HEALTH AND SAFETY PLAN

PORTAGE CREEK AREA
TIME CRITICAL REMOVAL ACTION
KALAMAZOO, KALAMAZOO COUNTY, MICHIGAN

Prepared for:

USEPA Region 5
Emergency Response Branch
77 West Jackson
Chicago, IL 60604

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HEALTH AND SAFETY PLAN

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Project Name: Allied Paper Portage Creek Site
Kalamazoo, Kalamazoo County, Michigan

ERRS Project No.: 030281.0087

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START Health and Safety

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GLOSSARY OF ACRONYMS AND TERMS

ANSI	-	American National Standards Institute
APR	-	Air Purifying Respirator
ACGIH	-	American Conference of Governmental Industrial Hygienists
CFR	-	Code of Federal Regulations
CRZ	-	Contamination Reduction Zone
DECON	-	Decontamination
EQ	-	Environmental Quality Management, Inc.
ERRS	-	Emergency and Rapid Response Services
EZ	-	Exclusion Zone
HASP	-	Health and Safety Plan
HAZWOPER	-	Hazardous Waste Operations and Emergency Response
IDLH	-	Immediately Dangerous to Life & Health
MSDS	-	Material Safety Data Sheet
NIOSH	-	National Institute for Occupational Safety & Health
OSC	-	On-Scene Coordinator
OSHA	-	Occupational Safety and Health Administration
PEL	-	Permissible Exposure Limit
PID	-	Photoionization Detector
PPE	-	Personal Protective Equipment
RM	-	Response Manager
SHSO	-	Site Health and Safety Officer
SOP	-	Standard Operating Procedure
START	-	Superfund Technical Assessment & Response Team
STEL	-	Short Term Exposure Limit
SZ	-	Support Zone
TLV	-	Threshold Limit Value
TWA	-	Time Weighted Average
U.S. EPA	-	U.S. Environmental Protection Agency
VOC	-	Volatile Organic Compounds

INTRODUCTION

This Health and Safety Plan (HASP) presents the health and safety requirements developed for the Allied Paper Portage Creek Site to protect on-site personnel, visitors, and the public from exposure to hazardous materials and physical injury. The provisions contained herein were based on the planned scope of work and best available information at the time of this HASP preparation. Specific requirements will be revised if the scope of work is significantly modified in a way that is not addressed by this HASP, and when new information is received or conditions change that directly impact the health and safety of on-site personnel, visitors, or the public. A written amendment will document significant changes made to this HASP, and will be included in Appendix A (Health and Safety Plan Amendments).

The provisions of this HASP are mandatory for all EQ, START, and team subcontractor personnel assigned to the Allied Paper Portage Creek Site. Other contractors that will be working at the Site are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities. Because other contractors are ultimately responsible for the health and safety of their employees, other contractors may mandate health and safety protection measures for their employees beyond the minimum requirements specified in this HASP. In addition, all visitors to the Site must abide by the requirements of this HASP and attend a pre-work briefing where the contents of this HASP will be presented and discussed.

All work practices and processes implemented on site will be designed to minimize worker exposure to hazardous materials and to reduce the possibility of physical injury. All work will be performed in accordance with applicable OSHA 29 CFR 1910 and 1926 Health and Safety Regulations, specifically 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, and EQ's Corporate Health and Safety Program. Where appropriate, specific OSHA regulations or other guidance will be cited and applied.

Daily Briefings

Prior to field activities at the Allied Paper Portage Creek Site, daily "tailgate" health and safety briefings with all project personnel will be conducted at the beginning of each shift. The briefings will provide information from this HASP and other pertinent resources to assist

workers in safely performing their scheduled work activities and will include a discussion of potential chemical, physical, and biological hazards and preventive safety measures. The briefings will serve to heighten awareness of potential hazards and provide an opportunity for workers to provide feedback on the "plan of the day." In addition, the briefings will provide an opportunity to discuss safety- and health-related deficiencies noted during field activities.

Health and Safety Plan Acknowledgment

The Response Manager or designee shall be responsible for informing all EQ and team subcontractor personnel and visitors of the contents of this HASP, and ensuring that each person reads this HASP and signs the Health and Safety Plan Acknowledgment Form prior to entering the work zone. By signing the Health and Safety Acknowledgment Form, the individual attests that he/she recognizes the potential hazards present on site and agrees to abide by the provisions of this HASP.

SECTION 1

SITE BACKGROUND AND SCOPE OF WORK

1.1 Site Background

The Allied Paper Portage Creek Site lies within the Great Lakes Basin in the Kalamazoo River watershed of Michigan's Lower Peninsula. The watershed drains 2,020 square miles of southwest Michigan. It reaches 162 miles into south-central Michigan, and ranges in width from 11 to 29 miles. The river itself drops 540 feet in elevation from its headwaters to its mouth, producing a slow to moderate stream gradient. The main channel of the Kalamazoo River flows northwest for 123 miles before ultimately emptying into Lake Michigan near Saugatuk, Michigan. The State of Michigan estimates that the river contributes 42 pounds of polychlorinated biphenyls (PCBs) annually to Lake Michigan. The Site is the second-most significant source of PCBs to Lake Michigan, after the Fox River.

Portage Creek is located in the City of Kalamazoo, Michigan. The Creek has an average width of approximately 32 feet, an average depth of approximately 2.3 feet and covers a surface area of approximately 8.2 acres. The Portage Creek Area removal project begins at East Alcott Street and will proceed north approximately two miles to the confluence of the Kalamazoo River. The Creek is bounded by developed and undeveloped residential, commercial, industrial and public properties for its entire length through the City of Kalamazoo. Numerous railroad and street bridges cross over Portage Creek as it flows to the Kalamazoo River. Within the Portage Creek Area, more than 50 storm water outfalls discharge into Portage Creek and approximately 18 bridges cross over the Creek. The outfalls and bridge embankments are of various sizes and some are in assorted states of disrepair. Portions of Portage Creek's shoreline have improvements consisting of sheet pile or concrete retaining walls, building foundations, fencing, and tree lined or manicured vegetated banks. The banks in the Portage Creek Area range in length from approximately 18 inches to 10 feet. Certain locations in the Portage Creek Area have limited access and may require heavy equipment to gain access onto the Creek bed to remove contaminated sediments.

The Administrative record for the Site contains numerous reports which summarize the investigations conducted since 1990 to date. Over 29 samples from the Portage Creek Area (between E. Alcott Street and the confluence with the Kalamazoo River) have PCB concentrations greater than 50 milligrams per kilogram (mg/kg) ranging in depth from surface sediment to 44 inches deep. Nearly half of the samples with concentrations greater than 50 mg/kg are located in Portage Creek adjacent to the Upjohn Park recreational area. Those samples range in sediment depth from surface sediment to 44 inches deep. The highest concentration of PCB in Portage Creek adjacent to the Upjohn Park area is 300 mg/kg. The highest sample results show a concentration of 590 mg/kg for the Portage Creek Area and came from a location between E. Walnut Street and E. Dutton Street. Specifically, in early November 2010, the Michigan Department of Natural Resources and Environment collected 80 sediment and floodplain soil samples from the Portage Creek Area. Sediment samples were collected from various depths ranging from top sediment to approximately 80 inches deep. Total PCB concentrations in sediment from these samples ranged from non-detect to 590 mg/kg. Floodplain soils were sampled at various depths ranging from top of surface to approximately 36 inches deep. Total PCB concentrations in floodplain soil ranged from 0.26 mg/kg to 72.0 mg/kg.

1.2 Scope of Work

The scope of work and associated health and safety requirements presented in this HASP primarily focus on the Phase 1 (Areas SA 6 and SA 7). This HASP will be reviewed and revised, as necessary, prior to the commencement of each major phase of field work to accurately reflect the planned operational phase of field work.

Site activities for Phase 1 will consist of the following major definable work elements:

- Mobilize/Demobilize Trailers and Equipment
- Establish Work Zones
- Clear/Grub Site (surveying, access road, excavation areas, creek banks)
- Perform Soil and Sediment Sampling
- Construct Dewatering and Staging Pad
- Construct/Operate Waste Water Treatment Plant
- Install/Operate/Remove Dewatering Pumps, Pipeline and Vacuum Wellpoint System
- Install/Remove Sheet Pile Cofferdams
- Install/Operate/Remove By-Pass Pumps and Piping
- Install/Remove Soil and Sediment Controls
- Construct/Remove Access Road
- Excavate/Remove/Stabilize Contaminated Soil and Sediment

- Transport/Dispose Contaminated Soil and Sediment
- Backfill/Grade/Restore Excavated Areas
- Restore Vegetation (topsoil, seed)

SECTION 2

SAFETY AND HEALTH ORGANIZATION

2.1 Roles and Responsibilities

On-Scene Coordinator (OSC)

The OSC or designee, as the representative of the Federal Government, is responsible for overall project administration and for coordinating health and safety standards for all individuals on site at all times. All Federal Government and contractor's health and safety guidelines and requirements as well as all applicable OSHA standards shall be applied. The OSC or designee is the overall Site Health and Safety Officer and will be responsible for the health and safety of on-site visitors. Each contractor (as an employer under OSHA), however, is also responsible for the health and safety of its employees. If there is any dispute with regard to health and safety, the following procedures shall be followed:

- Attempt to resolve the issue on site.
- If the issue cannot be resolved, on-site personnel shall consult off-site health and safety personnel for assistance, and the specific task operation in dispute shall be discontinued until the issue is resolved.

Response Manager (RM)

The EQ RM as the field representative for the ERRS cleanup contractor, Environmental Quality Management, Inc. (EQ) has the responsibility for fulfilling the terms of the delivery order. The RM must oversee the project and ensure that all technical, regulatory, and safety requirements are met. It is the RM's responsibility to communicate with the OSC or designee as frequently as dictated by the OSC or designee, but at least daily, regarding site cleanup progress and any problems encountered.

Superfund Technical Assessment and Response Team (START)

The START contractor (Weston Solutions, Inc.) is responsible for providing the OSC with assistance and support in regards to all technical, regulatory and safety aspects of site

activity. The START contractor is also available to advise the OSC on matters relating to sampling, treatment, packaging, labeling, compatibility, transport and disposal of hazardous materials, but is not limited to the abovementioned.

Site Health and Safety Officer (SHSO):

The ERRS Site Health and Safety Officer (SHSO) will be assigned to the site on a full-time basis with functional responsibility for implementing the Health and Safety Plan as it applies to ERRS personnel. The RM is the designated ERRS SHSO unless otherwise appointed. Site audits may be conducted by the ERRS Director of Health & Safety and/or the U.S. EPA, as approved by the OSC.

Specific duties include:

- Assume responsibility for health and safety of ERRS personnel.
- Document health and safety problems.
- Supervise decontamination of personnel and equipment.
- Conduct personal air monitoring on all ERRS employees as outlined in 29 CFR 1910.120(h)(4).
- Select protective equipment levels based upon chemical properties, method of contact and air sample results.
- Ensure all ERRS personnel are fit for duty based on medical surveillance reports.
- Inspect first aid kits/fire extinguishers.
- Update the HASP to reflect changes in site conditions or the scope of work. HASP updates must be reviewed and approved.
- Inspect the site for compliance with this HASP.
- Work with the EQ RM and OSC to develop and implement corrective action plans to correct deficiencies discovered during site inspections.
- Determine emergency evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation.
- Ensure that all site personnel and visitors have received the proper training and medical clearance prior to entering the site.
- Establish any necessary controlled work areas (as designated in this HASP or other safety documentation).
- Initiate tailgate safety meetings and maintain attendance logs and records.

2.2 Key Personnel

Key personnel are as follows:

- U.S. EPA On-Scene Coordinators: Sam Borries / Craig Thomas
  77 W. Jackson
  5th Floor
  Chicago, Illinois 60604-3507
- ERRS Contractor: Environmental Quality Management, Inc. (EQ)
  1800 Carillon Boulevard
  Cincinnati, Ohio 45240
  800-500-0575
- ERRS Deputy Program Manager: Eric Bowman (EQ)
- ERRS Director of Health & Safety: Todd Valli (EQ)
- ERRS Response Manager: Eric Bowman (EQ)
- ERRS Response Manager (back-up): Jeffrey Rhinefield (EQ)
- ERRS Site Health and Safety Officer: Eric Bowman (EQ) or Jeffrey Rhinefield (EQ)
- ERRS Team Subcontractor(s): Clay Corman (CMC)
- START Project Manager: Chris Lantinga (Weston Solutions, Inc.)
- START Site Lead: Mike Browning (Weston Solutions, Inc.)
- START Health and Safety: Tonya Balla (Weston Solutions, Inc.)

SECTION 3

HEALTH AND SAFETY HAZARDS

This section of the HASP details the chemical, physical, biological, and task-specific hazards posed to site personnel during planned project activities. Prior to the day's field activities, the RM/SHSO will conduct daily "tailgate" health and safety briefings at the beginning of each shift. Potential chemical, physical, and biological hazards and preventive health and safety measures will be discussed at these briefings.

A detailed Activity Hazard Analysis (AHA) has been developed for general construction/operational activities and the major, definable work elements. These AHAs identify specific hazards anticipated and the control measures to be implemented to minimize or eliminate each hazard. The AHAs will be used to augment daily briefings intended to heighten safety and hazard awareness on the job. A copy of the AHAs developed for this project is presented in Appendix B. These AHAs are primarily applicable to EQ. START will be performing in more of an oversight role for the majority of the associated tasks.

In addition, EQ Standard Operating Procedures (SOPs) related to Health and Safety for tasks to be performed on this project are presented in Appendix C. Weston SOPs for Health and Safety are available through the site lead, or online through Weston's intranet.

