correctly.
    - Check to see that all grommets (if present) are secure and not deformed from abuse or a fall.
    - Harness should never have additional punched holes
    - All rivets should be tight, not deformed.
    - Check tongue/straps for excessive wear from repeated buckling.

2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Storage will consist of hanging in an enclosed cabinet, to protect from damage.
4. All harnesses that are involved in a fall will be destroyed.

Lanyards/Shock Absorbing Lanyards

1. Inspect before each use.
    - Check lanyard material for cuts, burns, abrasions, kinks, knots, broken stitches and excessive wear.
    - Inspect the snaphooks for hook, locks, and eye distortion.
    - Check carabiner for excessive wear, distortion, and lock operation.
    - Ensure that all locking mechanisms seat and lock properly.
    - Once locked, locking mechanism should prevent hook from opening.
    - Visually inspect shock absorber for any signs of damage, paying close attention to where the shock absorber attaches to the lanyard.
    - Verify that points where the lanyard attaches to the snaphooks are free of defects.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Storage will consist of hanging in an enclosed cabinet, to protect from damage.
4. All lanyards that are involved in a fall will be destroyed.

Snaphooks

1. Inspect before each use.
    - Inspect snaphooks for any hook and eye distortions.
    - Verify there are no cracks, pitted surfaces, and eye distortions.
    - The keeper latch should not be bent, distorted, or obstructed.
    - Verify that the keeper latch seats into the nose without binding.
    - Verify that the keeper spring securely closes the keeper latch.
    - Test the locking mechanism to verify that the keeper latch locks properly.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. All snaphooks involved in a fall will be destroyed.

Self-Retracting Lanyards

1. Inspect before each use.
    - Visually inspect the body to ensure there is no physical damage to the body.
    - Make sure all back nuts or rivets are tight.
    - Make sure the entire length of the nylon strap is free of any cuts, burns, abrasions, kinks, knots, broken stitches, and excessive wear and retracts freely.
    - Test the unit by pulling sharply on the lanyard to verify that the locking mechanism is operating correctly.
    - If manufacturer requires, make certain the retractable lanyard is returned to the manufacturer for scheduled annual inspections.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Service per manufacturer specifications.
4. Inspect for proper function after every fall.

Tie-off Adaptors/Anchorages

1. Inspect for integrity and attachment to solid surface.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. All tie-offs adapters will be destroyed and replaced after a fall.

Articulating Man Lift

1. Inspect before each use.
2. Inspect/service per manufacturer guidelines. Forklift, scissors lifts, and safety nets will be inspected at the beginning of each shift in use. Structural integrity or forklift basket will be checked per same schedule.
3. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.

Maintenance will be performed as specified by the manufacturer.

Personal fall arrest equipment will be stored as follows:

1. Never store the personal fall arrest equipment in the bottom of a tool box, on the ground, or outside exposed to the elements (i.e., sun, rain, snow, etc.).
2. Hang equipment in a cool dry location in a manner that retains its shape.
3. Always follow manufacturer recommendations for inspection.
4. Clean with a mild, nonabrasive soap, and hang to dry.
5. Never force dry or use strong detergents in cleaning.
6. Never store equipment near excessive heat, chemicals, moisture, or sunlight.

7. Never store in an area with exposures to fumes or corrosives elements.
8. Avoid dirt and build-up on equipment.
9. Never use this equipment for any purpose other than personal fall arrest.
10. Once exposed to a fall, remove equipment from service immediately.

A designated storage area will be established for personal fall arrest equipment. An inspection sheet will be posted at the storage area to allow site personal to document their inspection prior to use. The inspection sheet will also provide direction and requirements for ensuring the equipment is in satisfactory condition.

12.0 Incident Investigation Procedures

All incidents that result in injury to workers, as well as near misses, regardless of their nature, shall be reported and investigated. The SSHO and Site Superintendent shall conduct investigations as soon after an incident as possible to identify the cause and means of prevention to eliminate the risk of reoccurrence.

In the event of such an incident, the Fall Protection Program shall be reevaluated by the SSHO and Safety and Health Manager to determine if additional practices, procedures, or training are necessary to prevent similar future incidents.

13.0 Evaluation of Program Effectiveness

This fall protection program will be evaluated periodically to determine effectiveness. The following criteria will be used to evaluate its performance:

1. Accident reports, number of accidents.
2. Management/staff compliance with program components.
3. Periodic on-site audits.
4. Safety Observation Reports
5. Staff feedback, interviews.

14.0 Inspection and Oversight Methods Employed

The SSHO, Site Superintendent, and the Construction Quality Control Systems Manager will be responsible for performing Safety Observation Reports for personnel performing tasks that involve the use of personal fall arrest systems. These observations will be done on a random basis and will be used in to aid in the evaluation of the Fall Protection Programs effectiveness. The Fall Protection Program will also be audited on a quarterly basis by the Safety and Health Manager or a member Sevenson's corporate health and safety staff.

Fall Protection Plan

Project Information

Project Location:		Plan Effective Dates
Specific Equipment Involved		Start:
Project Description		End:
Fall Protection Plan Author (Print)		Office or Cell Phone Number
Fall Protection Plan Author (Sign)		
Competent Person (Print)		Office or Cell Phone Number
Competent Person (Sign)		
Site Superintendent (Print)		Office or Cell Phone Number
Site Superintendent (Sign)		

Fall Protection Plan

Elevated Surface Work Plan

Questions to Consider	Answers or Solutions
Has an Activity Hazard Analysis (AHA) and a Fall Hazard Analysis (FHA) been performed to identify the hazards and controls to be used to eliminate hazards for work at unprotected elevations?	
What is the job to be performed?	
What is the location and the height of the work?	
What is the working or walking surface like (flat steel, textured steel, wood planking, dirt, etc.)?	
Are there any environmental factors to consider (i.e., heat, cold, slippery, wet, wind, glare, etc.)?	
Are there any hazards nearby or underneath that are exposed or could become exposed in an impact (i.e., plumping lines, electrical exposures, protruding or impalement hazards, etc.)?	
Will the work require special PPE (besides fall protection)?	
Will workers be utilizing the buddy system or will someone be monitoring the worker?	
How will the tools and equipment get to the work location (bucket with rope, tool belt, manlift, etc.)?	

Fall Protection Plan

Questions to Consider	Answers or Solutions
Does the lower level work area need to be barricaded to keep non-essential personnel away from the work area?	
Can the work be performed from the ground with extendable tools?	
Can the work be performed from a secured ladder?	
Can an aerial lift or scissor lift be used? Is the operator qualified to use this equipment?	
If not, can portable guardrails be installed?	
If not, can a fall arrest system be used?	
If yes, has a Fall Hazard Analysis and Rescue Plan been developed?	
Other?	

Fall Protection Plan

Fall Hazard Analysis for Fall Arrest

Are there any existing approved anchorage points that can be used? Where?	
Is the anchorage point labeled or obviously capable of holding 5000 pounds or more as determined by a qualified person?	
If not, can approved pre-engineered or manufactured anchorages be installed?	
Is the right equipment (full body harness, minimum length lanyard, shock absorber, connecting hardware, I-beam strap, self-retracting life line, etc.) available to affected employees?	
What is the distance a person may fall?	
Is there at least 6 feet of clear space from anchorage point before the next level down? (Calculate fall distance.)	
Will the worker hit anything on the way down during a fall?	
Has a Fall Rescue Plan been developed to determine how a fallen person will be rescued if suspended in the harness?	

Fall Protection Plan

Rescue Plan

A rescue plan must be developed whenever fall arrest systems are in use and when personnel may not be able to self-rescue if a fall occurs.

What is the emergency rescue service contact information (Emergency phone number and name of agency)?	
Are there any special instructions to give to the emergency rescue service when requesting assistance?	
Is basic (non-emergency) rescue equipment (i.e., ladders, aerial lifts, additional harnesses) immediately available at the work area for this task?	
Are there any obstructions in the way of reaching the suspended worker? If so, what.	
How will the rescue be assured within 15 minutes of the occurrence of the fall to minimize the risk of further injury or death due to suspension trauma?	
How will the safety of the rescuers be assured as well as that of the suspended worker?	
What communication systems will be used between the suspended worker and the rescue team?	

Attachment 5
Critical Lift Program

Critical Lift Program

A critical lift is a non-routine crane lift that requires detailed planning and additional procedures and precautions. Critical lifts include:

- Lifts made when the load weight is 75% or more of the rated capacity of the crane.
- Loads that require the load to be lifted, swung, or placed out of the operator's view.
- Lifts involving non-routine or technically difficult rigging arrangements.
- Hoisting personnel with the crane.
- The load is unique and, if damaged, would be irreplaceable or not easily repaired and is vital to the operation of the system.
- The cost to replace or repair the load or the delay in operations would have a negative impact on the operation of the system.

After a critical lift has been determined by the Superintendent, he will ensure that a pre lift plan is developed which contains the following:

- Identification of the items to be lifted, the weight, dimensions, and center of gravity of the load, and any hazardous or toxic materials which may be present.
- Identification of the crane and its rated capacity.
- Rigging sketches which may include:
    - Identification and rated capacity of slings, lifting bars, rigging, accessories, and below the hook lifting devices.
    - Load-indicating devices.
    - Load vectors.
    - Lifting points.
    - Sling angles.
    - Boom and swing angles.
    - Methods of attachment.
    - Crane orientation.
    - Other factors affecting equipment capacity.
- Only qualified and experienced operators who have been trained will be assigned to make the lift.
- Only designated, qualified signalers will give signals to the operator. However, the operator will obey a STOP signal at all times, no matter who gives the signal.
- The procedure and rigging sketches will be reviewed and approved by the Superintendent and the Safety Manager.

Critical Lift Program

- A pre-lift meeting will be held with the affected personnel, and the plan and procedures will be reviewed. Any questions will also be resolved at this time.
- After the conclusion of the pre-lift meeting, the lift will be accomplished.

Sevenson Environmental Services, Inc.
CRITICAL LIFT PLAN

Lift Identification	
Job Number:	Location:
Lift Supervisor Name:	
Date of Lift:	Time:
Lift Description:	
Approvals (Signatures Required)	
Site Manager:	Date:
Project Manager (if over 50 tons):	Date:
Lift Supervisor:	Date:
Rigging Superintendent:	Date:
Qualified Person:	Date:
Operator(s):	Date:
If engineering Designs Are Used	
Drawing Numbers:	
Attachments (Insert Page Numbers)	
1. Operator Certifications	
2. Capacity Certificates and Inspection Reports for all Lifting Equipment	
3. Inspection Reports for all Rigging Equipment	
4. Insurance Certificates	
5. Applicable capacity charts and chart notes for lifting equipment	
6. Load and Capacity Calculations	
7. Rigging Diagram(s)	
8. Lift Geometry and Free Body Diagram(s)	
9. Other:	
10 Other:	

Sevenson Environmental Services, Inc.