3.1 Chemical Hazards

Chemical hazards are expected to be limited to those chemicals brought on-site and those expected to be encountered during remediation conducted at the site. The chemicals brought on site will be managed in accordance with the Hazard Communication Standard (OSHA 29 CFR 1910.1200) and EQ's or START's Hazard Communication Programs.

Appendix D, Chemical Hazard Information, contains generic Material Safety Data Sheets (MSDSs) for anticipated materials. This should not be taken as a complete assessment of the hazards posed by materials at the Allied Paper Portage Creek Site. Therefore, personnel must be alert for symptoms of possible exposure such as unusual smells; stinging or burning eyes, nose, or throat; skin irritation; and euphoria, depression, sleepiness, or tiredness. Symptoms must be

immediately reported to the RM/SHSO.

Exposure to the following chemical hazards may be encountered:

Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are a group of manufactured organic chemicals that contain 209 individual chlorinated chemicals. PCBs are either oily liquids or solids and are colorless to light yellow in color. They have no known smell or taste. There are no known natural sources of PCBs. Some commercial PCB mixtures are known in the United States by their industrial trade name, Aroclor.

PCBs have been used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. The manufacture of PCBs stopped in the United States in 1977 because of evidence that they build up in the environment and cause harmful effects. Products containing PCBs are old fluorescent lighting fixtures, electrical appliances containing PCB capacitors, old microscope oil, and hydraulic fluids.

Chronic exposure to PCBs in the air may result in irritation of the nose and lungs, and skin irritations, such as acne and rashes. It is not known whether PCBs may cause birth defects or reproductive problems in people. The International Agency for Research on Cancer (IARC) considers PCBs to be "probably carcinogenic to humans" based on limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals.

The OSHA Permissible Exposure Limit - Time-Weighted Average (PEL-TWA) is 0.5 mg/m^3 for exposure to chlorodiphenyl (54% chlorine), and the PEL-TWA is 1.0 mg/m^3 for exposure to chlorodiphenyl (42% chlorine).

3.2 Physical Hazards

If not identified and addressed, numerous potential hazards associated with this project could lead to accidents and personal injury. To minimize physical hazards, EQ and START have developed SOPs that provide minimum health and safety requirements for this project site. These requirements will be followed at all times. Failure to follow health and safety protocols or continued negligence of these policies may result in expulsion of a worker from the site.

The RM/SHSO will observe the general work practices of each site worker and enforce procedures to minimize physical hazards. The following sections discuss typical health and safety hazards that may occur at the site, along with relevant hazard control procedures. The

most significant physical hazards include, but are not limited to, heavy equipment; excavations; noise; manual lifting; hoisting and rigging electrical; slips/trips/falls; heat/cold stress; utilities, and water hazards.

3.2.1 Heavy Equipment

All heavy equipment operations will be performed in accordance with 29 CFR 1926.600-604, Motor Vehicles and Mechanized Equipment. Heavy equipment operators can present construction safety hazards to other personnel as well as themselves. Only trained and qualified operators shall be authorized to operate heavy equipment. All of the rules that apply to public road use generally apply to project site roads and access ways. Any variations to public road rules on the project site roads and access ways will be posted.

The operator is responsible for performing daily pre-operation equipment inspections to identify, take out of service, and correct any equipment defects that would render equipment unsafe to operate. Standard safety devices and equipment required to be inspected and functional during use include:

- Seat Belts
- Tires, Wheel Nuts, and Rims
- Horn
- Lights (all)
- Steering and Hydraulic Systems
- Backup Alarms
- Warning Systems and Gauges
- Mirrors
- Braking System
- Safety Glass (enclosed cab)
- Portable Fire Extinguisher.

Operators are required to wear seat belts at all times when operating equipment and are responsible for the location of ground personnel in their work area. All operators working in conjunction with ground personnel will maintain “line of sight” with these individuals at all times. Ground personnel will adhere to the “twice the maximum boom length” rule at all times when working in the vicinity of heavy equipment.

The following rules shall apply to parking heavy equipment.

- Park only in designated areas;
- Use parking ditches (swales) provided;

- Lower all moveable attachments (i.e., forks, buckets, and blades) to the ground;
- Chock or wedge the wheels on inclines;
- Turn wheels into the side of the bank or road; and
- Select neutral and apply the parking brake.

NOTE: No personnel are allowed to sit or rest:
- Under any piece of heavy equipment; or
- Directly in front of or behind any piece of heavy equipment.

3.2.2 Excavations

Excavations are defined as any man-made cut, cavity, trench, or depression in the earth's surface formed by earth removal. A trench is defined as a narrow underground excavation that is deeper than it is wide, and no wider than 15 feet. Excavation work is among the most hazardous construction operation, and presents serious potential hazards to all workers involved. Cave-ins pose the greatest risk and are much more likely than other excavation-related incidents to result in worker fatalities. Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment.

Prior to commencing work on any excavation, the utility agency will be contacted and advised of the proposed work and requested to determine the location of all underground installations (e.g., sewer, telephone, water, fuel, electric and gas lines). The Competent Person will be responsible for ensuring that applicable provisions of 29 CFR 1926, Subpart P, Excavations, are implemented. All excavations 5 feet or more deep and those excavations in which personnel could potentially be exposed to cave-ins will be designed with protective systems such as:

- Sloping the sides of the excavation,
- Benching the sides of the excavation,
- Supporting the sides of the excavation, and/or
- Placing a shield between the side of the excavation and the work area.

When a protective system is used that requires soil classification, a Competent Person will classify each soil and rock deposit as Stable Rock, Type A, Type B, or Type C. The classification will be made based on the results of at least one visual and at least one manual analysis.

A Competent Person shall inspect excavations and adjacent areas daily, after every rainfall, as soil conditions change, and as needed throughout the shift where personnel exposure can be reasonably anticipated. If any of the following conditions exist, the necessary safety

precautions must be taken before any additional work in that section of the excavation begins:

- Potential slides or cave-ins
- Indication of failure of protective systems
- Standing water
- Other hazardous conditions

In trenches 4 feet or more in depth, ladders, steps, ramps, or other safe means of access and egress will be provided and located no more than 25 feet apart laterally. Any excavation that remains open at the end of a shift will be identified with physical barriers and appropriate signs. The Competent Person will ensure that safeguards are in place around any unattended excavation.

Although not classified as confined spaces, excavations greater than 4 feet in depth (e.g., trenches) will be evaluated in accordance with 29 CFR 1926.651 prior to entry into the excavation when oxygen deficiency or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby.

3.2.3 Noise

Noise is a potential hazard in areas where heavy equipment, power tools, pumps or generators are operated. Equipment operation may produce noise levels that equal or exceed 85 decibels A-weighted (dBA), the Action Level established by OSHA.

Exposure to elevated noise levels can lead to temporary or permanent incurable hearing loss and can cause tinnitus (ringing or roaring sound in your ears), muscle tension, and irritability. Noise levels that equal or exceed the 85 dBA Action Level can be estimated using the following rule of thumb: When normal voice communication is not possible between personnel who are no more than three feet apart. Adequate hearing protection will be utilized under these conditions.

The SHSO will ensure hearing protection is available and utilized when noise levels are elevated. The SHSO will evaluate noise exposure levels during equipment operation when deemed necessary. Hearing protection typically involves the use of disposable earplugs for the duration of the excessive noise level and will be used during heavy equipment and power equipment operations and other operations that present a noise hazard.

START personnel will follow all requirements of Weston Solutions, Inc. ECH&S Program Manual, Section 7 - Occupational Noise & Hearing Conservation Program.

3.2.4 Manual Lifting

The human body is subject to severe damage in the form of back injury and/or hernia if caution is not observed in the handling process. These injuries can be debilitating, unproductive, costly to both workers and employers, and sometimes permanent. Back injury prevention will be given a high priority. Preplanning will be exercised before heavy and bulky loads are lifted or handled manually by personnel. If a worker thinks the load is too heavy or bulky, it probably is. In these cases, the worker will get help or utilize mechanical equipment. The maximum weight to be lifted manually by a worker is 50 lbs. Mechanical equipment such as wheelbarrows, hand-trucks, forklifts, loaders, and cranes shall be utilized when possible and needed. General rules for minimizing injuries from manual lifting are:

- GET HELP if object is too awkward or heavy (>50 lbs limit) to lift.
- Plan the lift.
- Lift close to your body.
- Ensure a firm hold on the object.
- Place feet shoulder width apart.
- Bend at knees to lift object.
- Keep back straight.
- Tighten stomach muscles.
- Lift gradually by straightening the legs.
- Bend at knees to lower object.

3.2.5 Hoisting and Rigging

Hoisting refers to lifting and lowering of loads. Rigging refers to the process of safely attaching a load to a hook using adequately rated mechanical attachment devices. Hoisting and rigging operations present unique hazards and require specialized worker training. All hoisting and rigging operations will comply with 29 CFR 1926.251, including inspections of rigging equipment by a Competent Person representing the employer performing the hoisting and rigging operations. The objectives of an effective hoisting and rigging program are to protect personnel from injury, the environment from harm, and equipment and property from damage. The ability to safely lift materials, move the materials to another location, and lower the materials is a vital part of many construction activities. Mobile cranes and other materials-handling equipment (e.g., forklifts, telehandlers, excavators, loaders, etc.) are often used with mechanical attachment devices (i.e., rigging) to move loads that are too heavy or bulky to be safely moved manually.

Workers involved in hoisting and rigging must exercise care when selecting and using slings and related hardware. The selection of slings will be based upon the size and type of the load, and the environmental conditions of the workplace. Slings will be visually inspected before each use to ensure their effectiveness. There are generally six types of slings: chain, wire rope, metal mesh, natural fiber rope, synthetic fiber rope, or synthetic web. Slings tend to be placed into three groups: chain, wire rope and mesh, and fiber rope web. Each type has its own particular advantages and disadvantages. The following factors will be considered when choosing the best sling for the job: size, weight, shape, temperature, and sensitivity of the material being moved, and the environmental conditions under which the sling will be used. In addition, the following factors will be considered to safely use the sling to hold and move a suspended load: the load size, weight, and center of gravity; the number of legs and angle with the horizontal; the rated capacity of the sling and hardware; and the history of care and use of the sling and hardware.

3.2.6 Electrical

Electrical equipment used on site may also pose a hazard to workers. To help minimize electrical hazards, low-voltage equipment with ground-fault interrupters and water-tight, corrosion-resistant connecting cables will be used. An additional electrical hazard involves capacitors that may retain a charge. All such items will be properly grounded before handling. In addition, portable generator (rated more than 5 kW) frames will be properly grounded as specified in 29 CFR 1926.404. OSHA 29 CFR 1910.137 describes clothing and equipment that will be used to protect against electrical hazards.

In accordance with 29 CFR 1910.147, electrical devices and equipment will be de-energized prior to initiation of work near them. All extension cords will be kept out of water, protected from crushing, and inspected regularly to ensure structural integrity. Temporary electrical circuits must be protected with ground fault circuit interrupters. Only qualified electricians will be authorized to work on electrical circuits.

3.2.7 Slip/Trip/Fall

Some areas may have wet surfaces that will greatly increase the possibility of inadvertent slips. Caution will be exercised when steps and stairs are used because slippery surfaces can lead to fall hazards. Good housekeeping practices are essential to minimize trip hazards.

Protruding objects are any object that extends into the path of travel or working area that may cause injury when contacted by personnel. Always be aware of protruding objects and when feasible remove or label the protruding object with an appropriate warning.

3.2.8 Heat/Cold Stress

Heat Stress

Heat stress is one of the most common and potentially serious illnesses. Heat stress is usually the result of a combination of ambient factors such as high air temperature, high relative humidity, low air movement and high radiant heat, coupled with PPE usage. Protective clothing and respirators decrease natural body ventilation, which is essential to keeping the body temperature controlled. Although heat stress can manifest any time work is performed in elevated temperatures, the potential for heat stress to affect workers utilizing PPE is magnified. The potential exists for:

- Heat Rash
- Heat Cramps
- Heat Exhaustion
- Heat Stroke.

One or more of the following control measures can be used to help control heat stress:

- Site workers will be encouraged to drink plenty of water throughout the day.
- On-site drinking water will be kept cool to encourage personnel to drink frequently.
- A work regimen that will provide adequate rest periods for cooling down will be established.
- Workers will be advised of the dangers and symptoms of heat rash, heat cramps, heat exhaustion and heat stroke.
- Workers will be instructed to monitor themselves and coworkers for signs of heat rash, heat stress and to take additional breaks as necessary.
- Workers will not be assigned to other tasks during breaks.
- Workers will remove protective clothing during rest periods.
- Personnel will be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

Cold Stress

When the body is unable to warm itself, cold related stress may result. This may include tissue damage and possibly death. Four factors contribute to cold stress: cold air temperatures, high velocity air movement, dampness of the air, and contact with cold water or surfaces. A cold

environment forces the body to work harder to maintain its temperature. Cold air, water, and snow all draw heat from the body. Wind chill is the combination of air temperature and wind speed. While it is obvious that below freezing conditions combined with inadequate clothing could bring about cold stress, it is also important to understand that it can also be brought about by temperatures in the 50's ºF coupled with some rain and wind.

When in a cold environment, most of your body's energy is used to keep your internal temperature warm. Over time, your body will begin to shift blood flow from your extremities (hands, feet, arms, and legs) and outer skin to the core (chest and abdomen). This allows exposed skin and the extremities to cool rapidly and increases the risk of frostbite and hypothermia. Combine this with cold water, and trench foot may be a problem.

3.2.9 Utilities

Overhead electrical distribution lines, downed electrical wires, and buried cables all pose a danger of shock or electrocution if workers contact or sever them during site operations. Workers will use extreme caution when moving or operating equipment near overhead electrical distribution lines. Backhoes, excavators, and other equipment with booms shall not be operated within 10 feet of any energized electrical distribution line. Additional clearance, typically a minimum of 10 feet plus ½ inch for every 1 kV over 50 kV, is required for power distribution lines in excess of 50 kV. Downed or buried cables will be assumed to be energized unless proven otherwise. Prior to the start of intrusive operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. Should intrusive operations cause equipment to come into contact with utility lines, the RM/SHSO will be notified immediately. Work will be suspended until the applicable utility agency is notified and the appropriate actions for the particular situations can be taken. Generally, notifications will be made a minimum of 48 hours prior to site excavations to allow time for affected company personnel to mark or delineate the utilities. For this site, the applicable agency is MISS Dig at 811 or 800-482-7171.

3.2.10 Water Hazards

Construction activities on or around natural bodies of water presents special dangers. Every day, about ten people die from unintentional drowning. While drowning often happens in larger bodies of water, they can also happen in much smaller bodies of water, such as a ditch,

creek, or stream. The key to drowning prevention is to learn about water safety and then apply your knowledge to prevent a tragedy. Know the local weather conditions prior to working on or around bodies of water. Strong winds and thunderstorms with lightning strikes can be dangerous.

Personnel working on, over, adjacent to, or near water, where the danger of drowning exists, must wear USCG-approved personal flotation devices (PFDs). Prior to and after each use, the PFDs must be inspected for defects that would alter their strength and buoyancy. Ring buoys placed not more than 200 feet apart with at least 90 feet of line must be provided and readily available for emergency rescue operations.

A Float Plan will be prepared by the SSHO and boat operator when engaged in surveying, inspection, sampling, or other activities that are remote and are expected to take longer than 4 hours or when the operator is travelling alone. The Float Plan will be available to the RM and/or SSHO, and will contain the following, as a minimum:

- Boat Information (make/model/size)
- Personnel On-Board
- Activity to be Performed
- Expected Time of Departure, Route and Time of Return
- Means of Communication

3.3 Biological Hazards

Biological hazards present a unique obstacle to personnel working in environments that contain biological hazards or performing operations involving bio-hazardous materials. Protection must be identified and provided when biological hazards are anticipated. Contact with bodies of water, animals, insects, and plants can cause injury and illness to personnel. Care must be taken to ensure that these types of injuries are avoided. Some examples of biological hazards that may be present at the Allied Paper Portage Creek Site include:

- Natural and artificial bodies of water (e.g., ponds, streams, lagoons, etc.) may contain a variety of microorganisms. Microorganisms, in particular, present a significant hazard to personnel who contact contaminated bodies of water. Contact with microorganisms in water may result in dermatitis, infection (i.e., in cuts/lacerations), digestive distress, and other diseases. Always be aware of areas that may contain contaminated water (i.e., cooling tower effluents, etc.) and areas downstream of municipal wastewater treatment. To prevent exposure to microorganisms in water, always wear protective gloves (i.e., nitrile, etc.) and other appropriate PPE to prevent skin contact with water.
- Wild animals, such as snakes, raccoons, squirrels, and rats. These animals not only can bite

and scratch, but some can carry transmittable diseases (e.g., rabies). Avoid the animals whenever possible. If bitten, immediately seek medical attention.

- Insects such as mosquitoes, ticks, bees, and wasps. Mosquitoes can potentially carry and transmit the West Nile Virus a virus that can cause encephalitis or meningitis via the bite of an infected mosquito. Ticks can transmit Lyme disease or Rocky Mountain spotted fever. Remove the tick promptly and carefully using tweezers to grasp the tick near its head or mouth and pulling gently to remove the whole tick without crushing it. Use soap and water to wash your hands and the area around the tick bite after handling the tick. Seek medical attention if you are unable to completely remove the tick. If possible, seal the tick in a jar, since a physician may want to see the tick if signs or symptoms of illness (i.e., rash, fever, stiff neck, muscle aches, joint pain and inflammation, swollen lymph nodes and/or flu-like symptoms) develop after a tick bite. Bees and wasps can sting by injecting venom, which causes some individuals to experience anaphylactic shock (extreme allergic reaction). Whenever you will enter areas that provide a habitat for insects (e.g., grass areas, woods), wear light-colored clothing, long pants and shirt, and spray exposed skin areas with a DEET-containing repellent. Avoid prolonged or excessive use of DEET, however, and use it sparingly to cover skin and clothing (always follow manufacturer's instructions). Keep away from high grass wherever possible. Keep your eyes and ears open for bee and wasp nests. If bitten by insects, seek medical attention if there is any question of a serious allergic reaction.
- Plants such as poison ivy and poison oak can cause rashes on exposed skin. Be careful where you walk, wear long pants, and minimize touching exposed skin with your hands after walking through thickly vegetated areas until after you have thoroughly washed your hands with soap and water.
- Avoid prolonged or excessive use of DEET and use it sparingly to cover skin and clothing. Always follow manufacturer's instructions.

SECTION 4

TRAINING

All project personnel who will work on site must comply with the applicable training requirements specified in 29 CFR 1910.120(e), this HASP, and pertinent employer health and safety programs/policies. The RM/SHSO will verify and document that all ERRS personnel meet the applicable training requirements prior to the start of site work. Certificates documenting the training of all ERRS personnel will be maintained in the on-site project files. The RM/SHSO will be responsible for ensuring the required documentation is current and available on site. Project personnel without proper training documentation will not be permitted to perform work on site.

4.1 Initial Training

40-Hour

All general site workers (such as equipment operators, general laborers, and supervisory personnel) engaged in hazardous waste site operations that expose or potentially expose workers to hazardous substances and health hazards shall have received a minimum of 40 hours of initial health and safety training. In addition to the 40 hours of initial health and safety training, general site workers will have a minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. This training will address the duties the worker is to perform.

24-Hour

Workers on site only occasionally for a specific limited task (such as, but not limited to, groundwater monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall have received a minimum of 24 hours of initial health and safety training. In addition to the 24 hours of initial health and safety training, occasional workers will have a minimum of 1 day of actual field experience under the direct supervision of a trained, experienced supervisor.

Managers/Supervisors

On-site managers and supervisors directly responsible for site workers, or who supervise workers engaged in hazardous waste operations, shall have received a minimum of 40 hours of initial health and safety training, 3 days of supervised field experience, and at least 8 additional hours of specialized training on managing hazardous waste operations at the time of job assignment. The specialized training will be on topics such as the employer's health and safety program, personal protective equipment, spill containment, and health hazard monitoring.

Eric Bowman or Jeffery Rhinefield will serve as the Site Supervisor.

4.2 Site-Specific Training

Prior to the start of field activities for the Allied Paper Portage Creek Site, all project personnel will attend site-specific training. The RM/SHSO will be responsible for conducting and documenting the training. The site-specific training will include a review of the various sections of this HASP and any other information pertinent to the scope of work. The site-specific training session will allow site personnel to clarify any issues they do not understand, and will reinforce individual responsibilities regarding health and safety during site work.

In addition, all project personnel will receive Hazard Communication training as specified in Section 10 (Hazard Communication Program). The training will be pertinent to the hazardous chemicals brought on site and those hazardous chemicals/contaminants anticipated at the site (Section 3.1).

At least one member of each work crew shall have current training in the use of portable fire extinguishers in accordance with 29 CFR 1910.157(g). The training will include the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting.

Each person entering the site will be required to sign the Health and Safety Plan Acknowledgement Form (Appendix F) to attest that he/she understands the requirements of this HASP.

4.3 Annual Refresher Training

All project personnel required to take the 40-hour or 24-hour initial health and safety training shall have received 8-hour refresher training within the past year (unless they are current

with the 40-hour or 24-hour initial training). The 8-hour refresher training course will be taken at a minimum of once per year. All project personnel are required to take the annual refresher training to maintain their qualification for hazardous waste site operations work.

4.4 Daily Briefings

Prior to field activities, the RM/SSHO will conduct daily "tailgate" health and safety briefings with all project personnel at the beginning of each shift. The briefings will provide information from the HASP to assist workers in safely performing their scheduled work activities and will include a discussion of potential chemical, physical, and biological hazards and preventive control measures. The briefings should serve to heighten awareness of potential hazards and provide an opportunity for workers to provide feedback on the "plan of the day." In addition, the briefings should provide an opportunity to discuss health- and safety-related deficiencies noted during field activities.

4.5 First Aid / CPR Training

At least one individual (Response Manager) on site at the Allied Paper Portage Creek Site will hold a current certification in First Aid and CPR training from the American Red Cross, the American Heart Association, or an organization whose training is deemed equivalent by one of these organizations. The qualified individual(s) should have the knowledge and skills necessary to prevent, recognize, and provide basic care for injuries and sudden illnesses, and to respond to breathing and cardiac emergencies until advanced medical personnel are available.

4.6 Subcontractor Requirements

All subcontractors entering the work zone will have documentation on site of training satisfying 29 CFR 1910.120(e).

4.7 Documentation

ALL personnel on site must have the following documentation available on site:

- Copy of 40-Hour HAZWOPER Training certificate
- Copy of Manager's/Supervisor's 8-Hour HAZWOPER certificate (if applicable)
- Copy of 8-Hour Annual Refresher (if > 12 months since 40-hour)
- First Aid / CPR Certificate (if applicable)
- Respirator Fit Test Record (if applicable)
- Competent Person Designation (if applicable)

SECTION 5

PERSONAL PROTECTIVE EQUIPMENT

The following is a brief description of the personal protective equipment (PPE) that may be required during various phases of the project. The U.S. EPA terminology for protective equipment will be used: Levels A, B, C, and D.

5.1 Level A

Level A protection use is not anticipated during planned project activities.

5.2 Level B

Level B protection use is not anticipated during planned project activities.

5.3 Level C

Level C protection use is not anticipated during planned project activities.

5.4 Level D (Modified)

Level D (Modified) PPE includes Level D PPE and a selection of one or more of the following items:

- Chemical-Resistant Clothing (overalls and long-sleeved jacket, coveralls, one- or two-piece chemical-splash suit, disposable chemical-resistant overalls)
- Chemical-Resistant Over-Boots or Chemical-Resistant Steel-toe/Steel-shank Boots
- Boot Covers
- Chemical-Resistant Inner Gloves (e.g., disposable nitrile)
- Chemical-Resistant Outer Gloves (e.g., nitrile, viton, PVA, PVC)
- Safety Goggles/Face Shield
- Hearing Protection
- Personal Flotation Device.

Level D (Modified) protection will be used during some of the planned project activities. The AHAs identify the major tasks requiring Level D (Modified) protection.

5.5 Level D

Level D protection shall be used when:

- The atmosphere contains no known respiratory hazard; and
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals.

Level D PPE, at a minimum, shall consist of:

- Coveralls or Work Clothes
- Safety Shoes/Boots with Steel-toe/Steel-shank (or comparable material)
- Work Gloves – Cotton or Leather Palm
- Safety Glasses with Side Shields
- Hard Hat.

Level D protection will be used during some of the planned project activities. The AHAs identify the major tasks requiring Level D protection.

5.6 PPE Upgrade/Downgrade

Upgrades or downgrades in the minimum level of protection listed will be based on exposure monitoring results and/or a change in site conditions. The SHSO will determine which of the PPE levels is appropriate. The SHSO may also specify more stringent PPE levels. However, any downgrade of PPE below the minimum standard presented in the AHA can only be performed by a formal amendment of the site HASP.

The following conditions will necessitate reevaluation of PPE use.

- Commencement of a new work activity not previously identified.
- Change of job tasks during a work phase.
- Change of season/weather.
- Contaminants other than those identified in this HASP.
- Change in ambient levels of contaminants.
- Change in work that affects degree of chemical contact.

SECTION 6

MEDICAL SURVEILLANCE

EQ, START, and all team subcontractor personnel who are performing hazardous waste site work are required to be included in a medical surveillance program and undergo medical examinations in accordance with 29 CFR 1910.120(f), Hazardous Waste Operations and Emergency Response - Medical Surveillance.

Medical examinations are performed to establish an employee's baseline health status and to determine if the employee's health status changes over time because of occupational exposures. In addition, medical examinations are used to determine whether an employee is capable of performing his/her duties while wearing PPE under conditions (e.g., temperature extremes) that might be expected at a work site. Examinations must be performed by or under the supervision of a physician, who (at a minimum) is licensed in medicine, possesses specific training or expertise in occupational medicine, and has experience performing medical surveillance examinations.

All medical examinations must be completed and documented (e.g., Work Status Report) prior to assignment at the Allied Paper Portage Creek Site. Current medical clearance documentation must be kept on site for all EQ and team subcontractor personnel. START (Weston Solutions, Inc.) personnel will maintain their medical clearance documentation in accordance with Weston's corporate program policies.

6.1 Baseline Examination

A baseline examination (sometimes referred to as an initial or pre-employment examination) is required prior to EQ or START personnel being sent to the field to perform hazardous waste site work. The baseline examination is performed to establish whether personnel are fit to perform their duties and to characterize the health of employees before they begin a field assignment. The baseline examination is conducted following parameters established by EQ Corporate Health and Safety and EQ's occupational physician consultant.

6.2 Annual Examination

EQ personnel performing hazardous waste site work must receive a follow-up medical examination on an annual basis. A medical examination must be completed and clearance provided within the 12-month period prior to on-site activity. Not all of the medical tests included in the baseline examination are repeated during each annual follow-up examination unless there is an exposure concern or problematic symptoms reported that indicate the need for further evaluation. The annual examination is conducted following parameters established by EQ Corporate Health and Safety and EQ's occupational physician consultant.