CRITICAL LIFT PLAN

Critical Lift Load and Capacity Calculations

Lift Description: _____

Section A
Weight of Load (Equipment) – Live Load

1.	Load/Equipment condition New: ☐ Used: ☐	
2.	Weight of Load/Equipment Empty	Lbs
3.	Weight of Attachments	Lbs
a.	Platforms and Ladders	Lbs
b.	Piping and Accessories	Lbs
c.	Liquids Inside	Lbs
d.	Dirt and Debris	Lbs
e.	Internal Trays or Liners	Lbs
f.	Other:	Lbs
g.	Other:	Lbs
4.	Total Amount of Load/Equipment Weight (A2 through A3g)	Lbs

Section B
Total Lifted Weight (Weight of Load/Equipment + Rigging + (Main) Crane Deductions)

1.	Load/Equipment weight plus contingency*	%	7.	Weight of Jib Erected	Lbs
2.	Amount of Equipment Weight	Lbs	7a.	Weight of Jib Stowed	Lbs
3.	Weight of Headache Ball	Lbs	8.	Weight of Jib Headache Ball	Lbs
4.	Weight of Main Block	Lbs	9.	Weight of Cable (Load Fail)	Lbs
5.	Weight of Spreader Bar	Lbs	10.	Auxiliary Boom Head	Lbs
6.	Weight of Slings and Shackles	Lbs	11.	Other:	Lbs

* Use 100% plus some percentage (example +10%) to multiply times number in Section A4 to allow for contingency to compute Section B2.

TOTAL LIFTED WEIGHT
(Sum B2 through B11) Lbs

Source of Load Weight (A2):

(Name Plate, Drawings, Calculated, Weight Ticket, Etc.)

Weight and Calculations

Print Name	Signature	Date
By:		
Verified By:		

(See Page 2)

Sevenson Environmental Services, Inc.

CRITICAL LIFT PLAN

Critical Lift Load and Capacity Calculations

Section C Capacities of the (Main) Crane				
1.	Make and Model of Crane:			
2.	Counter Weight Size:	Type of Boom:		
3.	Lifting Arrangement			
a.	Max. Radius During Lift	Feet		
b.	Length of Boom	Feet		
c.	Angle of Boom at Pick	Degree		
d.	Angle of Boom at Set	Degree		
	Rated Capacity Under Most Severe Conditions			
	1. Over Rear	Lbs		
	2. Over Front	Lbs		
	3. Over Side	Lbs		
f.	Rated Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)			Lbs
4.	Jib			
a.	Is the Jib to be used	Yes ☐	No ☐	
b.	Length of Jib	Feet		
c.	Jib Angle	Degree		
d.	Rated Jib Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)			Lbs
5.	Load Line/Fall Cable			
a.	Is Main Block to be used	Yes ☐	No ☐	
b.	Number of Parts of Cable			
c.	Size of Cable	Inches		
d.	Maximum Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)			Lbs

Section D Percent of Cranes Capacity		
1.	$\frac{Total\ Lifted\ Weight}{Rated\ Capacity} * 100$	%

Section E Size of Slings				
1.	Sling Selection			
a.	Type of Arrangement		(Spreader, Vertical Slings, etc.)	
b.	Number of Slings to Hook	Capacity		Lbs
c.	Sling Size	Inches		
d.	Sling Length	Feet		
e.	Sling Capacity (at angle used)	Lbs		
f.	Number of Slings to Load	#		
g.	Total Rigging Capacity (E1e x E1f)			Lbs

Comments: _____

Sketch of rigging arrangements available Yes ☐ No ☐ See page:

(See Page 3)

Sevenson Environmental Services, Inc.

CRITICAL LIFT PLAN

Critical Lift Load and Capacity Calculations

Section F Total Lifted Weight to be Lifted by Tailing Crane			
1.	Percent of Total Equipment Weight **	%	(** Generally 50+% based on CG and movement during up righting)
2.	Amount of Equipment Weight (A4 x F1)	Lbs	
3.	Weight of Headache Ball	Lbs	
4.	Weight of Block	Lbs	
5.	Weight of Lifting Bar	Lbs	
6.	Weight of Slings and Shackles	Lbs	
7.	Weight of Jib Erected	Lbs	
8.	Weight of Jib Headache Ball	Lbs	
9.	Weight of Cable Load (Load Fall)	Lbs	
10.	Auxiliary Boom Head	Lbs	
11.	Other	Lbs	
12.	Total Weight of Load/Equipment Lifted by Tailing Crane (F2 through F11)	Lbs	
Source of Load Weight:			
(Name Plate, Drawings, Calculated, Scale Ticket)			

Weight and Calculations		
Print Name	Signature	Date
By:		
Verified By:		

Section G Capacities for Tailing Crane Based on Configuration			
1.	Make and Model of Crane:		
2.	Counter Weight Size:	Type of Boom:	
3.	Lifting Arrangement		
a.	Max. Radius During Lift	Feet	
b.	Length of Boom	Feet	
c.	Angle of Boom at Pick	Degree	
d.	Angle of Boom at Set	Degree	
	Rated Capacity Under Most Severe Conditions		
	1. Over Rear	Lbs	
	2. Over Front	Lbs	
	3. Over Side	Lbs	
f.	Rated Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)		Lbs
4.	Jib		
a.	Is the Jib to be used	Yes ☐ No ☐	
b.	Length of Jib	Feet	
c.	Jib Angle	Degree	
d.	Rated Jib Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)		Lbs
5.	Cable		
a.	Number of Parts	#	
b.	Size of Cable	Inches	
c.	Maximum Capacity	Lbs	

(See Page 4)

Sevenson Environmental Services, Inc.

CRITICAL LIFT PLAN

Critical Lift Load and Capacity Calculations

Section H Percent of Cranes Capacity Tailing Crane			
1.	$\frac{Total\ Lifted\ Weight}{Rated\ Capacity} * 100$		%
Section I **Size of Slings for Tailing Crane**			
1.	Sling Selection		
a.	Type of Arrangement		(Spreader, Vertical Slings, etc.)
b.	Number of Slings to Hook	Capacity	Lbs
c.	Sling Size	Inches	
d.	Sling Length	Feet	
e.	Sling Capacity (at angle used)	Lbs	
f.	Number of Slings to Load	#	
g.	Total Rigging Capacity (Ie x If)		Lbs

Comments:

Sketch of rigging arrangements available	Yes ☐	No ☐	See page:

Sevenson Environmental Services, Inc.
CRITICAL LIFT PLAN

Pre –Lift Checklist

		Yes	No
1.	Crane operator meets company qualification requirements?	☐	☐
2.	Lift Calculations and rigging plan completed?	☐	☐
3.	Are all required approvals/permits signed?	☐	☐
4.	Crane inspections up to date (Annual/Monthly/Daily)?	☐	☐
5.	Weather conditions and wind speed acceptable?	☐	☐
6.	Has the stability of the ground been assured?	☐	☐
7.	Matting and/or outrigger pads inspected and approved?	☐	☐
8.	Electrical equipment and power lines at required distance?	☐	☐
9.	Rigging inspected for defects?	☐	☐
10.	Engineering lifting lugs fabricated and installed correctly?	☐	☐
11.	Connecting/disconnecting means been developed?	☐	☐
12.	Have the safety precautions been reviewed?	☐	☐
13.	Is survey equipment required?	☐	☐
14.	The total lifted weight is below 95% capacity?	☐	☐
15.	Signal person(s) assigned?	☐	☐
16.	Safe Plan of Action (SPA) completed?	☐	☐
17.	Pre-lift meeting/Activity Hazard Analysis held?	☐	☐
18.	Hoist area and load path cleared of non-essential personnel?	☐	☐
19.	Crane set up per the lift plan (radius, configuration, etc.)?	☐	☐
20	Rigging equipment and tag line(s) installed per plan?	☐	☐

Personnel Completing Check List			
Print	Signature	Title	Date

Attachment 6
Control of Hazardous Energy Program

Control of Hazardous Energy (Lockout/Tagout) Program

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305

Table of Contents

1.0 Purpose

It is this company's policy that before any work or maintenance is performed on any machine, equipment, tool, or electrical system, that they are made totally safe before work starts by removing any source of energy or power to them. The Lockout/Tagout Program provides for a safe method of working on, near, or in machinery or equipment that can cause serious injury.

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It will be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

NOTE: This program will be available to all employees for review and a copy will be located in the following area(s):

1. Health and Safety Office

4. Main Office Trailer

2.0 Authority and Reference

Occupational Safety and Health Administration (OSHA) 29 CFR 1910.147.

This standard covers the servicing and maintenance of machines and equipment in which the unexpected energizing or start up of the machines or equipment, or release of stored energy could cause injury to employees.

3.0 Application

This program applies to the control of energy during servicing and/or normal maintenance of machines and equipment if:

1. An employee is required to remove or bypass a guard or other safety device.
2. An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is being performed at or upon the point of operation, or when an associated danger zone exists during a machine operating cycle.

EXCEPTION: Minor tool changes and adjustments which take place during normal production operations are not covered by the OSHA Standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection.

NOTE: The OSHA Lockout/Tagout Standard (See 29 CFR 1910.147) does not apply to work on cord-and-plug-connected electrical equipment when the employee performing the service or maintenance controls energizing by unplugging the equipment from the energy source. The standard also does not apply to hot tap operations involving transmission systems from substances such as gas, steam, water, or petroleum, when they are performed on pressurized pipelines. However, it must be demonstrated that the continuity of service is essential, shut off of the system is impractical, and special equipment is used which provides effective protection.

3.1 Affected Employees

Job Classification(s) required following Lockout/Tagout procedures include:

1. Mechanics

2. Service Technicians
3. Equipment Operators
4. Laborers
5. Electricians

3.2 Authorized Employees

Job classifications that have the authority and responsibility to perform lockout operations:

1. Mechanics
2. Service Technicians
3. Equipment Operators
4. Electricians
5. Laborers

3.3 Other Employees

Job classifications whose work operations are or may be in an area where energy control procedures may be utilized:

1. Health and Safety personnel
2. Site Superintendent
3. Project Manager

3.4 Sources of Energy and Stored Energy Requiring Lockout

1. Electrical: service panels, outlets, transformers, motors, and capacitors
2. Mechanical: spring-loaded equipment, tensioning devices
3. Hydraulic: rams, oil-powered equipment
4. Pneumatic: compressed-air equipment
5. Kinetic/Gravity: counterweights, flywheels
6. Fluids/Steam: heating pipes, steam lines

4.0 Compliance with this Program

4.1 All Employees

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout procedures. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment, which is locked out to perform servicing, or maintenance will not attempt to start, energize, or use that machine or equipment. Any employee who does not follow this lockout/tagout program will be subject to disciplinary action including written warning, suspension, or dismissal from the company. In the event that a particular assignment makes it impractical to follow all the provisions of this program, the supervisor directing the work activities will be notified immediately and before work starts.

4.2 Health and Safety Officer

The Site Safety and Health Officer or approved alternate will be responsible for the following:

1. Development of a facility-specific energy control policy.
2. Definition and procurement of authorized lockout and tagout devices.
3. Training of supervisors and employees on facility policy and procedures for hazardous energy control.
4. Implementation of the Energy Control Policy and review of supervisory/employee performance.
5. Assurance that newly acquired equipment or overload equipment can accommodate locks.
6. Master file maintenance of specific policies, lockout procedures review and training records.