6.3 Site-Specific Monitoring/Examination

Additional medical evaluations might be warranted if there is concern that an individual may be (or has been) exposed to a specific chemical contaminant while working. Medical surveillance provisions for some substances are detailed in the OSHA chemical-specific regulations, 29 CFR 1910.1001 through 1052. This series of OSHA regulations presents a wide range of medical testing and physical examination requirements that are largely dependent on the exposure duration and health status of the individual. Testing and examination elements will be triggered by the past or potential exposure situation and left to the discretion and judgment of EQ's occupational physician consultant with input from EQ Corporate Health and Safety.

6.4 Episodic Examination

An episodic examination occurs outside the required annual examination and is only performed if there is reason to believe that an individual has been over-exposed to a chemical, biological, or radiological agent, or to a physical stressor. Generally, an examination would be scheduled as soon as possible upon notification by an individual that he/she had (1) been injured or exposed above permissible exposure limits or published exposure levels, or (2) developed signs or symptoms indicating possible exposure to hazardous substances or health hazards. The examination will be specific for the contaminants and the associated target organs or physiological system.

The parameters of the episodic examination will be left to the discretion and judgment of EQ's occupational physician consultant with input from EQ Corporate Health and Safety. See Section 11.2 for respective phone numbers.

In addition, known occupational exposure to the eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other materials potentially infected with bloodborne pathogens must be handled in accordance with 29 CFR 1910.1030, Bloodborne Pathogens.

6.5 Subcontractor Requirements

All subcontractor personnel who are performing hazardous waste site work are required to be included in a medical surveillance program and undergo medical examinations in accordance with 29 CFR 1910.120(f), Hazardous Waste Operations and Emergency Response - Medical Surveillance. Medical examinations must be complete, and current medical clearance documentation must be available on site and copies provided to EQ Corporate Health and Safety (when requested) prior to subcontractor personnel performing hazardous waste site work.

SECTION 7

EXPOSURE MONITORING

Exposure monitoring procedures will be employed to assess employee exposure to chemical and physical hazards. Exposure monitoring will consist primarily of onsite determination of various parameters (e.g., airborne contaminant concentrations and heat stress effects), but may be supplemented by more sophisticated monitoring techniques, if necessary. According to 29 CFR 1910.120, air monitoring may be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection needed on-site.

The levels of PCBs measured in the creek sediment and the soil ranged from 0.26 to 72 mg/kg and non-detect to 590 mg/kg, respectively, according to the USEPA "Request for Approval on a Time-Critical Removal Action and Emergency Exemption at the Portage Creek Area of the Allied Paper Inc./Portage Creek/Kalamazoo River Superfund Site located in Kalamazoo, Kalamazoo County, Michigan" action memorandum, signed July 5, 2011. Given an EQ established Action Level of 0.25 mg/m^3 (OSHA PEL-TWA is 0.5 mg/m^3) for airborne PCBs and the soil/sediment containing 590 mg/kg PCBs, the level of airborne soil/sediment would need to be more than 420 mg/m^3 averaged over an 8-hour period to exceed the 0.25 mg/m^3 Action Level. The total nuisance particulates 8-hour ACGIH TLV-TWA exposure limit is 10.0 mg/m^3.

Given this fact, the likelihood of remediation operations creating unacceptable PCB exposures to workers is technically improbable. However, personal exposure will be conducted at the onset of operations, at the minimum, to negatively document worst case worker exposure conditions to PCBs and nuisance particulates during soil/sediment remediation of the Portage Creek Area.

7.1 General Area Air Monitoring

Based on the scope of work and associated hazards, general area air monitoring for personnel protection is not anticipated for this project. Should it be determined that general area

air monitoring is required, this HASP will be revised to reflect the site-specific air monitoring requirements.

7.2 Personal Air Monitoring

Personal air monitoring will be conducted to assess air contaminant exposures experienced by EQ employees and EQ subcontractors. The SHSO will be responsible for implementing the required personal air monitoring under the direction of a Certified Industrial Hygienist (CIH).

EQ will ensure its employees' exposures are quantified using appropriate monitoring techniques. EQ shall notify the employees monitored in accordance with OSHA regulations, and provide the results to the SHSO for use in determining the potential for other employees' exposure.

The summary for personal air monitoring requirements for personnel protection during soil/sediment remediation activities is provided in Table 1, Air Monitoring Summary.

TABLE 7.1 AIR MONITORING SUMMARY

Contaminant/ Compound	Instrument/ Method	Location/Frequency	Action Level / Comment
PCBs	NIOSH 5503	**Heavy Equipment Operator** – Breathing zone, full-shift monitoring during 5 days of representative dewatering/staging pad operations to include at least 3 days of monitoring during normal pug mill operations **Laborer** – Breathing zone, full-shift monitoring during 5 days of representative dewatering/staging pad operations to include at least 3 days of monitoring during normal pug mill operations	< 0.5mg/ m^3 - No Action ≥ 0.5 mg/ m^3 - Level C
Nuisance Particulates (Total)	Personal DataRAM (or equivalent)	**Heavy Equipment Operator** – Breathing zone, full-shift monitoring during 5 days of representative dewatering/staging pad operations to include at least 3 days of monitoring during normal pug mill operations **Laborer** – Breathing zone, full-shift monitoring during 5 days of representative dewatering/staging pad operations to include at least 3 days of monitoring during normal pug mill operations	< 5.0 mg/m^3 - No Action ≥ 5.0 mg/m^3 - Level C

7.3 Noise Exposure Monitoring

The ERRS SHSO will perform any necessary noise exposure monitoring; however, based upon the planned activities, duration of exposure and control measures (including enclosed-cab equipment), noise monitoring is not anticipated.

7.4 Heat/Cold Stress Monitoring

Heat stress controls for the Allied Paper Portage Creek Site will begin when ambient temperatures exceed 70°F. Heat stress monitoring for personnel working in permeable clothing (e.g., normal work clothing, single launderable cloth, single disposable tyvek), semi-permeable clothing (e.g., double launderable cloth, double disposable tyvek, single polycoated tyvek), and impermeable clothing (e.g., triple launderable cloth, triple disposable tyvek, single Saranex coated tyvek) will be conducted in accordance with the American Conference of Governmental

Industrial Hygienists' (ACGIH) Threshold Limit Values for heat stress. The SHSO will be responsible for verifying the work/rest schedules; determining Wet Bulb Globe Temperature (WBGT) using a black globe thermometer, a natural wet bulb thermometer, and a dry bulb thermometer (or WBGT monitor); notifying workers of results; and documenting results.

Cold stress monitoring for the Allied Paper Portage Creek Site will begin when temperatures fall below 40°F. Cold stress monitoring (ambient air temperatures and equivalent chill temperatures) for personnel working in permeable clothing, such as cotton or synthetic work clothes, will be conducted in accordance with the ACGIH Threshold Limit Values for cold stress. The SHSO will be responsible for verifying the work/rest schedules, notifying workers of results, and documenting results.

7.5 Calibration Procedures

All instruments used will be calibrated at the beginning and end of each work shift, in accordance with the manufacturer's recommendations. If the owner's manual is not available, the personnel operating the equipment will contact the applicable office representative, rental agency or manufacturer for technical guidance for proper calibration. If equipment cannot be pre-calibrated to specifications, site operations requiring monitoring for worker exposure or off-site migration of contaminants will be postponed or temporarily ceased until this requirement is completed

7.6 Name(s) of Monitoring Technician(s)

START - Mike Browning

EQ - TBD

7.7 Location of Monitoring Records

Copies of monitoring records will be retained in the on-site command post during the project and the job file upon completion of the project.

SECTION 8

SITE CONTROL

8.1 Work Zones

The primary purposes of site control are to delineate the various site work zones, to minimize potential contamination of workers, to reduce migration of contaminants into clean areas, to prevent access or exposure to hazards by unauthorized persons, and to protect the public from the site's hazards. These site control measures are developed based on the specific chemical contaminants expected and physical hazards associated with the tasks to be performed.

Given the nature of the work and associated potential hazards, a site-specific Support Zone (SZ), Contamination Reduction Zone (CRZ), and Exclusion Zone (EZ) will be required.

8.1.1 Support Zone

The SZ will be the uncontaminated area (or cold zone) outside the EZ and CRZ and within the geographic perimeters of the site. This area is used for staging materials, parking vehicles, office facilities, sanitation facilities, and receiving deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, etc., who will not necessarily be permitted in the EZ. All personnel arriving in the SZ will, upon arrival, report to the command post and sign the site entry/exit log. There will be one controlled entry/exit point from the clean zone to the CRZ. The location of the SZ will be established prior to site activity, and no later than the start of mobilization by the RM and/or OSC.

8.1.2 Contamination Reduction Zone

The CRZ (or warm zone) will provide a location for removal of contaminated PPE and final decontamination of personnel and equipment. All personnel and equipment should exit the EZ via the CRZ area. A separate decontamination area will be established for heavy equipment. The CRZ is a transition area between contaminated and clean areas generally identified by caution tape. The RM and/or OSC will establish the CRZ once on site.

8.1.3 Exclusion Zone

The EZ will be the contaminated area (or hot zone) within the site perimeter. Entry to and exit from this zone will be made through a designated point, and all personnel will be required to sign the EZ entry/exit log located at the decontamination area. Appropriate warning signs that clearly identify the EZ should be posted (e.g., "Danger - Authorized Personnel Only - Protective Equipment Required beyond This Point"). Personnel and equipment exiting the EZ must be decontaminated as described in Section 9. The EZ will be identified by barricades (e.g., caution tape) and signage, and will be established by the RM and/or OSC once on site.

General Health/Safety Rules for the EZ include:

- Wear the appropriate level of PPE defined in the HASP.
- Do not remove/break the integrity of PPE.
- Implement buddy system and communication procedures.
- No smoking, eating, or drinking permitted.
- No horseplay allowed.

8.2 Field Health/Safety Rules

The following field health/safety rules have been established to protect the health and safety of workers, visitors, and government personnel. These rules will be discussed during health and safety briefings, and as deemed necessary by the SHSO.

- All visitors must be sent to the command post and referred to the OSC or designee.
- All personnel (workers and visitors) must sign in and out on the site entry/exit log as they enter and exit the site.
- It is EQ policy to practice administrative hazard control for all EZ areas by restricting entrance to these areas to essential personnel.
- Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Stay away from any waste drums unless necessary. Protect equipment from contamination by bagging.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of contamination is prohibited in the EZ.
- Hands and face must be thoroughly washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco, smoking, or performing other activities that may result in ingestion of contamination.
- Personnel will only travel in vehicles where individual seats for each occupant are provided. Seat belts will be worn as required.

- Fire extinguishers will be available on site and in all areas with increased fire danger such as refueling areas.
- A minimum of two personnel will always be on site whenever heavy equipment is operated. Only necessary personnel will be permitted on heavy equipment or in proximity to heavy equipment operations.
- Employees may not interfere with or tamper in any way with exposure monitoring equipment.
- Backhoes, excavators, and other equipment with booms shall not be operated within 10 feet of any energized electrical distribution line. Additional clearance, typically a minimum of 10 feet plus ½ inch for every 1 kV over 50 kV, is required for power distribution lines in excess of 50 kV.
- Visitors are not allowed in the work areas without authorization, and authorized visitors must have appropriate levels of PPE and training as established by this HASP or the SHSO. Access to the site is restricted to the EPA and authorized representatives. All persons must sign in at the Command Post and receive authorization to enter the site.
- The RM will assume responsibility for personnel entering site.
- The OSC or designee will allow only authorized personnel to enter the site. If unauthorized personnel are identified on site, contact the RM, OSC or designee, and/or security immediately and do not leave the individual unattended.
- All personnel must comply with established health/safety procedures. Personnel who do not comply with health/safety procedures, as established by the HASP or the SHSO, will be subject to immediate dismissal from the site.
- Personal decontamination procedures will be followed before leaving the site.
- Buddy System
  - The buddy system is mandatory any time personnel are working in the EZ, or remote areas, or when conditions present a risk to personnel.
  - A buddy system requires at least two trained/experienced people who work as a team and maintain (at a minimum) audible and/or visual contact while operating equipment.
- Communication Procedures
  - Cell phones and/or two-way radios will be used for on-site communications.
  - The crews should remain in cell phone, radio, or visual contact while on site.
  - The site evacuation signal will be three blasts on the air or vehicle horn.

SECTION 9

DECONTAMINATION

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination prior to leaving the work zone. Any material that is generated by decontamination procedures will be stored in a designated area until disposal arrangements are made. EQ does not anticipate performing work in Level A, B, or C protection for this project and therefore has not specified the associated decontamination procedures.

9.1 Personnel Decontamination

Level D does not require personal decontamination. This decontamination procedure applies to personnel at this site wearing various ensembles of Level D (Modified) protection. These are the minimum acceptable requirements:

Step 1: Wash and rinse outer boots and outer gloves (if applicable).
Step 2: Remove and discard outer-boots and outer gloves (if applicable).
Step 3: Remove and discard chemical-resistant clothing (if applicable).
Step 4: Remove hard hat and wipe clean.
Step 5: Remove and discard inner gloves (if applicable).
Step 6: Thoroughly wash hands and face with soap and water.

Eating, drinking, chewing gum/tobacco, smoking, or engaging in any practice that increases the probability of hand-to-mouth transfer and/or ingestion of materials is prohibited in any areas where the possibility of contamination exists.

9.2 Equipment Decontamination

Following decontamination and prior to exit from the work zone, the SHSO shall be responsible for ensuring that the item has been sufficiently decontaminated. This inspection shall be included in the site log.

Equipment decontamination will consist of one or more of the following steps:

a. Sweeping or scraping to remove gross contamination.
b. Hydrospraying equipment.
c. Washing equipment tires using manual or automatic tire wash station.
d. Inspecting equipment prior to removal from site.

9.3 Emergency Decontamination

The victim should be moved only if it is safe to do so. The victim should be decontaminated only to the extent as to allow his/her safe removal without further injury. Any blood-contaminated material or body fluid will be bagged, labeled Biohazard, and accompany the victim to the hospital.

9.4 Decontamination Wastes Disposition

All PPE and decontamination materials (i.e., rinsate, tubs, brushes, etc.) must be disposed of in accordance with federal, state, and local regulations. Contaminated PPE and various decontamination materials may need to be disposed of as hazardous waste based on the types and degree of contamination. Spent PPE and decontamination materials may be containerized, consolidated with other contaminated materials, or included with excavated soils when transporting by dump truck or roll-off box. The contents of containerized wastes will be labeled, and accumulation dates will be marked on each container used.

SECTION 10

HAZARD COMMUNICATION PROGRAM

Hazardous chemicals pose a wide range of health hazards (such as irritation, dizziness, sensitization, and carcinogenicity) and physical hazards (such as flammability, corrosion, and reactivity). The OSHA Hazard Communication Standard (29 CFR 1910.1200) is designed to ensure information about these hazards and associated protective measures is disseminated to personnel exposed or potentially exposed to hazardous chemicals. To ensure compliance, EQ and all team subcontractors at the Allied Paper Portage Creek Site will be responsible for maintaining a copy of their respective Hazard Communication Program on site, including a Hazardous Chemical List and the associated Material Safety Data Sheets (MSDSs).

10.1 Hazardous Chemicals List

To comply with 29 CFR 1910.1200, EQ and each team subcontractor will separately maintain a list of all hazardous chemicals brought on site and utilized by EQ and each subcontractor during field activities. Hazardous chemicals related to the clean-up/remediation activities are not included in this list. The list will generally include the chemical or common name of the chemical or chemical mixture and the manufacturer. The list will serve as an inventory of every hazardous chemical requiring an MSDS. Additional information on each chemical or chemical mixture may be obtained from the MSDS.

Section 3.1 provides a list summarizing pertinent details of the most significant (i.e., chemical(s) of concern) hazardous chemicals and chemical mixtures related to the clean-up/remediation activities at the Allied Paper Portage Creek Site. The list should not be considered inclusive of all the significant chemical hazards posed by materials at the site, given the nature of typical clean-up/remediation activities.

10.2 Material Safety Data Sheets

To comply with 29 CFR 1910.1200, EQ, START, and each team subcontractor will separately maintain MSDSs for all hazardous chemicals utilized by EQ and its team subcontractors during field activities. Hazardous chemicals related to the clean-up/remediation activities are not included in the MSDSs. Appendix D provides generic MSDSs for the most significant hazardous chemicals and chemical mixtures inherent to the Allied Paper Portage Creek Site. MSDSs for those hazardous chemicals brought on site as well as those hazardous chemicals and chemical mixtures related to the clean-up/remediation activities will be available to all EQ employees and subcontracted employees for review during the work shift.

The MSDSs are to contain the following information at a minimum:

- Manufacturer/vendor name, address, phone number
- Identity of the hazardous chemical used on the label and common name(s)
- Physical and chemical characteristics
- Physical and health hazards
- Primary route(s) of entry
- OSHA Permissible Exposure Limit (PEL) and ACGIH Threshold Limit Value (TLV)
- Carcinogenic listings
- Safe handling/use precautions
- Control measures to limit exposure
- Personal protective equipment
- Spill/leak clean-up recommendations
- Emergency and first-aid procedures

10.3 Labeling

All incoming containers of hazardous chemicals must be labeled with the identity of the contents, appropriate hazard warnings, and manufacturer’s contact information. The RM/SHSO or the subcontractor using the material will inspect all incoming containers received on site to ensure the following:

- Containers are clearly labeled as to the identity of the contents.
- Containers are clearly labeled with the appropriate hazard warning.
- Containers are clearly labeled with the manufacturer's contact information.

The RM/SHSO or the team subcontractor using the material will ensure all secondary containers of hazardous chemicals will be labeled with either a copy of the original manufacturer's label, a Hazardous Materials Identification System (HMIS) compliant in-house label marked with the identity of the contents and the appropriate hazard warning(s), or a

National Fire Protection Association (NFPA) compliant in-house label marked with the identity of the contents and the appropriate hazard warning(s).

10.4 Information and Training

Prior to starting work, all project personnel who work with, or will be potentially exposed to, hazardous chemicals will receive a Hazard Communication briefing that will include information and training on the following:

- Overview of the OSHA Hazard Communication Standard
- Hazardous chemicals present at the site
- Location and availability of the written Hazard Communication Program
- Physical and health effects of the hazardous chemicals
- Methods and observations that may be used to detect the presence or release of a hazardous chemical
- Methods of preventing or eliminating exposure to hazardous chemicals through use of engineering controls, work practices, and personal protective equipment
- Emergency procedures to follow if exposed
- Explanation of how to read labels and review MSDSs to obtain appropriate hazard information
- Location of hazardous chemicals list and MSDSs

The information and training may be designed to cover either specific chemicals or categories of hazards (e.g., reactives, flammables, corrosives, carcinogens, etc.). Detailed chemical-specific information will always be available to project personnel through MSDSs and container labels.

10.5 Non-Routine Tasks

Periodically, project personnel may be required to perform non-routine tasks that are hazardous. Prior to starting work on such tasks, affected personnel will be provided information from the RM/SHSO about the hazardous chemicals he or she may encounter during the activity. This information will include, at a minimum, the specific health and physical hazards of the hazardous chemical(s); the methods of preventing or eliminating exposure to hazardous chemicals through use of engineering controls, work practices, and personal protective equipment; the requirements to use the buddy system; and specific emergency procedures.

10.6 Multi-Employer Sites

When hazardous chemicals are used in such a way that the employees of other employer(s) may be exposed, the RM/SHSO will:

- Provide the other on-site employer(s) access to MSDSs for each hazardous chemical the other employer(s)' employees may be exposed to while working.
- Inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the site's normal operating conditions and in foreseeable emergencies.
- Inform the other employer(s) of the labeling system used in the workplace.

SECTION 11

EMERGENCIES/ACCIDENTS/INJURIES

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

11.1 Emergency Contacts

The Emergency Contacts for the Allied Paper Portage Creek Site are:

- Fire: 911
- Police: 911
- Sheriff: 911
- Ambulance: 911
- Hospital: Bronson Methodist Hospital
601 John Street
Kalamazoo, Michigan 49007
- Telephone: 269-341-7654 (general)
269-341-6386 (emergency department)
- Chemical Trauma Capabilities? Yes

Directions from the site to Bronson Methodist Hospital. (See Map in Appendix E).

NOTE: Maps and directions to the hospital will be posted in the Command Post office and in site vehicles. *(Confirm route below once on site)*

The route to the hospital was verified by _____ on _____, 2011. Distance from site to hospital is ___ miles. Approximate driving time is ___ minutes. The fire, police, and hospital were notified of site operations by _____ on _____, 2011.

11.2 Additional Emergency Numbers

The following are additional emergency numbers:

- U.S. EPA Region 5 (24-hr) 312-353-2318
- U.S.EPA region 5 - S. Borries 312-353-8360 (office)
  312-802-5336 (cell)
- U.S. EPA Region 5 - C. Thomas 312-886-5907 (office)
  312-802-9637 (cell)
- National Response Center (24-hr) 800-424-8802
- Centers for Disease Control (24-hr) 770-448-7100
- AT&F (Explosives Hotline) (24-hr) 888-283-2662
- Chemtrec (24-hr) 800-262-8200
- Poison Control Center (24-hr) 800-222-1222

Environmental Quality Management Inc. Contacts

The following are EQ contacts:

- EQ Regional Office 513-825-7500
- EQ ERRS Hotline (24-hr) 800-500-0575
- EQ Response Manager / SSHO - E. Bowman 513-265-8875
- EQ Response Manager / SSHO - J. Rhinefield 513-309-4703
- EQ Deputy Program Manager - E. Bowman 513-265-8875
- EQ Director of Health and Safety - T. Valli, CIH 513-310-8419
- WorkCare (Medical Services) - Dr. P. Greaney 800-455-2114

START Contacts

The following are START (Weston Solutions, Inc.) contacts:

- Project Manager – C. Lantinga 616-942-0307 (office)
  616-550-5358 (cell)
- Site Lead - M. Browning 248-259-4761 (cell)
- Director of Health and Safety - O. Douglas 610-701-3065 (cell)
- START Health and Safety Officer - T. Balla 847-528-2623 (cell)
- WorkCare (Medical Services) - Dr. P. Greaney 800-455-6155

11.3 Emergency Equipment Available On Site

<u>Communications Equipment</u>

- Private Telephones
- Cell Phones: Various Personnel
- Emergency Alarms/Horns

Medical Equipment

- First Aid / Bloodborne Pathogen Kits
- Eye Wash Station
- Hand Wash Station

Inspection Date: _____By:

Firefighting Equipment

- Fire Extinguishers

Inspection Date: _____By:

Spill or Leak Equipment

- Absorbent booms/pads and dry absorbent

Additional Emergency Equipment

11.4 Accident Reporting/Investigation

Any significant failures of the HASP, including those resulting in any injury or property damage, will be investigated. The investigation will be performed by the RM/SHSO or START, as applicable. In addition, the government representative will be immediately informed of any incident requiring investigation and the progress of the investigation. The government representative will determine if the incident is serious enough to warrant modifying or terminating certain field activities pending the results of the investigation. The results of any accident investigation will be summarized in a report. This report will be maintained on site for the duration of the project and made available to the government representative. EQ or START will report, in writing, the occurrence of a recordable accident (as defined by 29 CFR 1904.12) to the government representative within 24 hours of its occurrence. As a follow-up, EQ will forward a completed Accident Investigation Report to the government within 72 hours of the accident's occurrence. EQ agrees to participate in any and all inquiries into such accidents made by the government representative. All injuries or occupational illnesses excluding injuries requiring only first aid must be investigated, and an Accident/Injury Report Form must be completed. In the case of an injury to an employee that requires medical treatment, these steps will be followed:

- Procure medical treatment for the worker.

- The RM/SHSO will investigate the incident and fill out appropriate Accident/Injury Report Form(s).
- The RM/SHSO will complete and submit any necessary worker's compensation reports.
- The RM/SHSO will ensure the government representative is notified immediately.
- OSHA Form 300 Log will be updated if the injury is recordable per 29 CFR 1904.
- A report must be obtained from the attending physician that clears the employee to resume regular duties, describes any modified work that is acceptable, or removes the employee from work duty.

In the case of a fatal injury or where three or more persons are admitted to the hospital for an overnight stay, OSHA and other appropriate agencies will be notified within 48 hours of the incident, and an in-depth accident investigation will be conducted in addition to the steps identified above.

The EQ/PM will immediately notify the government representative and the CO in the event of an accident that results in death, serious injury, or substantial property damage. The government representative will determine if field activities should be immediately modified or terminated. This determination will be made in concurrence with the CO.

Any accident, illness, security incident, or near miss incident occurring with START personnel will be reported to Weston Solution's, Inc. START Health & Safety Officer within 2 hours of occurrence. Weston Solutions, Inc. will initiate a notice-of-incident according standard procedures based on the nature of the incident

SECTION 12

EMERGENCY RESPONSE CONTINGENCY PLAN

12.1 Project Personnel Responsibilities During Emergencies

The RM and OSC have primary responsibility for responding to and correcting emergency situations. Duties include:

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

The RM must immediately report emergency situations to the OSC, take appropriate measures to protect site personnel, and assist as necessary in responding to and mitigating the emergency situation.

12.2 Medical Emergencies

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible when practical. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.) First aid should be

administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the RM and OSC.

If the first aid provided to an injured person presents the possibility of exposure to blood or other body fluids or potentially infectious material, the caregiver must wear surgical type impermeable gloves. The exposure must be reported to the RM, OSC or designee, the individual's supervisor, and the SHSO within 24 hours of exposure, naming the injured person(s) and the person(s) administering first aid. Hepatitis B vaccination and treatment must be offered to exposed individuals within 24 hours or as soon as possible after exposure. Exposed individuals may decline the vaccination and treatment, but must do so by means of a signed statement.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and information on the chemical(s) they may have been exposed to. Any vehicle used to transport contaminated personnel will be cleaned or decontaminated as necessary.

12.3 Fire or Explosion

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

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

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

12.4 Spills, Leaks or Releases

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

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

12.5 Evacuation Routes and Resources

Evacuation routes have been established by work area locations for this site. All buildings and outside work areas have been provided with designated exit points. Evacuation

should be conducted immediately, without regard for equipment under conditions of extreme emergency. Evacuation procedures are as follows:

- Evacuation notification will be three blasts on an air horn, vehicle horn, or by verbal communication via radio.
- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation is not via the decontamination corridor, site personnel should remove contaminated clothing once they are in a location of safety and leave it near the EZ or in a safe place.
- The RM and/or OSC will conduct a head count to ensure all personnel have been evacuated safely.