The Site Safety and Health Officer or approved alternate shall:

1. Identify specific hazards and develop hazard isolation procedures within the facility.
2. Assure that the facility's hazardous energy control policy and procedures are communicated to employees in the work unit.
3. Monitor hazard isolation procedures for effectiveness.
4. Enforce hazard isolation procedures within his/her work unit and between work units or employers in the case of outside contractors.
5. Maintain work unit files documenting employee training.
6. Specify controls capable of being locked out when replacing or updating equipment controls.

5.0 Transfer of Lock/Tagout Responsibility

No employee shall remove a lockout or tagout device affixed by another employee unless authorized. Responsibility for lockout or tagout remains that of the authorized employee who affixes the lockout or tagout device subject to the following exception.

When an incoming authorized employee is to assume lock/tagout responsibilities on a piece of equipment from a departing employee due to shift or personnel changes, the incoming employee shall affix his/her properly labeled locks and/or tag devices to the equipment. If it is intended that the equipment remain securely locked out until the departing employee returns, responsibility does not need to be passed on to the incoming employee.

6.0 Definitions

Affected Employee:

An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which servicing or maintenance is being performed.

Authorized Person:

A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Energy Isolating Device:

A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source:

Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal or other potential energy source that could have potential to endanger personnel.

Entry Point of Power:

The point at which energy enters the system, machine or unit, such as the main electrical disconnect. Changes in power routing at the entry point should be shown on the circuit diagrams for the machines.

Lockout:

The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Other Employees:

All other employees whose work operations are or may be in an area where control procedures may be utilized.

Power:

Any type of energy that can operate equipment, cause movement, or cause injury directly from the energy source. Common types of power are electricity, air or gas under pressure, gravity, springs, oil or water under pressure and steam.

Residual Electrical Power:

Electrical energy, which is retained in a system, machine or unit when the supply line disconnect, is placed on the "OFF" position. Power capacitors and electric or magnetic fields are examples that may have residual power if not properly dissipated.

Residual Pressure:

The differential pressure remaining within a component after the pressure source is closed off.

Tagout:

The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

6.0 Energy Control Procedures

Procedures will be developed and documented when employees are engaged in activities that potentially could be hazardous, due to exposure from an energy source. The following exceptions to required documentation include:

1. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.

2. The machine or equipment has a single energy source, which can be readily identified and isolated.
3. The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
4. The machine or equipment is isolated from that energy source and locked during servicing or maintenance.
5. A single lockout device will achieve a locked-out condition
6. The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
7. The servicing or maintenance does not create hazards for other employees.
8. The employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

Energy control procedures shall clearly and specifically outline the purpose, rules and techniques to be utilized for the control of hazardous energy. (See Form #1) These procedures must include the following:

1. A specific statement of the intended use of the procedures.
2. Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy.
3. Specific procedural steps for the placement, removal and transfer of lockout or tagout devices and the responsibility for them.
4. Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

7.0 Equipment for Lockout/Tagout

For the purpose of achieving lockout/tagout, employees will be provided with appropriate lockout equipment. Equipment shall include, but not be limited to:

7.1 Padlocks

One or more padlocks will be issued to each authorized employee. Each employee will have an individual key. Only one key per lock shall be issued. These locks may be used only for lockout purposes. Locks will be identified by a number assigned to each employee and/or by the use of a nametag. Only the authorized person may apply and remove the lock, and the key may never be given to another person.

Note: A second or master key for each lock will be issued to designated supervisors to enable them to open and remove a padlock after taking the required precautions.

7.2 Lockout Tags

Authorized employees will be issued warning tags, which must be used whenever a padlock cannot be applied. The tag must be affixed as closely as possible to the energy disconnect with a single purpose 50-pound strength plastic tie. Extra caution must be exercised since there is no physical restraint when only a tag is used and energy can be restored without removing a padlock. In addition, where possible, energy source components should be altered, removed, or obstructions should be placed to restrict access to energy disconnects. Electricians may remove

fuses but must attach a tag to the panel involved and remove it when the machine is ready for service and the fuse is replaced.

Tag legends may include, but are not limited to:

DANGER Do Not Start	DANGER Do Not Energize
DANGER Do Not Open	DANGER Do Not Operate
DANGER Do Not Close	

Warning tags shall bear the name of the authorized person and the date of application. Tags must be durable, weather proof and not easily damaged

7.3 Lockout hasps

These devices are designed to accommodate more than one lockout padlock when more than one person is working on de-activated equipment. Each person, to assure his or her safety, will apply a lock and warning tag and remove it when the task is completed

7.4 Circuit Breaker Lockout Devices

These devices are designed to attach to circuit breakers inside a panel box. Once attached a lock and tag may be applied to the device to prevent the breaker from being energized.

8.0 Sequence of Lockout

1. The authorized employee shall notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. It is the responsibility of the equipment operator to notify all affected supervision and employees when a piece of equipment is to be repaired.
2. The authorized employee will refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, will understand the hazards of the energy, and will know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).
4. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source. (Examples: main switch, circuit breaker, flow/control valve, etc).
5. Lock out the energy isolating device(s) with assigned individual lock(s). If more than one person is exposed to the hazard or is working on the machine or equipment, each person must attach his or her individual lock. Only the person who attaches the lock is authorized to remove their lock.
6. Dissipate or restrain any stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam or water pressure, etc.) by such actions as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the machine or equipment is disconnected from the energy source(s) by first checking that no persons are exposed, then verify the machine or equipment is isolated by operating the push/on button or other normal operating control(s) or by testing to make certain the machine or equipment will not operate. Cautions: Return operating control(s) to neutral or “off” position after verifying the isolation of the machine or equipment. For

any electrical work, voltage checks will be made of any circuit elements and electrical parts on which work is to be performed and any exposed adjacent parts.

8. The machine or equipment is now locked out, and servicing or maintenance may proceed.

9.0 Procedures Involving More Than One Person (Group Lockout)

In the preceding steps, if more than one individual is required to lock the energy-isolating device(s), they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. When an energy-isolating device cannot accept multiple locks, a multiple lockout or tagout device (hasp) may be used.

10.0 Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps will be taken.

1. Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact, and all guards are installed.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area. Notify all affected employees that the lockout/tagout is going to be removed.
3. Verify that the controls are in the neutral position.
4. Remove the lockout/tagout device and reenergize the equipment. Except in emergencies, only the person who attached the lockout device may remove it!

   Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.
5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

11.0 Abandoned Lock Removal Procedures

If an employee who has departed the building has left a safety lock in place, it shall be removed only by adherence to the following procedure:

Before the lock is removed:

1. A thorough inspection of the equipment is to be made by the supervisor responsible for the area.
2. The supervisor must confirm that the authorized employee who applied the lockout device is not at the facility.
3. The supervisor shall make all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed.
4. The supervisor shall remove the lock providing he/she has determined starting up the equipment will not endanger other personnel.
5. Each time it is necessary to remove/cut a safety lock, the person authorized to remove the lock shall prepare a written report and a copy will be sent to the H&S Officer (Position designated).

6. The supervisor shall ensure that the authorized employee has knowledge of this release before he/she resumes work at the facility.

12.0 Training

Lockout/Tagout training will be conducted for all employees who are required to perform work on any equipment as referenced in this program. The training will address all components and procedures of this program. It will include methods to ensure employees understand the purpose and function of the program, that they can recognize applicable lockout/tagout situations, and that they have acquired the knowledge and skills required for applying, using, and removing the locks and tags.

1. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control. The training will be documented on Form #2.
2. Each affected employee will be instructed in the purpose and use of the energy control procedure. The training/instruction will be documented on Form #3.
3. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, will be instructed about the procedure and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out. The instruction will be documented on Form #4.
4. When employees are assigned to work in or on equipment that could potentially endanger personnel should it be activated, the supervisor assigning employees to this work is responsible for ensuring that these workers are provided with specific equipment and instructions to comply with this power lockout procedure.
5. Authorized and affected employees will be retrained whenever there is a change in their job assignments that could affect their lockout responsibilities, a change in the machines that presents a hazard or when there is a change in energy control procedures.
6. Additional retraining will be conducted whenever the periodic inspection reveals that there are deviations from or inadequacies in the employee's knowledge or use of energy control procedures.
7. The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

13.0 Periodic Inspection/ Assessment

The SSHO or approved alternate will be conduct a comprehensive inspection/audit of the energy control procedures at least annually to ensure that the facility is in compliance with the OSHA Power Lockout/Tagout Standard 29 CFR 1910.147 and the procedures outlined in this policy. The results of the annual inspection will be recorded on the Annual Power Lockout/Tagout Certified Inspection Worksheet. (See Form #5) Each machine/equipment-specific lockout procedure must be assessed at least annually to ensure that the procedure remains valid or if any changes are warranted. This assessment must be machine-procedure specific and be documented.

14.0 Outside Personnel (Contractors, etc.)

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures. The on-site employer shall ensure that

his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program. The exchange of this information shill be documented on Form #6.

LIST OF SAMPLE FORMS

Form 1: Specific Energy Control Procedures

Form 2: Authorized Employee Training Certification

Form 3: Affected Employee Training Certification

Form 4: Other Employee Training Certification

Form 5: Annual Power Lockout/Tagout Certified Inspection Worksheet

Form 6: Documentation of Information Given to Contractors Pertaining to Lockout/Tagout Procedures

Form 7: Lockout/Tagout Inventory Form

Form 8: Lockout/Tagout Inspection Form

Lockout/Tagout Form #1

SPECIFIC ENERGY CONTROL PROCEDURES FOR EACH PIECE OR TYPE OF MACHINE OR EQUIPMENT

Procedure Number/ Name: _____ Date: _____

Completed By: _____

Machine(s) or Equipment utilizing this procedure: _____

_____

Number of Locks required: _____

Other Lockout Devices required: _____

PROCEDURES FOR CONTROLLING HAZARDOUS ENERGY

1. Sources of Hazardous Energy (examples)
   - Electrical Natural Gas Springs
   - Hydraulic Gravity Steam
   - Chemical Pneumatic Thermal
   - Other: _____

2. Notify affected employees that the machine is about to be shut down and locked out. Specific Instructions

_____

_____

_____

_____

_____

3. Shut down the machine using normal stopping procedures.
Specific Instructions:

_____

_____

_____

4. Isolate all energy sources listed above.
Specific Instructions:

5. A) Apply locks to all isolate devices operated in Step Four.
Specific Instructions:

B) If a tag is used in lieu of a lock when the energy-isolating device is incapable of lockout, the following additional safety precaution will be taken:
Specific Instructions:

6. Block or dissipate all stored energy in rams, flywheels, springs, pneumatic or hydraulic systems, etc.
Specific Instructions:

7. Verify that the machine is locked out by testing the machine operating controls.
RETURN ALL CONTROLS TO THE "NEUTRAL" OR "OFF" POSITION AFTER TESTING.
Specific Instructions:

PROCEDURE FOR REMOVING LOCKS/TAGS

1. Check the machine to be sure it is operationally intact, tools have been removed, and guards have been replaced.

Specific Instructions:

2. Check to be sure all employees are safely positioned.

Specific Instructions:

3. Notify all affected employees that locks/tags are going to be removed and the machine is ready for operation.

Specific Instructions:

4. Remove all locks, blocks, or other energy restraints.

Specific Instructions:

5. Restore all energy to the machine/equipment.

Specific Instructions:

Other Comments/Special Precautions:

Lockout/Tagout Form #2

"AUTHORIZED" EMPLOYEE TRAINING CERTIFICATION

Date of Training: _____

Instructor's Name: _____

Instructor's Signature: _____

The following employees have received "AUTHORIZED" employee training on lockout/tagout procedures:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Employee Name (Please Print):_____

Employee Signature:_____

Lockout/Tagout Form #3

"AFFECTED" EMPLOYEE TRAINING CERTIFICATION

Date of Training:_____

Instructor's Name: _____

Instructor's Signature: _____

The following employee have received "AFFECTED" employee training on lockout/tagout procedures:

Employee Name (Please Print):_____

Employee Signature: _____

Lockout/Tagout Form #4

"OTHER" EMPLOYEE TRAINING CERTIFICATION

Date of Training:_____

Instructor's Name: _____

Instructor's Signature: _____

The following employees have received "OTHER" employee training on lockout/tagout procedures:

Employee Name (Please Print):_____

Employee Signature: _____

Lockout/Tagout Form #5

ANNUAL POWER LOCKOUT/TAGOUT CERTIFIED INSPECTION WORKSHEET

DATE: _____ DEPT.: _____

MACHINE/EQUIPMENT NAME: _____

REVIEW WITH EMPLOYEE (S) PERFORMING SERVICE OR MAINTENANCE ON THE FOLLOWING:

• HAVE YOU HAD LOCKOUT TRAINING? ☐ YES, ☐ NO

• DO YOU HAVE A SAFETY LOCK? ☐ YES, ☐ NO

• ARE LOCKOUT PROCEDURES FOR ABOVE MACHINE/ EQUIPMENT AVAILABLE AND/OR POSTED? ☐ YES, ☐ NO

• DOES EMPLOYEE (S) UNDERSTAND HIS/HER LOCKOUT RESPONSIBILITIES? ☐ YES, ☐ NO

OBSERVATION:
WERE LOCKOUT PROCEDURES FOLLOWED? ☐ YES, ☐ NO

NONE REQUIRED:
LIST DEVIATION (S) OR INADEQUACIES OBSERVED: _____

_____

_____

CORRECTIONS/CHANGES/COMMENTS:
EMPLOYEE (S) INSPECTED:

NAME: _____ DEPT.: _____

NAME: _____ DEPT.: _____

NAME: _____ DEPT.: _____

NAME: _____ DEPT.: _____

INSPECTED BY:

NAME: _____ POSITION: _____

Lockout/Tagout Form #6

DOCUMENTATION OF INFORMATION GIVEN TO CONTRACTORS PERTAINING TO LOCKOUT/TAGOUT PROCEDURES

Date	Contractor	Information Given

Contractor's Signature: _____ Date: _____

Authorized Employee Signature: _____ Date: _____

Authorized Supervisor's Signature: _____ Date: _____

Lockout/Tagout Form #7

LOCKOUT - TAGOUT INVENTORY FORM

Location: _____

1. Machine/Equipment: _____

2. Maintenance or service performed on this machine/equipment in this work area?

☐ YES, ☐ NO

3. Type of Power/Energy Source(s)
Electrical_____

Hydraulic_____

Gas_____

Pneumatic_____

Water_____

Gravity _____

Other _____

4. Energy Source Type
Main Source/Location_____

Source on Machine/Equipment_____

5. What type of lockout processes can be used on this equipment?
(Check all available)
Keyed locks with tags _____Blocks _____
Tags only _____Wedges _____
Chains _____
Other (list) _____
_____
_____
_____

6. What steps should be taken to secure this machine/equipment from accidental start-up?

_____

_____

_____

Lockout/Tagout Form #8

LOCKOUT - TAGOUT INSPECTION FORM

Agency/Institution: _____

Department: _____

Type of Machine Locked Out: _____

Employee: _____ Job Title: _____

Employee Observed by: _____ Job Title: _____

Date and Time of Inspection: _____

Employee obeying safe procedures for locking and tagging:

_____

_____

Unsafe procedures or practices observed:

_____

_____

Recommendations:

_____

_____

Corrective actions taken:

_____

_____

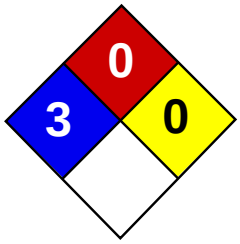
Inspection reviewed with employee observed: _____

Date/Time: _____

Observed Employee's signature: _____ Date: _____

Inspection Performed by: _____ Date: _____

Attachment 7
Chemical Information Sheets



Material Safety Data Sheet
Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 05/21/2013 12:00 PM

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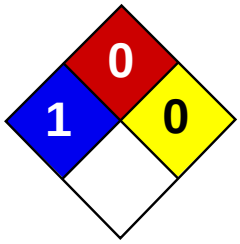

Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:21 PM

Last Updated: 05/21/2013 12:00 PM

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Attachment 8
Hazardous Communication Program

Hazard Communication Program

June 2015

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305

Table of Contents

Hazard Communication Program

1. PURPOSE

The Hazard Communication Standard, OSHA 1910.1200, recently amended to meet the international Global Harmonization Standard (GHS), is the primary regulation to communicate information about chemical hazards. The regulation requires that each employer develop and implement its own program to assure employees know and understand how to protect themselves from the hazards of using chemicals at Sevenson.

2. SCOPE

This program and the procedures described herein apply and shall be practiced by all Sevenson employees using or potentially exposed to the hazards of chemical in the workplace. This program applies to permanent facilities and construction sites equally.

3. REQUIREMENTS

All employees who may be exposed to hazardous materials will be trained according to the requirements of this Hazard Communication Program BEFORE using or being potentially exposed to hazardous chemical. . The training requirements are in Section 6.

Retraining will occur as needed when new hazards become recognized, when employees become exposed to new hazards as a result of transfer, process changes, or new chemical introductions, or when they demonstrate a lack of understanding and/or adherence to the program requirements. In the event non-English speaking or reading employees are utilized at the site, accommodations will be made to obtain a SDS in their native langue and have someone who can communicate effectively with the individual(s) participate in the training. Employees shall demonstrate comprehension of the chemical hazards they may be exposed to, how to protect themselves from such hazards, how to use an SDS to recognize and avoid those hazards.

4. ROLES & RESPONSIBILITIES

Job site personnel shall be under the general direction of the Sevenson Project Manager. Each project shall also have personnel with the primary responsibility of site safety and who are under the direction of the Sevenson Director of Health and Safety. Facility-based personnel shall be directly responsible to the Director of Health and Safety. Following is a description of the different program roles.

Site Safety/Health Officer (SSHO) reports directly to the Sevenson Director of Health and Safety. The on-site SSHOs are responsible for implementing the Sevenson Hazard Communication Program. Depending upon the size of the project, the SSHOs may have safety technicians reporting to them. The SSHO's are responsible for;

1. Assuring all personnel on the job site have received training described by this program.

2. Obtaining and managing all SDSs of chemicals used on the site.

3. Conveying site-specific hazard communication information.

4. Conducting site observations to assure that this program is properly implemented.

Project Superintendents/field supervisors assigned to field management roles are required to;

1. Enforce the requirements of the Sevenson Hazard Communication Program.

2. Apprise other contractors regarding the hazardous chemicals which their employees may be exposed to. Contractors, whose employees may be exposed to hazardous substances used by Sevenson employees, will be given access to this Hazard Communication Program.

3. Ensure that all Subcontracts working at the site shall submit all SDSs for the materials they are using at the site to the Site Safety and Health Officer. The Site Safety and Health Officer will review the SDSs to ensure the product is not restricted by the site owner.

Craft and Facility Personnel are responsible for carrying out the requirements of this program and notifying their immediate supervisor of any deficiencies or concerns.

5. HAZARD COMMUNICATION PROGRAM

I. INVENTORY

A written inventory of all the hazardous chemicals used or stored by Sevenson is maintained by the Site Safety Officer and is available in the Site Safety Office. Likewise, a written inventory will be maintained at each facility location and will include all chemicals used at that facility.

II. WARNING LABELS

Sevenson will ensure that each container of hazardous chemical in the workplace will be labeled with the following information, provided on the manufacturer's SDS:

a. Identity of the hazard.

b. Appropriate hazard pictogram (see next page).

c. Signal word (danger or warning).

d. Hazard statement with degree of hazard.

e. Precautionary statements.

Employees are required to label secondary containers into which hazardous chemicals are

transferred from labeled containers even if only for immediate use and under constant control. Manufacturer's and/or shipping labels will be left on the containers and that all containers will be labeled.

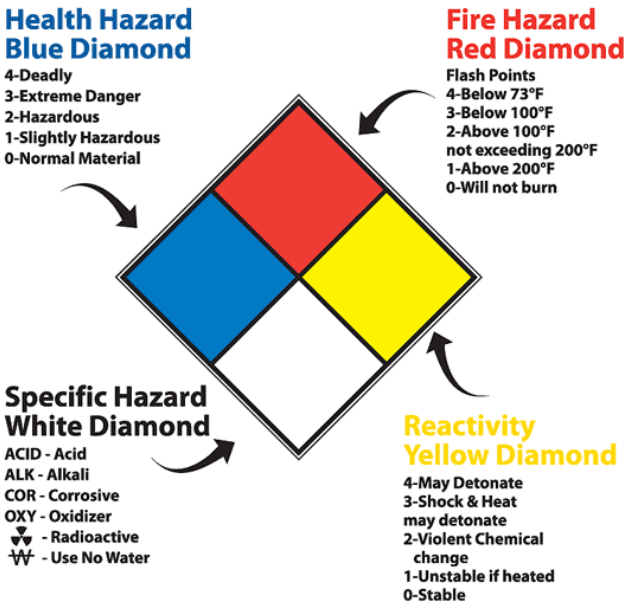
Labeling Chemicals in the Workplace:

HCS Pictograms and Hazards - Mandatory

Health Hazard  ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity	**Flame**  ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides	**Exclamation Mark**  ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  ▪ Gases Under Pressure	**Corrosion**  ▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals	**Exploding Bomb**  ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
Flame Over Circle  ▪ Oxidizers	**Environment (non-Mandatory)**  ▪ Aquatic Toxicity	**Skull and Crossbones**  ▪ Acute Toxicity (fatal or toxic)

The following labels may continue to be used in addition to the mandatory requirements above.

NFPA Method – optional



HMIS Method - optional

Refer to the National Paint & Coatings Association for further explanation of the HMIS system.