In the event that an emergency site evacuation is necessary, all personnel are to:

- Escape the emergency situation;
- Decontaminate to the maximum extent practical; and,
- Meet at the following gathering points depending upon your site location:

U.S. EPA Command Post:
Primary - Command Post trailer
Secondary - intersection of Crosstown Parkway and John Street

SA 7:
Primary - intersection of Reed Avenue and the site's access road
Secondary - TBD

SA 6:
Primary - entrance to the Department of Public Works on Stockbridge Avenue
Secondary - TBD

12.6 Adverse Weather

Adverse weather can take many forms, such as flash floods, high winds, hurricanes, severe thunderstorms, tornados, tropical storms and winter storms (e.g., snow, freezing rain and sleet). Sudden changes in the weather, extreme weather conditions, and natural disasters can create a number of hazards. Generally, adverse weather can create hazards due to slips, trips and falls, generation of airborne debris, electrical shock, etc. Natural disasters can create many secondary hazards such as release of hazardous materials into the environment, structure failure, and fires.

In the event of impending adverse weather, continuous monitoring of weather broadcasts (e.g., radio, internet, television, etc.) will provide current information regarding impending adverse weather. In addition, monitoring of weather broadcasts will provide information on

current weather conditions. Several of the more prevalent weather condition terminology pertinent to the Allied Paper Portage Creek Site includes:

Advisory - Highlights special weather conditions that are less serious than a warning. They are for events that may cause significant inconvenience, and if caution is not exercised, it could lead to situations that may threaten life and/or property.

Watch - A watch is used when the risk of a hazardous weather or hydrologic event has increased significantly, but its occurrence, location, and/or timing is still uncertain. It is intended to provide enough lead time so that those who need to set their plans in motion can do so.

Warning - A warning is issued when a hazardous weather or hydrologic event is occurring, is imminent, or has a very high probability of occurring. A warning is used for conditions posing a threat to life or property.

Flash Flood Watch - Issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain or imminent.

Flash Flood Warning - Issued to inform the public, emergency management and other cooperating agencies that flash flooding is in progress, imminent or highly likely.

High Winds - Sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration.

Lightning - A visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground or between the ground and a cloud.

Severe Thunderstorm Watch - Issued when conditions are favorable for the development of severe thunderstorms in and close to the watch area. A severe thunderstorm is a thunderstorm that produces 3/4 inch hail or larger in diameter and/or winds equal or exceed 58 mph. The size of the watch can vary depending on the weather situation. They are usually issued for a duration of 4 to 8 hours. They are normally issued well in advance of the actual occurrence of severe weather.

Severe Thunderstorm Warning - Issued when either a severe thunderstorm is indicated by radar or a spotter reports a thunderstorm producing hail 3/4 inch or larger in diameter and/or winds equal or exceed 58 mph. Severe thunderstorms can produce tornadoes with little or no advance warning. They are usually issued for a duration of one hour. They can be issued without a Severe Thunderstorm Watch being already in effect.

Tornado Watch - Issued when conditions are favorable for the development of tornadoes in and close to the watch area. Their size can vary depending on the weather situation. They are usually issued for a duration of 4 to 8 hours. They normally are issued well in advance of the actual occurrence of severe weather.

Tornado Warning - Issued when a tornado is indicated by radar or sighted by spotters. They can be issued without a Tornado Watch being already in effect. They are usually issued for a duration of around 30 minutes.

Winter Storm Watch - Issued when there is a potential for heavy snow or significant ice accumulations, usually at least 24 to 36 hours in advance. The criteria for this watch can vary from place to place.

Winter Storm Warning - Issued when a winter storm is producing or is forecast to produce heavy snow or significant ice accumulations. The criteria for this warning can vary from place to place.

Information provided by emergency and weather broadcasts will be used to determine what actions need to be taken by project personnel. If an area is experiencing severe weather, the OSC in conjunction with the RM/SHSO will decide what operations, if any, are safe to perform based on existing and anticipated weather conditions, and shall notify personnel when to suspend operations and seek shelter. The best protection against most severe weather episodes and natural disasters is to seek shelter before the storm hits. When notification is given that severe weather is approaching, the site should be secured (if time permits) and personnel should immediately take appropriate action for personal safety.

In particular, these precautions should be taken under the following conditions:

- Flash Flood - Seek higher ground.
- High Wind - Secure materials and equipment and seek shelter.
- Lightning - Alert all personnel if lightning appears to be imminent. Activate lightning detector, or use “flash to bang” rule (i.e., lightning to thunder) where a count of five seconds equals one mile, to determine distance of lightning strikes from site. Suspend outdoor work and seek shelter in substantial buildings, enclosed vehicles or other predetermined location, when lightning strike is within six (6) miles from site. Wait a minimum of 30 minutes following the last lightning strike within six (6) miles.
- Severe Thunderstorm - Seek shelter in substantial buildings, enclosed vehicles or other predetermined location. If no shelter is available, seek cover in clumps of bushes or within groups of trees. Avoid metal objects, towers, fences and creek beds.
- Tornado - Vacate trailers/automobiles and seek building/shelter below ground level (e.g., basement, ditch or culvert).
- Winter Storm - Seek shelter and avoid unnecessary travel.

SECTION 13

CONFINED SPACE

This section is not applicable because there will be no confined space entries during site work activities.

APPENDIX A

HEALTH AND SAFETY PLAN AMENDMENTS

HEALTH AND SAFETY PLAN AMENDMENT: # 01 :

SITE NAME: Allied Paper Portage Creek

DATE: 4/12/12

TYPE OF AMENDMENT: Listing of Secondary Evacuation Points SA6, SA7

REASON FOR AMENDMENT: Secondary Evacuation Sites Not Listed in Original Plan, Section 12-5

* Secondary Evacuation Point SA6, Intersection of Lake St. Bridge + Creek West Bank

* Secondary Evacuation Point SA7, Reed Court to East + intersection of Reed Ct, Reed St

ALTERNATE SAFEGUARD PROCEDURES: At Assembly Point Stay Out of the Main Thoroughfare, Stay on Sidewalks

REQUIRED CHANGES IN PPE: N/A

4/12/12
ERRS Response Manager (Date)

4/12/12
ERRS Director of Health and Safety (Date)

4/12/12
U.S. EPA OSC (Date)

4/12/12
START Health and Safety (Date)
(if amendment relates to Weston START activities)

HEALTH AND SAFETY PLAN AMENDMENT: # 22 :

SITE NAME: ALLIED PAPER PORTAGE CREEK

DATE: 9/19/12

TYPE OF AMENDMENT: Addition of local ER contacts for notification

REASON FOR AMENDMENT: Missing in Section 11.2

ALTERNATE SAFEGUARD PROCEDURES: N/A

REQUIRED CHANGES IN PPE: N/A

9/19/12
ERRS Response Manager (Date)

9/19/12
ERRS Director of Health and Safety (Date)

9/19/12
U.S. EPA OSC (Date)

START Health and Safety (Date)
(if amendment relates to Weston START activities)

APPENDIX B

ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Poor Housekeeping	Maintain good housekeeping at all times in all project work areas. Establish common paths of travel and keep them free from the accumulation of materials and debris. Keep walkways, aisles, exits, stairways and emergency equipment free from obstructions. Designate specific areas for the proper storage of materials. Store all tools, equipment, materials and supplies in an orderly manner. Store or remove unessential materials and debris from the work area as work progresses. Provide containers for collecting trash and other debris and dispose of the contents at regular intervals.
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Material Handling (manual) - injury from sharps (i.e., materials/equipment having corners, edges or projections capable of cutting or piercing the skin)	Wear cut-resistant work gloves when the possibility of lacerations or other injury may occur. Utilize mechanical device, if appropriate, to avoid directly handling sharps. Maintain all hand and power tools in a safe condition. Wear a face shield (in addition to safety glasses) for protection from glass breakage.

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Slip/Trip/Fall – walking surface, rough and uneven terrain, debris and wet surfaces	Practice good housekeeping Use caution when working on uneven or wet ground. Eliminate or clearly mark protrusions and obstructions. Ensure abrupt changes in elevation are readily identifiable. Keep all work areas and paths of travel clear of equipment, materials, debris and other obstructions. Avoid stringing cords, cables and hoses across paths of travel. Maintain adequate lighting or provide supplemental lighting (i.e., flash lights) to personnel. Stay alert and pay attention to hazardous walking surfaces.
Vehicle Accidents/Collisions	All equipment will be properly secured during transport. Use ground guide and back-up alarm during backing. Vehicle and equipment operators should look in the direction of travel; look before backing up. Arrange traffic flow to prevent foot traffic from crossing the routes of heavy equipment and moving loads. Ensure the operator acknowledges your presence before walking near equipment in operation. Use of cell phones by the driver/operator is prohibited while the vehicle/equipment is in motion. Adhere to posted speed limits.
Fire/Explosion (flammable chemicals, combustible/reactive materials) - general hazards	Adhere to requirements specified in the OSHA Flammable and Combustible Liquids Standards (29 CFR 1910.106 and 1926.152). Provide fire extinguishers consistent with the OSHA Fire Protection Standard (29 CFR 1926.150) and/or the OSHA Portable Fire Extinguisher Standard (29 CFR 1910.157) in sufficient number and locations to allow on-site personnel the opportunity to extinguish manageable fires. Do not allow combustible materials to accumulate in any area or in any manner to create a fire hazard. Prohibit ignition sources within 50 feet of any area where flammable/combustible liquids are used or stored. Designate approved smoking areas and prohibit smoking on the job site except in designated smoking areas. Provide safe receptacles at designated smoking areas.

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Fire/Explosion - fueling operations	Place portable containers on level ground during fueling operations. Items such as tables, tailgates, truck beds or other similar configurations are not to be considered as an equivalent to level ground during refueling activities. Check container/tank fuel levels only when the fill-nozzle is shut off. Avoid filling the container/tank completely full. Maintain enough air space (about 5-10% of container/tank capacity) to allow for expansion of the fuel. Shut off equipment engines prior to fueling. Allow all equipment to cool down prior to fueling (i.e., a minimum cool-down time of 20-minutes). Exception is vehicles/heavy equipment on which the fuel tank fill location is remote from all hot compartments or surfaces. Provide at least one fire extinguisher having a rating of not less than 20-B:C within 75 feet of each pump, dispenser, and underground fill pipe opening.
Fire/Explosion - portable pump/generator fueling operations	Avoid filling the container/tank completely full. Maintain enough air space (about 5-10% of container/tank capacity) to allow for expansion of the fuel. Shut off equipment engines prior to fueling. Allow all equipment to cool down prior to fueling (i.e., a minimum cool-down time of 20-minutes). Provide fire extinguisher having a rating of not less than 20-B:C in close proximity to pump/generator.

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Power Tool Use - general hazards	Use only properly trained and qualified personnel. Inspect the tool, cords, and hoses prior to use, and if a tool is found to be damaged or defective, immediately remove it from service. Maintain tools in accordance with the manufacturer's recommendations, lubricating when necessary, and keeping them clean and sharp. Do not modify equipment or its use (i.e., use tools only for their intended purpose). Never carry a tool by the cord or hose, or yank the cord to disconnect it. Keep cords away from heat, oil and sharp edges. Avoid standing in wet areas when using portable power tools. Avoid accidental starting (e.g., do not place fingers on the switch button when carrying a plugged-in tool). Never disable or modify guards or automatic "off" switches on power tools. Secure work with clamps or a vice, freeing both hands to operate the tool. Be aware of hand placement and avoid putting your hands in the line of operation while maintaining good footing and balance. Disconnect tool from energy source and compressed air (when in use) before performing servicing, and before replacing bits, blades and cutters. Wear appropriate PPE (including safety glasses, work gloves and hearing protection) and avoid loose-fitting clothing that could become entangled in moving parts.

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Electrical Shock / Electrocution - portable power tools and equipment	Use double-insulated or properly grounded electric power-operated tools. Operate electric power tools and equipment according to manufacturers' instructions. Maintain electric power tools and equipment in a safe condition. Utilize ground-fault circuit interrupters (GFCI) and heavy-duty flexible extension cords. Ensure flexible cords are equipped with third-wire grounding; covered, elevated, or protected from damage when passing through work areas; protected from pinching if routed through doorways and not fastened with staples, hung from nails or suspended with wire. Protect flexible cords from damage by covering or routing them overhead. Keep all plugs and flexible cords out of standing water. Inspect all flexible cords daily for structural integrity, ground continuity and damaged insulation. Inspect electrical equipment and power tools for damage prior to use. Remove defective electric power tools and equipment from service. Use approved waterproof/weatherproof receptacles if conditions warrant. Do not suspend temporary lights by their electric cord unless designed for suspension. Protect temporary lights from accidental contact or breakage. Inspect all electrical power circuits prior to commencing work.
Biological Hazards – poisonous plants (e.g., poison ivy, poison oak and poison sumac)	Avoid tall grass/weeds and brush (i.e., stay in clear/open areas). Wear appropriate clothing and cover exposed skin to avoid contact with poisonous plants. Mow high grass/weeds. Use Ivy Block (or similar skin lotion) when working in areas where there may be contact with poisonous plants. Shower or wash exposed skin and clothing if in contact with poisonous plants.