Informing Vendors and Sub-Contractors

It is the responsibility of the Site Safety Officer to provide contractors the following information:

- Hazardous chemicals to which they may be exposed while on the jobsite; and
- Precautions the employees may take to lessen the possibility of exposure by usage of appropriate protective measures

III. SAFETY DATA SHEET (SDS)

Sevenson shall obtain or develop a SDS for all hazardous chemicals used in the workplace. The SDS is a form that provides more detailed information about a chemical than the label. It is accessible upon request. The SDS file exists both on a computerized data system and in hard copies. The SDS file is maintained by the Site Safety and Health Officer and is available for review at any time from the Safety Office. All material received on-site must have a SDS prior to the use of this material.

Sevenson's procedures - If a SDS is not received with the material, then the procedures for obtaining a SDS are as follows:

Step 1 - A letter will be sent at any time an item is received and a SDS does not accompany it.

Step 2 - If after 30 days, a SDS has not been received, a follow up request will be sent.

Step 3 - If after an additional 30 days from the follow up letter a SDS has not been received, the company will report to OSHA in an attempt to receive the proper information.

Below is a sample letter requesting a SDS:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Date

Dear Sir:

The Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200) requires that employers be provided Safety Data Sheets (SDS) for all hazardous substances used in their facility, and to make these forms available to employees potentially exposed to these hazardous substances.

In an effort to comply with these regulations, we ask your cooperation in providing us with a current Safety Data Sheet on (product name) no later than (date). Delays in receiving the SDS information may prevent use of your product.

Please consider this letter as a standing request to your company for any information concerning the safety and health aspects of using this product that may become known in the future.

Your cooperation is greatly appreciated. Thank you for your timely response to this request. If you have any questions concerning this matter, please contact myself at the above address.

Sincerely,

SEVENSON ENVIRONMENTAL SERVICES, INC.

Your name

Title

The Site Safety and Health Officer will review all incoming SDS for completeness and accuracy and make the information directly available to employees. Employees will be advised of precautionary measures in using the product.

The following is an outline of the guidelines used to check for SDS completeness:

A. Is a SDS available for the hazardous chemicals used?

B. Is the SDS in English?

C. Are all mandatory sections of the SDS included?

1. Identification
2. Hazard(s) identification
3. Composition
4. First Aid
5. Fire-fighting
6. Accidental release
7. Handling and storage
8. Exposure limits & controls
9. Properties
10. Stability and reactivity
11. Toxicology
12. Ecological information
13. Disposal
14. Transportation
15. Regulations
16. Other information

D. SDS information and key sections follows;

Section 1. Product Name & Identification

Chemical Manufacturer's Name - this may list one or more alternate manufacturers or importers, the address and emergency telephone number.

Name of Product - generally the trade name, which is an adopted name that is given by a manufacturer to distinguish it as produced by him and that it may be protected as a trademark.

Chemical Name - lists the name of the chemical. (In some cases this may be listed as a "Trade Secret" but the remainder of the SDS should be filled out).

A manufacturer, importer, or employer may withhold the chemical identity if it is a trade secret. However, it must be stated clearly that the chemical is a trade secret and the hazardous nature of the chemical **MUST** still be listed, both on the label and the SDS.

Section 2. Hazard identification

This includes all the information required on the label for that chemical including the hazard pictogram(s), signal word, hazard statement, and precautionary statement(s).

Section 3. Composition/Information on Ingredients

Here you will find information on the chemical identity, common names or synonyms, CAS numbers or other unique identifiers as well as any impurities and stabilizing additives which are themselves classified and which contribute to the classification of a substance and any concentrations of the mixture if applicable.

Section 4. First Aid

Here you will find the immediate treatment and response to an emergency exposure.

Section 5. Firefighting measures

This section provides firefighting measures, e.g., suitable and unsuitable extinguishing media, specific hazards arising from the chemical (nature of any hazardous combustion or decay products), and special PPE for firefighters.

Section 6. Accident Release Measures

Here you will find personal precautions, PPE and emergency procedures, environmental precautions, and methods/materials for containing and cleaning up the release.

Section 7. Handling and storage

This section details how the chemical must be handled to prevent fire, explosion, or spill which could result in exposure to employees or the environment.

Section 8. Exposure controls/personal protection

Here you will find the regulatory allowable exposures, engineering controls, and personal protective equipment necessary to minimize exposure.

Section 9. Physical and Chemical Properties

This section provides information on appearance, odor, odor threshold, pH, melting/freezing point, boiling point and range, flash point, evaporation rate, flammability, upper and lower explosive limits, vapor pressure, relative density, solubility, partition coefficient, auto ignition temperature, decomposition temperature, and viscosity.

Section 10. Stability and Reactivity

This section provides information on reactivity, chemical stability, possibility of hazardous reactions, conditions to avoid (static discharge, shock, vibration) incompatible materials,

hazardous decomposition products.

Section 11. Toxicology Information

This section provides concise but compete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects.

Section 12. Ecological Information

This section provides information on eco-toxicity, persistence and degradability, bio-accumulative potential, mobility in soil, and other adverse effects.

Section 13. Disposal Information

This provides a description of waste residues and information on their safety handling and methods of disposal, including the disposal of any contaminated package.

Section 14. Transportation Information

This section provides the UN number, UN proper shipping name, transport hazard class(es), packing group, environmental hazards (marine pollutant), transporting in bulk, and special precautions which a user needs to be aware of, or needs to comply with, in connection with the transport or conveyance within or outside their premises.

Section 15. Regulatory Information

This provides safety, health and environmental regulations specific for the product in question.

Section 16. Other Information

This section allows the manufacturer or distributer to add additional information they feel should be conveyed to the user.

6. TRAINING

Prior to handling or being exposed to chemical hazards and as required, each employee shall receive instruction as described below.

A. TRAINING COURSE OUTLINE

I. Course Introduction

A. Chemical Hazard Recognition
B. Sources of Information on Chemical Hazards
C. Control of Chemical Hazards

II. Chemical Hazard Recognition

Employees shall be instructed of the health hazards of each hazardous chemical in

their workplace.

A. Types of Hazards

1. Physical Hazards - employees shall be instructed on the fire hazard of hazardous chemicals in their workplace.

   a. Combustible liquid
   b. Compressed Gas
   c. Explosive
   d. Flammable
   e. Oxidizer
   f. Pyrophoric
   g. Unstable or Reactive

2. Health Hazards

   a. Acute Hazards

      i. corrosive
      ii. highly toxic
      iii. toxic
      iv. irritant
      v. sensitizer

   b. Chronic Hazards

      i. carcinogens
      ii. mutagens
      iii. teratogens and reproductive toxins
      iv. hepatotoxins
      v. nephrotoxins
      vi. neurotoxins
      vii. other toxic effects

   Employees shall be instructed on how to protect themselves when exposed to hazardous chemicals. They will also be instructed on the type and use of personal protective equipment required when using a particular hazardous chemical.

B. Routes of Entry

1. Ingestion
2. Inhalation
3. Skin absorption

C. Symptoms of Exposure to Hazardous substances

1. Acute exposure

   a. Short term exposure period

b. Usually high concentrations
c. Immediate health effect

2. Chronic exposure

a. Long term exposure period
b. Usually low concentrations
c. Long term health effects

3. Types of reaction to acute and chronic exposures

a. Chronic lung disease-silica, cotton dust
b. Anesthetics-solvent vapors
c. Irritants-formaldehyde, acids
d. Chronic liver damage-carbon tetrachloride
e. Sensitizers-reactive dyes
f. Cutaneous Hazards-ketones, chlorinated compound
g. Eye hazards-methanol, acids

D. Relationship of Dose to Risk

1. Toxicity of chemical
2. Concentration of chemical
3. Mode of exposure and exposure time
4. The greatest risk is posed by toxic substances that are:
   a. highly toxic
   b. present in high concentrations and
   c. to which employees are exposed to several hours per day/day after day

E. Exposure standard

1. OSHA Permissible exposure limits

a. 8-hour time weighted averages
b. 15 minute ceiling
c. legally binding

2. ACGIH Threshold Limit Values

a. 8-hour time weighted averages
b. instantaneous ceiling
c. not legally binding

3. Other Relevant Standards or Criteria

a. NIOSH Criteria Documents
b. ANSI Standards
c. EPA Health Assessment Documents

4. Common Features of Exposure Limits

a. units-very small amounts

i. ppm, ppb, ppt
ii. mg/m3, ug/m3

b. Not "safe" limits but exposure to concentration below levels is generally low risk

III. Sources of Information on Chemical Hazards

A. Summary of HCS

1. Hazard determination-performed by manufacturer
2. SDS
3. Labeling
4. Training Requirements
5. Written Hazard Communication Program
6. List of Hazardous substances in workplace

B. Contents of a SDS

1. Manufacturer's address and phone number
2. Hazardous ingredients/identity
3. OSHA, PEL, ACGIH, TLV, other recommended limits
4. Physical/Chemical characteristics
   a. boiling point
   b. vapor pressure
   c. vapor density
   d. solubility in water
   e. specific gravity
   f. melting point
   g. evaporation rate
   h. appearance and odor
5. Fire and explosion hazard data
   a. flash point
   b. flammable limits
   c. explosive levels
   d. extinguishing media
   e. special firefighting procedures
   f. unusual fire and explosion hazards
6. Reactivity Data
   a. stability
   b. conditions to avoid
7. Health Hazard Data
   a. routes of entry
   b. acute and chronic hazards, including carcinogen
   c. signs and symptoms of exposure

d. medical conditions aggravated by exposure
e. emergency first aid procedures

8. Precautions for Safe Handling and Use

a. steps to be taken in handling and storage
b. waste disposal method
c. precautions to be taken in handling and storing
d. other precautions

9. Control measures

a. ventilation

i. local exhaust, special
ii. mechanical other

b. sealed systems
c. other engineering controls
d. respiratory protection
e. protective gloves
f. other protective clothing or equipment
g. eye protection
h. workplace practices, industrial hygiene procedures

C. Labeling

1. Labels tell you

a. what the principal hazards are
b. what precautions you should take
c. emergency first aid procedures

2. Labels provide this information by

a. words
b. symbols
c. numbers
d. colors
e. combinations

D. Recognizing Hazardous Chemicals are present

1. Appearance or odor of hazardous chemicals
2. Physical or health effects
3. Monitoring
4. Inventory Control

IV. Control of Chemical Hazards

A. Chemical Hazards are Controlled by Various Methods

1. Engineering control, e.g. ventilation

2. Workplace practices e.g., grounding containers of flammable substances
3. Personal protective devices
    a. gloves, shoes
    b. safety glasses
    c. protective clothing
    d. dust masks
    e. respirators
4. Isolation of chemical

B. Safe Handling of Hazardous Chemicals

1. Storage practices
2. Reactivity considerations
3. Proper containers
4. Spill prevention
5. Spill cleanup procedures
6. Personal protective equipment

Attachment 9
Snakes of New Jersey Information Brochure

SNAKES OF NEW JERSEY

Fish and Wildlife

Introduction

Snakes have been around for over 100,000,000 years and despite the odds, historically, 23 species of snakes existed in New Jersey. However, most herpetologists believe the non-venomous queen snake is now extirpated (locally extinct) in New Jersey. 22 species of snakes can still be found in the most densely populated state in the country. Two of our snake species are venomous, the timber rattlesnake and the northern copperhead, and the remaining twenty species are non-venomous.

New Jersey's snake populations have declined during the past 50 years for a number of reasons. Habitat destruction in the form of urbanization has been a primary cause, but pollution, changing land use, commercial collecting and human persecution have all contributed to the reduction of our snake populations. The copperhead is a state species of special concern and the rattlesnake is listed as endangered. In fact, the timber rattlesnake is listed as endangered or threatened in all but one northeastern state. Aside from the listed venomous snakes, additionally listed state species include the threatened pine snake and the state endangered corn snake.

All snakes perform an integral ecological role in their control of rodents and insects and are food to other animals such as raccoons, opossums, black bears, coyotes, bobcats, other snakes, hawks and owls. Even mice will nibble on snakes when they are inactive during hibernation.

Snakes are not slimy or wet as some people think, but are actually dry to the touch. Most have a small head compared with the rest of the body, but the jaws are loosely hinged so that the mouth can be extended to swallow objects several times larger than the snake's own head. The non-venomous snakes in New Jersey have a single row of small, even-length teeth which point slightly backward to help hold prey. The venomous rattlesnake and copperhead have two large, hinged, hollow fangs, one on each side of the upper jaw, which may inject venom when they strike. The venom is used to immobilize and kill small prey, mostly rodents. Both of the venomous snakes are members of the pit viper family, which have (an) elliptical pupils and the characteristic heat-sensing pit that is located between the eye and the nostril.

The venomous snakes of New Jersey are feared the most due to misinformation and misunderstanding. Each year many non-venomous snakes are misidentified as venomous snakes and are killed needlessly, but all snakes in New Jersey are protected under the NJ Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A-1-13), which makes it illegal for anyone to kill, collect, or harass our native snake species. Often, the non-venomous northern water snake is misidentified as the water moccasin (cottonmouth) which does ***not*** occur in New Jersey.

It is extremely rare for the average citizen to encounter a rattlesnake or copperhead due to their elusive nature, preference for interior forest habitat, small, localized populations, and sensitivity to human disturbance. The chance of being bitten by a venomous snake in New Jersey is far less than being struck by lightening. Those who have been bitten in the last half-century, in most cases have attempted to handle the snake, or more rarely, were walking through venomous snake territory in the dark with inappropriate footwear. However, while still rare, increased development and encroachment into venomous snake territory has increased the likelihood of human-venomous snake interactions.

Dispelling Myths

From historical times to present day Hollywood movies, snakes have been portrayed as evil, aggressive, and sneaky creatures.

Throughout history, no other group of animals has undergone and survived such mass disdain. Today, in spite of the overwhelming common sense and the biological facts that attest to the snake's value to our environment, a good portion of the general public still looks on the snake as something to be feared, destroyed, or at best relegated to glassed-in cages at zoos.

- All snakes can swim, but only the northern water snake and queen snake rely heavily on waterbodies. Northern water snakes are frequently found swimming in waterways and basking on embankments, and are often mistaken for water moccasins, which do not occur in New Jersey.
- Snakes do not chase people. Male snakes *may* defend their mates during the breeding season by moving towards a predator, including people, while the female escapes by moving in the opposite direction. Otherwise, snakes will try to move away from people.
- Snakes do not prefer to be around people. To snakes, people are predators and should be avoided.
- All snakes *can* bite if handled . . . just as all animals *can* bite if handled. Animals bite to protect themselves when they feel threatened.
- Rattlesnakes do not travel in pairs. Although rattlesnakes den communally and may share early-season basking areas, they spend much of their active season alone.
- The Division of Fish and Wildlife did *not* re-establish rattlesnake populations in New Jersey. Timber rattlesnake populations have been steadily declining due to wanton killing, illegal collection, and more recently, habitat destruction and encroachment. Rattlesnakes, copperheads, and many of our non-venomous snakes can not be relocated as they have a strong affinity to their home ranges and most likely will not survive in unfamiliar territory.

Controlling snake presence

- Keep your lawn mowed short to deter snake presence and so you can view potential snake activity at a glance.
- Keep your property free of mulch and debris piles. Mulch is composting material that generates heat as it decomposes, creating a warm, inviting basking area for some snakes. Debris piles attract rodents which attract snakes.
- Remove any food that attracts rodents.
- Some snakes, such as garter snakes and milk snakes, can often be found near homes and in basements. During the summer months, homeowners should make certain that all cracks and crevices in the house and outbuilding foundations are sealed.
- Although not scientifically proven, some people believe the use of aromatic cedar mulch annually deters snake presence on their properties.

Keeping snakes in captivity

- It is illegal for anyone in New Jersey to keep any venomous snake in captivity unless it is at an educational or rehabilitative facility or zoo. These facilities must have the appropriate permit(s).
- It is illegal to capture any snake, or other animal, from the wild and keep it as a pet in New Jersey.
- All owners of captive snakes require permits. The permits can be obtained through the Division of Fish and Wildlife's Exotic and Nongame Permits Office (www.njfishandwildlife.com).

Snakes: Descriptions, Pictures and Range Maps

1. Northern water snake (*Nerodia sipedon sipedon*):

22"-53"L. This is one of the most common snakes in NJ, inhabiting freshwater streams, ponds, lakes, swamps, marshes, and bogs throughout the state. Commonly observed basking communally on logs and rocks along stream banks, this snake is often misidentified as NJ's northern copperhead. The ground color is brown or gray with darker brown, reddish, or black bands on the neck and back. The darker pattern color forms wider bands along the back and slightly narrower bands on the sides, resembling a "reverse" hourglass pattern. Older water snakes are much darker, usually brown or black with faint remnants of pattern while juveniles' patterns are typically more vivid. They have keeled scales. They give birth to live young in late summer. The water snake often exhibits a highly defensive disposition and can inflict a painful, non-venomous bite if handled.

2. Eastern milk snake (*Lampropeltis triangulum triangulum*):

24"-52"L. The milk snake is a common species found in NJ. It inhabits various habitats including fields, wooded areas, riverbanks, and rocky hillsides. It may be found in barns or other buildings that house rodents. It is often mistaken for NJ's northern copperhead or timber rattlesnake. The ground color is creamy gray with red or brown blotches outlined in black along the back and sides. Commonly, a Y- or V-shaped light patch can be found on the nape of the neck. They have smooth scales. Six to 24 eggs are laid in June and hatch in late August.

3. Coastal plain milk snake integrade (*Lampropeltis t. triangulum x L.t. elapsoides*):

In southern NJ, the eastern milk snake intergrades with the scarlet snake and is referred to as the "coastal plain milk snake." The milk snake integrade is a rare species found in southern NJ. It inhabits similar habitats as the eastern milk snake. It may be mistaken for NJ's timber rattlesnake. The ground color may be yellow with orange blotches outlined in black along the back and sides. There is typically no Y- or V-shaped patch on the nape of the neck. They have smooth scales.

4. Corn snake (*Elaphe guttata guttata*):

24"-72"L. The corn snake is a state endangered species found in the Pine Barrens of NJ. It inhabits sandy, forested areas preferring pine-oak forest with an understory of low brush. It may also be found in hollow logs, railroad ties, and foundations of old buildings as well as under boards and logs. This snake is locally called the "red rat snake." The ground color is variable, ranging from orange to brown to gray. Orange, red, or brown blotches outlined in black extend the down the length of the back and some individuals may have stripes rather than blotches. They have weakly keeled scales. Five to 18 eggs are laid in July or August, hatching in late August–September.

5. Northern scarlet snake (*Cemophora coccinea copei*):

Adult above; Juvenile below

14"-32¼"L. The northern scarlet snake is an uncommon snake in NJ. It inhabits sandy soils usually hiding under logs, boards, or debris. It may also be found in or near damp woodlands. It resembles the poisonous coral snake of the southern U.S., however, the northern scarlet snake is not poisonous. Its red bands do not extend all the way around the body and are bordered by black with white or creamy-yellow interspaces. They have smooth scales. This snake rarely comes above ground except at night.

6. Eastern kingsnake (*Lampropeltis getula getula*):

36"-82"L. This snake is only found in the southern region of NJ and is considered common. It inhabits borders of swamps and streambeds and can often be found under logs and debris, but will frequently bask in the open. It is frequently referred to as the "chain snake" because of its shiny black or dark brown color patterned with large white or cream-colored links. They have smooth scales. The kingsnake will eat timber rattlesnakes as well as other reptiles in addition to rodents, birds, and frogs. Three to 24 eggs are laid in June and hatch in August.

7. Northern pine snake (*Pituophis melanoleucus melanoleucus*):

48"-100"L. The northern pine snake is a state threatened species found in the Pine Barrens of NJ. It is limited to sandy habitat as it burrows underground for shelter and egg laying. It is a large snake with white, gray, or cream ground coloration marked with black or dark brown blotches. The blotches are more clearly defined towards the tail of the snake. They have keeled scales. The pine snake will hiss and defend itself vigorously when threatened and can inflict a painful, non-venomous bite if handled. The pine snake climbs trees readily but spends a considerable amount of time burrowing. Eggs are laid in June and hatch in August; young measure from 15-18" at hatching.

8. Black rat snake (*Elaphe obsoleta obsoleta*):

Adult above; Juvenile below

34"-101"L. This is NJ's largest snake. Like the black racer, the black rat is common throughout the state in rural and semi-suburban areas and is found in very similar habitats. The adult black rat is a long, plain black snake with a white chin and throat and a white or pale yellow belly. It is a slightly more bulky snake than the racer and when the skin is distended, some skin between the scales may appear white. Juvenile black rats are commonly misidentified as timber rattlesnakes as they have a gray ground color with dark brown or gray blotches on the back. They have weakly keeled scales. These snakes are climbers, and may be found in trees or rock crevices. Five to 24 eggs are laid in June or July and hatch in late-August.

9. Northern black racer (*Coluber constrictor constrictor*):

Adult above; Juvenile below

34"-77"L. Common throughout the state in rural and semi-suburban areas, the black racer can be found in fields or woodlands, and occasionally around residential gardens. The adult black racer is a long, slender, fast black snake with a white chin and throat. Juvenile black racers are commonly misidentified as timber rattlesnakes as they have a gray ground color with dark brown or gray blotches on the back with smaller spots on the sides. The pattern fades and the ground color becomes darker with age. They have smooth scales. Black racers mimic rattlesnakes by vibrating their tails on leaves and

grass when they are threatened. Black racers will eat newborn rattlesnakes as well as other wildlife, and may climb trees to access bird nestlings for food. They are rather defensive snakes that frequently inflict a painful, non-venomous bite when handled. Eggs are laid in June or July and hatch in late-August.

10. Eastern hognose snake (*Heterodon platyrhinos*):

20"-45½"L. This snake occurs statewide, except in metropolitan areas, and is considered uncommon in most parts of the state. It inhabits a variety of habitats with sandy substrate. The most common feature of the hognose snake is its upturned snout, which is used for burrowing. Coloration and pattern vary considerably, but commonly, the ground color ranges from a golden to rusty gray with brown or black rectangular shaped blotches. They have keeled scales. The hognose snake will mimic venomous snakes when threatened by puffing up its body and flattening its head. If the attacker persists, the hognose snake will roll over and play dead, emitting an awful smell to deter the predator from eating it. These snakes usually spend most of their time above ground rather than under objects. Four to 46 eggs are laid in June and July, and hatch in late-August through September.