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Biological Hazards - biting/stinging insects (e.g., mosquitoes, bees and wasps) and animals (e.g., stray dogs/cats, rodents and snakes)	Notify supervision if allergic to biting/sting insects. Avoid insect nest areas and likely habitats of vermin. Avoid all contact with wild animals. Apply insect repellant (≤ 30% DEET) according to manufacturer's instructions. Wear appropriate clothing and cover exposed skin to protect against biting/stinging insects. Tape pants legs at the ankles. Be alert and watch for rodents, snakes, etc. Avoid rodent urine, droppings or nesting materials. Avoid areas with significant pigeon droppings. Check skin/clothing for ticks at breaks and end of shift.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.
Noise Exposure – power tool/equipment use	Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear adequate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Heat Stress – weather conditions, physical activity and wet clothing	Monitor ambient conditions (WBGT measurements). Know the signs/symptoms of heat stress and use the buddy system to monitor one another for these signs/symptoms. Request immediate medical attention if someone shows signs of heat stress (exhaustion or stroke) Acclimatize personnel to hot and humid environments by gradually increasing their work period or workload over the course of several days. Drink plenty of fluids (water or sports drink) frequently while working in hot, humid conditions and limit the intake of caffeinated beverages. Wear light-colored clothing. Keep additional clothing and change into dry clothing as soon as possible after work clothing becomes significantly saturated with perspiration. Take frequent rest breaks in areas that are shaded or air-conditioned. Reduce physical exertion levels by providing extra personnel. Schedule heavy work for cooler periods of the work shift (e.g., early mornings, cool/overcast days). Provide temperature-controlled cabs for equipment operators (when possible). Use fans/ventilation to provide air movement for cooling (when possible). Consider the use of personal cooling devices.
Cold Stress – weather conditions, physical activity and wet clothing	Monitor ambient conditions (ambient temperature and wind velocity). Know the signs/symptoms of cold stress and use the buddy system to monitor one another for these signs/symptoms. Request immediate medical attention if someone shows signs of cold stress. Plan work activities so outside work is conducted during the warmer parts of the day or rescheduled for days predicted to be warmer. Move work indoors or to an area that is protected from wind/precipitation (when possible). Wear layers of clothing that are windproof and waterproof. Keep additional clothing and change into dry clothing as soon as possible after work clothing becomes significantly wet. Take frequent rest breaks in warm, sheltered spaces. Drink plenty of fluids to prevent dehydration and limit the intake of caffeinated beverages.

ACTIVITY HAZARD ANALYSIS 1	
JOB TASK: General Construction and Operational Activities *(applies to all work elements)*	
PERSONAL PROTECTIVE EQUIPMENT: Varies	
HAZARD	**CONTROL MEASURES**
Illumination Inadequate	Adhere to requirements specified in the OSHA Illumination Standard (29 CFR 1926.56) and the Illuminating Engineering Society, as applicable. Conduct lighting survey to ensure adequate provisions for illumination are being met. Provide necessary supplemental lighting as needed to perform work safely.
Drowning	Wear U.S. Coast Guard (USCG) approved personal flotation devices for work activities on or near water whenever there is a drowning hazard. Place ring buoys not more than 200 feet apart with at least 70 feet of 3/8 inch of solid braid polypropylene (or equivalent) rope.

ACTIVITY HAZARD ANALYSIS 2	
JOB TASK: Mobilize/Demobilize Trailers and Equipment	
PERSONAL PROTECTIVE EQUIPMENT: Level D	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Material Handling (manual) - injury from sharps (i.e., materials/equipment having corners, edges or projections capable of cutting or piercing the skin)	Wear cut-resistant work gloves when the possibility of lacerations or other injury may occur. Utilize mechanical device, if appropriate, to avoid directly handling sharps. Maintain all hand and power tools in a safe condition. Wear a face shield (in addition to safety glasses) for protection from glass breakage.
Slip/Trip/Fall – walking surface, rough and uneven terrain, debris and wet surfaces	Practice good housekeeping Use caution when working on uneven or wet ground. Eliminate or clearly mark protrusions and obstructions. Ensure abrupt changes in elevation are readily identifiable. Keep all work areas and paths of travel clear of equipment, materials, debris and other obstructions. Avoid stringing cords, cables and hoses across paths of travel. Maintain adequate lighting or provide supplemental lighting (i.e., flash lights) to personnel. Stay alert and pay attention to hazardous walking surfaces.

ACTIVITY HAZARD ANALYSIS 2	
JOB TASK: Mobilize/Demobilize Trailers and Equipment	
PERSONAL PROTECTIVE EQUIPMENT: Level D	
HAZARD	**CONTROL MEASURES**
Fire/Explosion (flammable chemicals, combustible/reactive materials) - general hazards	Adhere to requirements specified in the OSHA Flammable and Combustible Liquids Standards (29 CFR 1910.106 and 1926.152). Provide fire extinguishers consistent with the OSHA Fire Protection Standard (29 CFR 1926.150) and/or the OSHA Portable Fire Extinguisher Standard (29 CFR 1910.157) in sufficient number and locations to allow on-site personnel the opportunity to extinguish manageable fires. Do not allow combustible materials to accumulate in any area or in any manner to create a fire hazard Prohibit ignition sources within 50 feet of any area where flammable/combustible liquids are used or stored. Designate approved smoking areas and prohibit smoking on the job site except in designated smoking areas. Provide safe receptacles at designated smoking areas.
Electrical Shock / Electrocution – electrical work to include connect/disconnect utilities	Adhere to requirements specified in the applicable OSHA Electrical Standards (29 CFR 1910, Subpart S and 1926, Subpart K). Follow lock-out/tag-out procedures in accordance with EQ Lockout/Tagout SOP. De-energize or shut off utility lines at their source before work begins. Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters (GFCI). Use qualified electricians to run and hook up electrical circuits. Use approved waterproof/weatherproof type wiring and receptacles if conditions warrant. Inspect all electrical power circuits prior to commencing work. Prohibit the wearing of conductive articles of jewelry (e.g., watches, rings and key chains) and conductive clothing when performing electrical work. Use only ladders with nonconductive side rails where the worker or the ladder could contact exposed energized electrical equipment.

ACTIVITY HAZARD ANALYSIS 3	
JOB TASK: Establish Work Zones	
PERSONAL PROTECTIVE EQUIPMENT: Level D	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Material Handling (manual) - injury from sharps (i.e., device having corners, edges or projections capable of cutting or piercing the skin)	Wear cut-resistant work gloves when the possibility of lacerations or other injury may occur. Maintain all hand and power tools in a safe condition.
Slip/Trip/Fall – walking surface, rough and uneven terrain, debris and wet surfaces	Practice good housekeeping Use caution when working on uneven or wet ground. Eliminate or clearly mark protrusions and obstructions. Ensure abrupt changes in elevation are readily identifiable. Keep all work areas and paths of travel clear of equipment, materials, debris and other obstructions. Avoid stringing cords, cables and hoses across paths of travel. Maintain adequate lighting or provide supplemental lighting (i.e., flash lights) to personnel. Stay alert and pay attention to hazardous walking surfaces.

ACTIVITY HAZARD ANALYSIS 4	
JOB TASK: Clear/Grub Site (surveying, access road, excavation areas, creek banks)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Remain safe distance from leading edges. Ensure loads are properly distributed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 4	
JOB TASK: Clear/Grub Site (surveying, access road, excavation areas, creek banks)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Tree Removal/Trimming	Contact public utility for all work requiring power outage or clearance from power lines to perform work safely. Contact public utility to identify location of underground utilities prior to performing work that could damage underground utilities. Visually inspect the tree for any broken limbs that may already be hanging and remove those limbs first. Walk through the work area before trimming. Mark water meters and sprinkler heads using orange cones or "flags". Stop tree trimming operations during electrical storms and when lightning is visible or thunder is heard. Use leather work gloves when handling tree stumps and branches. Do not stand under a tree or tree limb when trimming is in progress. Do not cut a branch away until the ground crew is away from the branch's fall area.

ACTIVITY HAZARD ANALYSIS 4	
JOB TASK: Clear/Grub Site (surveying, access road, excavation areas, creek banks)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Chainsaw Use	Operate equipment in strict accordance with manufacturer's requirements. Utilize "buddy system" at all times. Wear hearing protection (combined ear plugs and ear muffs), face protection (face shield - in addition to safety glasses), leather work gloves, substantial leather shoes and chaps. When transporting a chain saw by hand, stop the engine, grip the saw handle, place the muffler at the side away from your body and position the guide bar to the rear. Do not use a chain saw with parts that are loose, worn, cracked or otherwise visibly damaged. Do not remove the chain brake or alter handles, chain brake, chain or covers. Tag damaged chain saws "Out of Service" to prevent accidental start up or use. Use only grip locations as specified by the manufacturer as handholds when operating the chain saw. Do not pour fuel into the tank of a running engine. Keep body parts and clothing away from the running engine and the cutting blade. Allow the engine to cool before performing maintenance or refueling. Stop the engine and disconnect the spark plug wire before cleaning, inspecting, adjusting or repairing cutting blades or other rotating parts. Always start a chain saw with a 10 inch or larger bar on the ground. Engage the chain brake, place one foot through the bottom handle, hold the top handle and pull the starter rope. Do not place a chain saw on your knee when starting it. Always use both hands to maintain control of the chain saw. Activate the chain brake, remove your finger from the trigger and keep the bar away from your body when moving from tree to tree or cut to cut. Do not operate a chain saw above your shoulder height. Keep the nose of the bar clear of other nearby objects during cutting to prevent kickback. Do not set a saw down while the blade is engaged. Stop the engine and turn the switch to "OFF" when the chain saw is to be left unattended.

ACTIVITY HAZARD ANALYSIS 4	
JOB TASK: Clear/Grub Site (surveying, access road, excavation areas, creek banks)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Chipper Use	Operate and maintain equipment in strict accordance with manufacturer's requirements. Ensure workers are trained to understand the hazards associated with chippers. Wear hearing protection (combined ear plugs and ear muffs), face protection (face shield - in addition to safety glasses) and leather work gloves Avoid wearing loose clothing that could become entangled in moving parts. Inspect equipment for proper guards and safety devices prior to operation. Designate one or more employees as a safety watch to be stationed near emergency shut-off devices while other employees feed material into the chipper. Stand to the side of the infeed chute when feeding material into the chipper to reduce the "caught-in" hazard and allows quick access to emergency stop devices. Keep hands and feet out of the immediate infeed chute area while the chipper is running. Push material into feed rollers with a wooden tool or a long branch. Feed branches into the chipper butt-end first. Place shorter branches on top of longer branches being fed into the chipper. Never stand, sit or climb onto any part of the chipper while it is running. Shut down the chipper and remove the ignition key when it is unattended. Ensure that the discharge chute is positioned to prevent chips from hitting workers. Do not stand in front of the feed table when the chipper is running. Check material to be fed to ensure that it is free of metal and other foreign objects. Use proper locking pins to immobilize the disc cutting wheel when attempting to clear a clogged chipper chute or changing chipper blades.

ACTIVITY HAZARD ANALYSIS 4	
JOB TASK: Clear/Grub Site (surveying, access road, excavation areas, creek banks)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.
Biological Hazards – poisonous plants (e.g., poison ivy, poison oak and poison sumac)	Avoid tall grass/weeds and brush (i.e., stay in clear/open areas). Wear appropriate clothing and cover exposed skin to avoid contact with poisonous plants. Mow high grass/weeds. Use Ivy Block (or similar skin lotion) when working in areas where there may be contact with poisonous plants. Shower or wash exposed skin and clothing if in contact with poisonous plants.
Biological Hazards - biting/stinging insects (e.g., mosquitoes, bees and wasps) and animals (e.g., stray dogs/cats, rodents and snakes)	Notify supervision if allergic to biting/sting insects. Avoid insect nest areas and likely habitats of vermin. Avoid all contact with wild animals. Apply insect repellant (≤ 30% DEET) according to manufacturer's instructions. Wear appropriate clothing and cover exposed skin to protect against biting/stinging insects. Tape pants legs at the ankles. Be alert and watch for rodents, snakes, etc. Avoid rodent urine, droppings or nesting materials. Avoid areas with significant pigeon droppings. Check skin/clothing for ticks at breaks and end of shift.

ACTIVITY HAZARD ANALYSIS 5	
JOB TASK: Perform Soil and Sediment Sampling	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Contaminant Exposure (inhalation and skin contact) – PCB contaminated soil and sediment	Wear appropriate PPE for the specific activity performed. Avoid direct contact with liquids and solids. Minimize airborne contaminants when handling dry materials. Provide and ensure that workers use washing facilities, and emphasize personal hygiene such as washing their hands and face after work and before eating to minimize their exposure.
Slip/Trip/Fall – walking surface, rough and uneven terrain, debris and wet surfaces	Practice good housekeeping Use caution when working on uneven or wet ground. Eliminate or clearly mark protrusions and obstructions. Ensure abrupt changes in elevation are readily identifiable. Keep all work areas and paths of travel clear of equipment, materials, debris and other obstructions. Avoid stringing cords, cables and hoses across paths of travel. Maintain adequate lighting or provide supplemental lighting (i.e., flash lights) to personnel. Stay alert and pay attention to hazardous walking surfaces.
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Drowning	Wear U.S. Coast Guard (USCG) approved personal flotation devices for work activities on or near water whenever there is a drowning hazard. Place ring buoys not more than 200 feet apart with at least 70 feet of 3/8 inch of solid braid polypropylene (or equivalent) rope.

ACTIVITY HAZARD ANALYSIS 6	
JOB TASK: Construct Dewatering and Staging Pad	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Remain safe distance from leading edges. Ensure loads are properly distributed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 6	
JOB TASK: Construct Dewatering and Staging Pad	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Heavy/Hauling Equipment Operation - vehicle traffic	Look in the direction of travel before backing up. Arrange traffic flow to prevent foot traffic from crossing the routes of heavy/hauling equipment and moving loads. Adhere to posted speed limits. Use reflective warning vests when exposed to vehicle traffic. Reroute traffic as necessary to minimize potential for an accident. Utilize dedicated flaggers when necessary at site roadway crossings. Set-up signs, traffic cones and/or barricades to define and protect the project area from the non project-related vehicle traffic.

ACTIVITY HAZARD ANALYSIS 6	
JOB TASK: Construct Dewatering and Staging Pad	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, worker rotation, etc.). Wear appropriate hearing protection. Brief workers on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.