11. Queen snake (*Regina septemvittata*):

15"-36¾"L. This snake is an uncommon snake of NJ and believed to be extirpated from our state. They have keeled scales. Historically, the snake was at the edge of its range inhabiting a narrow area adjacent to the Delaware River from just south of Trenton to Gloucester County. The snake dwells where crayfish are available and abundant, including streams and rivers with rocky bottoms. They would be found in the water or basking along the shoreline, or under nearby rocks or debris. The young are born in September.

12. Northern brown snake (*Storeria dekayi dekayi*):

9"-20¾"L. A common snake of NJ that may be found in moist woodlands and lowland habitats and in rural and semi-suburban areas, this snake commonly hides under logs, rocks, and debris on the ground. A vertical dark bar a short distance behind the eye and two rows of dark spots down the back are key identifying marks. The ground color is light to dark brown or gray, sometimes with a slightly yellowish or reddish tone. They have keeled scales. Eleven to 18 young are born in August and September.

13. Northern redbelly snake (*Storeria occipitomaculata occipitomaculata*):

8"-16"L. Common to the state, but difficult to find, the northern redbelly is a small brown, gray, or black snake with a red, unmarked underside and three pale spots on the neck just behind the head. These spots occasionally run together. The belly is usually red, but may be yellow, orange, or more rarely blue-black. They have keeled scales. This snake can be found in hedgerows, stone walls, fields, bogs, and wood lots.

14. Eastern smooth earth snake (*Virginia valeriae valeriae*):

7"-13¼"L. This snake is uncommon occurring primarily in the Piedmont and Coastal Plain regions. It spends most of its life under debris in or near deciduous forests. It has smooth gray or reddish brown scales with a white belly. It may display black dots or a faint light stripe on the back. They have weakly keeled or smooth scales. Two to four young are born in September.

15. Eastern worm snake (*Carphophis amoenus amoenus*):

7½"-14¾"L. The eastern worm snake is found in moist soil under stones, boards, and rotten logs and burrows underground. Distributed statewide in rural and suburban areas, this snake is seldom seen. It resembles the eastern smooth earth snake with its dull brown ground color. It has a very round body with a pointy head and tail. The underside and the first one or two rows of scales on the lower sides are pink. They have smooth scales. One to five eggs are laid in June and hatch in August.

16. Northern ringneck snake (*Diadophis punctatus edwardsii*):

10"-30"L. The northern ringneck is found statewide in woodland and rocky areas typically under logs, bark slabs and stones. The back is dark with a golden neck collar and the belly is plain yellow, usually dotted with black. They have smooth scales. One to eight eggs are laid in June and July and hatch in late August-early September.

17. Southern ringneck snake (*Diadophis punctatus punctatus*):

7"-18"L. This snake is almost identical to the northern ringneck, inhabiting much of the same environments but has a greater fondness for moist habitats. It, too, can be found under woody or rocky debris. The two differences in this snake's appearance from the northern ringneck is a dark mark cutting through the neck ring and the underside of the southern ringneck is marked with a series of black half-moons running down the midline. They have smooth scales.

18. Eastern garter snake (*Thamnophis sirtalis sirtalus*):

18"- 51⅝"L. The garter snake is the most common snake found in the state and around residences. They can be found in a variety of habitats including woods, fields, meadows, and near water. Occasionally garter snakes will hibernate under the siding of a home's south facing wall. These snakes are the first to emerge in NJ, and can often be seen in mid-March during warm spells. The adult garter snake's ground color varies from olive to brown to black and typically has three stripes, one on the back and one on each side extending from head to tail. The stripes are usually yellow, but may be greenish, brownish, or bluish, and stripes are occasionally absent. There is often a black or reddish, checkered pattern between the stripes which is more distinguishable on juveniles. The belly is pale yellow to pale green. They have keeled scales. Young are born in late summer, an individual can give birth to about 30 young and large adults can give birth to more than 30.

19. Eastern ribbon snake (*Thamnophis sauritus sauritus*):

18"-40"L. A common snake of NJ that resembles the eastern garter snake. This snake can be found in semiaquatic areas such as bogs, swamps, and streams. The ribbon snake is distinguished from the garter snake by its longer tail, a much more slender body, and side stripes. The ground color is black or brown and the stripes are bright yellow. The underside is pale yellow to pale green with a brown stripe on the edge of the belly and the first two scale rows on the sides. They have keeled scales. Three to 20 young are born in August.

20. Smooth green snake (*Opheodrys vernalis*):

11⅞"-26"L. This snake is in NJ's northern region found primarily in grasses, meadows, open woods, and other terrestrial habitats where it blends easily. This snake does not display the climbing ability of the rough green snake. It has smooth, light green scales with a white, yellow, or pale green belly. They have smooth scales. The eggs are laid in July and hatch in September.

21. Rough green snake (*Opheodrys aestivus*):

20"-45⅝"L. This snake is arboreal, frequently found in vegetation overhanging water in NJ's southern region and is considered common in its limited range. It is very similar in appearance to the smooth green snake except that its scales are keeled giving them a rough texture. It is often called the "vine snake" because of its slender, light green body and plain white, yellow, or pale green belly. Three to 13 eggs are laid in July and August, hatching in August and September.

22. Northern copperhead (*Agkistrodon contortrix mokasen*):

22"-53"L. This is one of two VENOMOUS SNAKES found in NJ. It is an uncommon snake in its range (state species of special concern) inhabiting NJ's northern region extending as far south as the Sourlands of Hunterdon and Somerset counties northeast through localized areas within Somerset and north through western Bergen County. It inhabits rocky fields, berry thickets, woodlands, farmlands, and even old mulch piles. The copperhead is two shades of copper or a reddish brown, the lighter background color with the darker pattern forming an

Copperhead neonate

hourglass shape, wider bands on the sides of the snake and narrower bands across the back. The head is a solid copper color. Young copperheads have a yellow-tipped tail that acts as a lure for prey. They have weakly keeled scales. No one has ever

died from a copperhead bite in NJ. These snakes will ***not*** chase you, but they will defend themselves if they feel threatened. **Keep your distance!** They give birth to 6-17 young in mid-August to early October.

23. Timber rattlesnake (*Crotalus horridus horridus*):

35"-74½"L. This is one of two VENOMOUS SNAKES found in NJ. A state endangered species, three populations remain: in NJ's northern region along the Kittatinny Ridge and within the Highlands region and in southern NJ within the Pine Barrens. In northern NJ, the snake is found in rocky, wooded areas and will hunt in open and dense forests. In southern NJ, the snakes inhabit swamps and pine-oak forests, hunting in open and dense forests and occasionally basking on dirt roads. The color varies: 1) yellow phase: ground color is yellow to brown, with black or dark brown jagged "V-shape" bands and blotches towards the head; 2) black phase: similar pattern to yellow phase, but the dark brown to black ground color obscures much of the pattern. The head is unmarked and the last few inches of an adult's tail are solid black or dark brown. Some timber rattlesnakes may be completely black. They have keeled scales. No one has ever died from a timber rattlesnake bite in NJ. In fact, there are no reported incidents of bites other than to those handling the snakes. The snakes will defend themselves if they feel threatened. **Keep your distance!** Six to 10 young are born in late August to mid-September. All sightings should be reported to the Endangered and Nongame Species Program. Learn more about the venomous snake response team on our website.

What to do if bitten by a venomous snake

If you encounter a venomous snake, you should keep a safe distance (at least 5 feet) and keep young children and pets at your side for control. Tell older children to stay further back.

Venomous snakes may administer a dry bite without injecting venom. This may be done when the strike is in defense rather than for acquiring food. If you are bitten by a venomous snake:

- Stay as calm as possible.
- Call 911 immediately and do not attempt to drive yourself to the hospital.

- Wash the bite with soap and water.
- Immobilize the bitten area and keep it lower than your heart.

What *not* to do if bitten by a venomous snake

- Do not attempt to draw venom from a wound by sucking. Attempts to draw venom from a wound should only be done with a snake-bite venom-extractor kit.
- Do not cut the wound or apply ice to the bite.
- Do not apply a tight bandage. If medical assistance will take longer than 30 minutes to reach you, wrap a bandage 2-4 inches above the wound to attempt to slow the venom transfer through the bloodstream. Be careful not to tie the bandage too tightly, constricting blood flow. You should be able to slip a finger beneath the tied bandage.

Requesting assistance with a venomous snake

The Division of Fish and Wildlife's Endangered and Nongame Species Program (ENSP) has developed the Venomous Snake Response Team (VSRT) to respond to human/venomous snake interactions and increase an awareness of our responsibilities for living in venomous snake country. The VSRT is a group of trained volunteers that includes animal control officers, park rangers, local and state police, and other select individuals that are on-call to remove venomous snakes from private lands upon request. They also educate landowners about snakes and instruct them on how to live safely in snake country. Snakes are removed from harms way and returned to nearby areas away from human habitation.

Landowners that encounter timber rattlesnakes or northern copperheads on their property and wish to have them removed should contact ENSP immediately.

Monday–Friday (8:30 am–4:30 pm)

Northern Region Office: 908-735-8975, 735-9281 or 735-2931

Southern Region Office: 609-628-2103

After hours, weekends, or when unable to contact a biologist at one of the telephone numbers above:

1-877-WARN-DEP

Do's and don'ts when living or recreating in venomous snake country

Always keep your dog on a leash when in state parks and forests. This is a state law created to protect your pet, NJ's native wildlife and other park visitors. Dogs are active, playful and are instinctive hunters. Dogs may kill ground nesting birds, small mammals, reptiles, and amphibians by running off-trail. They may chase black bears into other hikers or back to you or they may encounter a venomous snake, potentially risking a snake bite.

Stay on the trails when hiking where it is easier to see wildlife in your path. If you live in venomous snake country remain on paved paths, wear leather shoes and use a flashlight at night to scan the walkway in front of you and to the sides. Never walk barefoot!

Do not reach into your shrubs, wood piles or rock walls without first thoroughly looking for the presence of snakesusing a stick or broom handle to push vegetation aside.

Attachment 10
Respiratory Protection Program

Respiratory Protection Program

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305

This respiratory protection program has been written to comply with the applicable OSHA regulations and contract specifications, to provide the basis for the administration of the respirator program, and to serve as a training tool for the affected workers. Specifics of the program such as brands of respirators used, cartridges or filters, and type of monitoring equipment will be provided upon mobilization.

Since respiratory protection, in many instances, will be the primary method for protecting a worker's health, it is Sevenson's policy that all portions of this program be followed and that any deficiencies in the administration and enforcement of this program will be immediately corrected.

The overall responsibility for documenting and administering the respirator program rests with the Project Manager. This responsibility will be delegated to the Senior Site Safety Officer. The Site Safety Officer will be responsible for the purchasing, maintenance, and cleaning of respiratory protective equipment as well as providing "refresher" training for affected personnel. The Certified Industrial Hygienist (CIH) will be responsible for the preparation and evaluation of this program.

The type of respirators that will be used will be selected on the basis of either legally mandated requirements or on the professional judgment of the CIH. OSHA standard 1910.134 and the contract specifications are explicit in the types of respirators that are permitted to be worn when contaminants are handled. Those requirements are based on the airborne concentration of the various types of contaminants. Since monitoring is a requirement of the OSHA standard and contract specifications, sufficient data will be generated to determine the proper type of respiratory protection. The type of respirators to be worn will be chosen from the following types:

1. Half mask air purifying equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
    a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.
    b. This style of respirator has an assigned protection factor of 10.
2. Full face air purifying equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
    a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.
    b. This style of respirator has an assigned protection factor of 10 or 50. The assigned protection factor of 50 may only be assigned if a quantitative fit test was performed and the wearer achieves a fit factor greater than 500 for the fit test.
3. Powered air purifying air helmet equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
    a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.

b. This style of respirator has an assigned protection factor of 25.

4. Powered air purifying respirator equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
    a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.
    b. This style of respirator has an assigned protection factor of 1,000.
5. Full face piece supplied-air respirator operated in the pressure demand mode.
    a. Limited to use in atmospheres from which the wearer can escape unharmed without the aid of the respirator. The wearer is restricted in movement by the hose and must return to a respirable atmosphere by retracing his route or entry. The hose is subject to being severed or pinched off.
    b. This style of respirator has an assigned protection factor of 1,000.

It is important that a worker understands the proper use and limitations of the various respirators. Therefore, all workers who are required to wear respirators will undergo a training program that consists of:

1. Nature of the hazards
2. Explanation of why other control methods are not feasible
3. Explanation of the selection criteria for the respirators that are to be used
4. Limitations
5. Inspection
6. Proper donning and wearing
7. Positive and negative pressure fit tests
8. Maintenance
9. Emergency situations

In addition, all respirator users will be given a qualitative fit test.

All respirators will be cleaned and disinfected at the end of each day's use. The following procedure will be used:

1. Cartridges, filters, and canisters will be removed and discarded.
2. Wash respirator in warm water (approx. 120°F) and cleaner/disinfectant solution.
3. Rinse in clean, warm water and then in a 50% isopropyl alcohol solution.
4. Air dry or use a hair dryer.
5. Inspect all parts of respirator and replace any that are missing or defective.
6. Place face piece in plastic bag.

All respirators will be stored in a separate plastic bag and stored in the decontamination trailer.

It will be the responsibility of the site safety officer to assure that all respirators have been

properly inspected and maintained.

The inspection will consist of:

1. Tightness of connections.
2. Condition of face piece, straps, connecting tubes, and canisters.
3. Condition of exhalation and inhalation valves.
4. Pliability and flexibility of rubber parts.
5. Condition of lenses of full face piece respirators.
6. Charge of compressed air cylinder of self contained breathing apparatus.
7. Proper functioning of regulators and warning devices.

As outlined in the air monitoring section of the health and safety plan, personal air samples will be taken to determine the extent of worker exposure. The results of this sampling will be reviewed and evaluated and the proper type of respiratory protection will then be determined by the CIH.

As the work progresses, the type and extent of the health hazards will become more fully documented. Also there is the potential for the development of new hazards. Therefore, this respiratory protection program will be continually evaluated by the on-site safety and health personnel in consultation with the CIH.

All personnel who will be required to wear respirators must participate in the medical surveillance program outlined in the health and safety plan. A certificate stating that the employee is physically able to wear a respirator will be obtained and made available to the owner's representative.

All respiratory protective equipment used on this project will be approved by the National Institute for Occupational Safety and Health.

Air Supplied Breathing Apparatus Standards contains specific requirements for supplied air systems.

Respirator Fit

An employee wearing a respirator can be protected against airborne contaminants only if there is successful sealing of the respirator on his or her face. All employees may not obtain a successful fit for a specific respirator, since facial dimensions vary considerably from person to person. A half face piece must contact a rather complex facial surface and the possibility of leakage is greater than in the case of the full face piece. Studies have shown that temples on glasses, absence of dentures, full beards, handlebar mustaches or wide sideburns can reduce respirator performance by as much as 25 percent.

The respirator face piece-to-face seal will be tested each time the employee enters a contaminated atmosphere. Most respirator manufacturers provide instructions for wearing and leak testing and these instructions will be followed. The training program will cover these procedures. Face piece-to-face fit tests include the following:

A. Positive Pressure Test - close or "block off" the exhalation valve and exhale gently into the face piece. If a slight positive pressure is built up with no apparent outward leakage

around the seal, then the facepiece-to-face seal is satisfactory. Note that this test only applies to those respirators that have an exhalation valve that can be blocked (the exhalation valve cover may have to be removed for the test).

B. Negative Pressure Test - Close the inlet opening or hose of the respirator facepiece with the hand(s), tape or other means, inhale gently so that the facepiece collapses slightly and hold the breath for ten seconds. If the facepiece remains slightly collapsed and no inward leakage occurs, then the facepiece-to-t\face seal is probably satisfactory.

C. The respirator fit test will be performed according to the Qualitative Fit Test (QLFT) protocols as outlined in Appendix D of OSHA Standard 1910.1025, which are detailed below. Positive and negative pressure tests will be performed by the employee before each wearing of his respirator.

The isoamyl acetate protocol is as follows:

a. **Odor Threshold Screening**

1. Three 1-liter glass jars with metal lids (e.g. Mason or Bell jars) are required.
2. Odor-free water (e.g. distilled or spring water) at approximately 25°C will be used for the solutions.
3. The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor-free water in a 1-liter jar and shaking for 30 seconds. This solution will be prepared new at least weekly.
4. The screening test will be conducted in a room separate from the room used for actual fit testing. The two rooms will be well ventilated but may not be connected to the same recirculating ventilation system.
5. The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into 500 cc of odor-free water using a clean dropper or pipette. Shake for 30 seconds and allow to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution may be used for only one day.
6. A test blank is prepared in a third jar by adding 500 cc of odor-free water.
7. The odor test and test blank jars will be labeled 1 and 2 for jar identification. If the labels are put on the lids they can be periodically dried off and switched to avoid people thinking the same jar always has the IAA.
8. The following instructions will be typed on a card and placed on the table in front of the two test jars (i.e. 1 and 2);

"The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of

the bottle. Indicate to the test conductor which bottle contains banana oil."

9. The mixtures used in the IAA odor detection test will be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

10. If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA QLFT may not be used.

11. If the test subject correctly identifies the jar containing the odor test solution, he may proceed to respirator selection and fit testing.

b. **Respirator Selection**

1. The test subject will be allowed to select the most comfortable respirator from a large array of various sizes and manufacturers that include at least three sizes of elastomeric half face pieces and units of at least two manufacturers.

2. The selection process will be conducted in a room separate from where the fit test will take place.

3. The test subject should understand that he is being asked to select the respirator which provides the most comfortable fit for him. Each respirator represents a different size and shape and, if fit properly, will provide adequate protection.

4. The test subject holds each facepiece up to his face and eliminates those which are obviously not giving a comfortable fit. Normally, selection will begin with a half-facepiece and if a fit cannot be found here, the subject will be asked to go to the full face piece respirators. (A small percentage of users will no be able to wear any half-facepiece respirator).

5. The more comfortable face pieces are recorded; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in #6 below. If the test subject is not familiar with using a particular respirator, he will be directed to don the mask several times and to adjust the straps each time, so that he becomes adept at setting proper tension on the straps.

6. Assessment of comfort will include reviewing the following points with the test subject:

- Chin properly placed
- Positioning of mask on nose
- Strap tension
- Fit across nose bridge
- Room for safety glasses

- Distance from nose to chin
- Room to talk
- Tendency to slip
- Cheeks filled out
- Self-observation in mirror
- Adequate time for assessment

7. The test subject will conduct the conventional negative and positive pressure fit checks (e.g. see ANSI Z88.2-1980). Before conducting the negative or positive-pressure checks, the subject will be told to "seat" his mask by rapidly moving the head side-to-side and up and down, taking a few deep breaths.
8. The test subject is now ready for fit testing.
9. After passing the fit test, the test subject will be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator will be tried.
10. The employee will be given the opportunity to select a different facepiece and be retested if during the first two weeks of on-the-job wear the chosen facepiece becomes unacceptably uncomfortable.

c. **Fit Test**

1. The fit test chamber will be substantially similar to a clear 55 gallon drum liner suspended inverted over a two foot diameter frame, so that the top of chamber is about six inches above the test subject's head. The inside top center of the chamber will have a small hook attached.
2. Each respirator used for the fitting and fit testing will be equipped with organic vapor cartridges to offer protection against organic vapors. The cartridges or masks will be changed at least weekly.
3. After selecting, donning, and properly adjusting a respirator himself, the test subject will wear it to the fit testing room. This room will be separate from the room used for odor threshold screening and respirator selection, and will be well ventilated, as by an exhaust fan or lab hook, to prevent general room contamination.
4. A copy of the following test exercises and rainbow (or equally effective) passage will be taped to the inside of the test chamber:

Test Exercises

i. Normal breathing.

ii. Deep breathing. Be certain breaths are deep and regular.

iii. Turning head from side-to-side. Be certain movement is complete. Alert the test subject not to bump the respirator on the shoulders.

Have the test subject inhale when his head is at either side.

iv. Nodding head up and down. Be certain motions are complete and made about every second. Alert the test subject not to bump the respirator on the chest. Have the test subject inhale when his head is in the fully up position.

v. Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

vi. Normal breathing.

5. Each test subject will wear his respirator for at least ten minutes before starting the fit test.

6. Upon entering the test chamber, the test subject will be given a six inch by five inch piece of paper towel or other porous absorbent single ply material, folded in half and wetted with three-quarters of one cc of pure IAA. The test subject will hang the wet towel on the hook at the top of the chamber.

7. Allow two minutes for the IAA test concentration to be reached before starting the fit-test exercises. This would be an appropriate time to talk with the test subject, to explain the fit test, the importance of his cooperation, the purpose for the head exercises, or to demonstrate some of the exercises.

8. Each exercise described in No. 4 above will be performed for at least one minute.

9. If at any time during the test, the subject detects the banana-like odor of IAA, he will quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

10. Upon returning to the selection room, the subject will remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, etc. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject will wait about five minutes before retesting. Odor sensitivity will usually have returned by this time.

11. If a person cannot be fitted with the selection of half-facepiece respirators, include full facepiece models in the selection process.

12. When the test subject leaves the chamber he will remove the saturated towel, returning it to the conductor. To keep the area from becoming contaminated, the used towels will be kept in a self-sealing bag. There should be no significant IAA concentration buildup in the test chamber from subsequent tests.

13. Persons who have successfully passed this fit test may be assigned the use of the tested respirator in atmospheres with up to ten times the PEL of airborne lead. In other works this IAA protocol may be used to assign a protection factor no higher than ten.