ACTIVITY HAZARD ANALYSIS 7	
JOB TASK: Construct/Operate Waste Water Treatment Plant	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Crane Use - general hazards	Adhere to requirements specified in the OSHA Cranes and Derricks in Construction Standard (29 CFR 1926, Subpart CC). Comply with the manufacturer's specifications and limitations applicable to the operation of the crane. Use only properly trained Competent Persons, Qualified Persons, Crane Operators, Crew Members, Dedicated Spotters and Signal Persons as required for crane assembly/disassembly and operation. Designate a Qualified Person to inspect all machinery and equipment prior to each use to make sure it is in safe operating condition. Ensure power line clearance requirements are met for crane assembly/disassembly and operation as specified in 29 CFR 1926.1407 - 1926.1411.
Crane Use – assembly/disassembly	Designate an Assembly/Disassembly Director to direct crane assembly/disassembly activities. Inspect (Qualified Person) equipment upon completion of assembly to assure that it is configured in accordance with manufacturer equipment criteria. Comply with all applicable manufacturer prohibitions and procedures. Ensure supporting surface underneath crane is level, firm and stable to support the weight of the crane and its load. Avoid placing body or any part of body in a pinch point during assembly/disassembly. Level the crane according to the manufacturer’s specifications. Use outriggers (if provided) and always extend all beams completely.

ACTIVITY HAZARD ANALYSIS 7	
JOB TASK: Construct/Operate Waste Water Treatment Plant	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Crane Use - operation	Begin visual inspection (Competent Person) of equipment prior to each shift the equipment will be used and complete inspection before or during that shift. Designate only one Signal Person to signal the Crane Operator. Ensure all hand signals are clearly understood by both the Crane Operator and Signal Person. Provide Crane Operator the authority to stop and refuse to handle loads, whenever there is a concern as to safety, until a Qualified Person has determined that safety has been assured. Do not exceed the manufacturer's recommended capacity, rating or scope of attachments used with cranes. Ensure rated load capacities, recommended operating speeds and special hazard warnings are conspicuously posted on all equipment. Barricade accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, in such a manner as to prevent an employee from being struck or crushed by the crane Keep clear of suspended loads and loads about to be lifted. Do not work under suspended loads and stay out from under boom when in operation. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the crane or load. Use taglines to keep the load from swinging. Check the level of the crane frequently during operation and level when necessary. Maintain constant attentiveness to moving load or signal person. Suspend operations during high wind conditions.

ACTIVITY HAZARD ANALYSIS 7	
JOB TASK: Construct/Operate Waste Water Treatment Plant	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (mechanical) - hoisting/rigging operations - general hazards	Adhere to requirements specified in the OSHA Cranes and Derricks (29 CFR 1926.550) and Rigging Equipment for Material Handling (29 CFR 1926.251) Standards. Comply with the manufacturer's specifications and limitations applicable to hoisting/rigging equipment. Use only properly trained and authorized personnel for hoisting/rigging operations. Designate a Competent Person to inspect all machinery and equipment (e.g., slings and rigging accessories) prior to each use to make sure it is in safe operating condition. Remove damaged rigging equipment from service if the condition presents any possibility of failure. Determine the weight of the load, the center of gravity and the best method to attach the load prior to lifting. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the lifting equipment or load. Use softeners, protector pads or blocking at sharp corners. Do not exceed the sling manufacturer’s recommended rated capacity. Lift load a few inches and verify adequacy of rigging design and equipment. Store properly all rigging equipment when not in use.
Elevated Work (≥ 6 feet above lower level) - fall hazard	Adhere to requirements specified in the OSHA Fall Protection Standard (29 CFR 1926, Subpart M). Identify and evaluate fall hazards. Protect with guardrail system, safety net system, personal fall arrest system, positioning device system or warning line system as required. Provide guardrail protection around openings/holes in floors or other unprotected areas and along unprotected sides of ramps and stairways. Provide specific fall protection training. Inspect and maintain fall protection equipment. Develop and implement Fall Protection Plan if it can be demonstrated that it is infeasible or creates a greater hazard to use conventional fall protection systems. Suspend elevated work when average wind speed exceeds 25 mph. Barricade areas below elevated work to ensure personnel are not exposed to falling objects.

ACTIVITY HAZARD ANALYSIS 7	
JOB TASK: Construct/Operate Waste Water Treatment Plant	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Ladder (Portable) Use	Adhere to requirements specified in the applicable OSHA Ladders Standards (29 CFR 1910.25, 1910.26 and 1926, Subpart X). Purchase and use only portable ladders meeting ANSI A14 Ladder Standards. Designate a Competent Person to inspect ladder for visible defects on a periodic basis and after any occurrence that could affect their safe use. Inspect ladder prior to every use and remove from service if damaged. Evaluate fall protection requirements/methods for activities involving ladders that present a unique fall hazard. Do not exceed ladder's maximum load rating. Use the 1:4 ratio to ensure a stable working platform by placing the base of the ladder 1 foot away of whatever it leans against for every 4 feet of height to the point where the ladder contacts at the top. Minimize the amount of work that is performed on a ladder if other methods are available. Use ladder only on a stable and level surface, unless it has been secured (top and bottom) to prevent displacement. Limit work on a ladder when the individual's feet are 6 feet or more above the ground to short duration activities when possible. Pay attention to each step and handhold, maintain 3 points-of-contact with the ladder and always face the ladder keeping the body between the rail when ascending and descending. Do not use a self-supporting ladder (E.g., stepladder) as a single ladder or in a partially closed position. Avoid use of metal ladders for electrical work activities and near power lines or exposed electrical equipment. Place or erect ladders on a solid and stable surface. Extend ladders at least 3 feet above the point of support when accessing elevated surfaces. Do not move/shift/extend ladder while a person or equipment is on the ladder. Secure or barricade the ladder when placed in a location where it can be displaced by other activities. Do not sit on top or straddle a stepladder. Suspend ladder use (work ≥ 6 feet above lower level) when average wind speed exceeds 25 mph. Store and transport ladders properly.

ACTIVITY HAZARD ANALYSIS 7	
JOB TASK: Construct/Operate Waste Water Treatment Plant	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Power Tool Use - general hazards	Use only properly trained and qualified personnel. Inspect the tool, cords, and hoses prior to use, and if a tool is found to be damaged or defective, immediately remove it from service. Maintain tools in accordance with the manufacturer's recommendations, lubricating when necessary, and keeping them clean and sharp. Do not modify equipment or its use (i.e., use tools only for their intended purpose). Never carry a tool by the cord or hose, or yank the cord to disconnect it. Keep cords away from heat, oil and sharp edges. Avoid standing in wet areas when using portable power tools. Avoid accidental starting (e.g., do not place fingers on the switch button when carrying a plugged-in tool). Never disable or modify guards or automatic "off" switches on power tools. Secure work with clamps or a vice, freeing both hands to operate the tool. Be aware of hand placement and avoid putting your hands in the line of operation while maintaining good footing and balance. Disconnect tool from energy source and compressed air (when in use) before performing servicing, and before replacing bits, blades and cutters. Wear appropriate PPE (including safety glasses, work gloves and hearing protection) and avoid loose-fitting clothing that could become entangled in moving parts.
Plant Operation – general operational hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with operational procedures. Wear appropriate PPE for the specific activity performed. Avoid direct contact with liquids and solids. Minimize airborne contaminants when handling dry materials. Provide and ensure that workers use washing facilities, and emphasize personal hygiene such as washing their hands and face after work and before eating to minimize their exposure.

ACTIVITY HAZARD ANALYSIS 7	
JOB TASK: Construct/Operate Waste Water Treatment Plant	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.
Contaminant Exposure (inhalation and skin contact) – PCB contaminated filter media	Wear appropriate PPE for the specific activity performed. Avoid direct contact with liquids and solids. Minimize airborne contaminants when handling dry materials. Provide and ensure that workers use washing facilities, and emphasize personal hygiene such as washing their hands and face after work and before eating to minimize their exposure.

ACTIVITY HAZARD ANALYSIS 8	
JOB TASK: Install/Operate/Remove Dewatering Pumps, Pipeline and Vacuum Wellpoint System	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Heavy Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 8	
JOB TASK: Install/Operate/Remove Dewatering Pumps, Pipeline and Vacuum Wellpoint System	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.

ACTIVITY HAZARD ANALYSIS 8	
JOB TASK: Install/Operate/Remove Dewatering Pumps, Pipeline and Vacuum Wellpoint System	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (mechanical) - hoisting/rigging operations - general hazards	Adhere to requirements specified in the OSHA Rigging Equipment for Material Handling (29 CFR 1926.251) Standard. Comply with the manufacturer's specifications and limitations applicable to hoisting/rigging equipment. Use only properly trained and authorized personnel for hoisting/rigging operations. Designate a Competent Person to inspect all machinery and equipment (e.g., slings and rigging accessories) prior to each use to make sure it is in safe operating condition. Remove damaged rigging equipment from service if the condition presents any possibility of failure. Determine the weight of the load, the center of gravity and the best method to attach the load prior to lifting. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the lifting equipment or load. Use softeners, protector pads or blocking at sharp corners. Do not exceed the sling manufacturer’s recommended rated capacity. Lift load a few inches and verify adequacy of rigging design and equipment. Store properly all rigging equipment when not in use.
Heat Fusion Welding - HDPE	Use only properly trained and authorized personnel. Adhere to manufacturer’s operating manual. Inspect equipment prior to operation. Cover exposed skin to prevent direct contact with hot plate surfaces. Avoid contact with hot surfaces.
Fire/Explosion - portable pump/generator fueling operations	Avoid filling the container/tank completely full. Maintain enough air space (about 5-10% of container/tank capacity) to allow for expansion of the fuel. Shut off equipment engines prior to fueling. Allow all equipment to cool down prior to fueling (i.e., a minimum cool-down time of 20-minutes). Provide fire extinguisher having a rating of not less than 20-B:C in close proximity to pump/generator.

ACTIVITY HAZARD ANALYSIS 9	
JOB TASK: Install/Remove Sheet Pile Cofferdams	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 9	
JOB TASK: Install/Remove Sheet Pile Cofferdams	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.

ACTIVITY HAZARD ANALYSIS 9	
JOB TASK: Install/Remove Sheet Pile Cofferdams	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (mechanical) - hoisting/rigging operations - general hazards	Adhere to requirements specified in the OSHA Rigging Equipment for Material Handling (29 CFR 1926.251) Standard. Comply with the manufacturer's specifications and limitations applicable to hoisting/rigging equipment. Use only properly trained and authorized personnel for hoisting/rigging operations. Designate a Competent Person to inspect all machinery and equipment (e.g., slings and rigging accessories) prior to each use to make sure it is in safe operating condition. Remove damaged rigging equipment from service if the condition presents any possibility of failure. Determine the weight of the load, the center of gravity and the best method to attach the load prior to lifting. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the lifting equipment or load. Use softeners, protector pads or blocking at sharp corners. Do not exceed the sling manufacturer’s recommended rated capacity. Lift load a few inches and verify adequacy of rigging design and equipment. Store properly all rigging equipment when not in use.
Drowning	Wear U.S. Coast Guard (USCG) approved personal flotation devices for work activities on or near water whenever there is a drowning hazard. Place ring buoys not more than 200 feet apart with at least 70 feet of 3/8 inch of solid braid polypropylene (or equivalent) rope.

ACTIVITY HAZARD ANALYSIS 10	
JOB TASK: Install/Operate/Remove By-Pass Pumps and Piping	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Heavy Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 10	
JOB TASK: Install/Operate/Remove By-Pass Pumps and Piping	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Material Handling (mechanical) - hoisting/rigging operations - general hazards	Adhere to requirements specified in the OSHA Rigging Equipment for Material Handling (29 CFR 1926.251) Standard. Comply with the manufacturer's specifications and limitations applicable to hoisting/rigging equipment. Use only properly trained and authorized personnel for hoisting/rigging operations. Designate a Competent Person to inspect all machinery and equipment (e.g., slings and rigging accessories) prior to each use to make sure it is in safe operating condition. Remove damaged rigging equipment from service if the condition presents any possibility of failure. Determine the weight of the load, the center of gravity and the best method to attach the load prior to lifting. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the lifting equipment or load. Use softeners, protector pads or blocking at sharp corners. Do not exceed the sling manufacturer's recommended rated capacity. Lift load a few inches and verify adequacy of rigging design and equipment. Store properly all rigging equipment when not in use.

ACTIVITY HAZARD ANALYSIS 10	
JOB TASK: Install/Operate/Remove By-Pass Pumps and Piping	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.
Fire/Explosion - portable pump/generator fueling operations	Avoid filling the container/tank completely full. Maintain enough air space (about 5-10% of container/tank capacity) to allow for expansion of the fuel. Shut off equipment engines prior to fueling. Allow all equipment to cool down prior to fueling (i.e., a minimum cool-down time of 20-minutes). Provide fire extinguisher having a rating of not less than 20-B:C in close proximity to pump/generator.
Drowning	Wear U.S. Coast Guard (USCG) approved personal flotation devices for work activities on or near water whenever there is a drowning hazard. Place ring buoys not more than 200 feet apart with at least 70 feet of 3/8 inch of solid braid polypropylene (or equivalent) rope.

ACTIVITY HAZARD ANALYSIS 11	
JOB TASK: Install/Remove Soil and Sediment Controls	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Heavy/Hauling Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 11	
JOB TASK: Install/Remove Soil and Sediment Controls	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Maintain 25 feet upwind position during loading and dumping operations. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.

ACTIVITY HAZARD ANALYSIS 12	
JOB TASK: Construct/Remove Access Road	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 12	
JOB TASK: Construct/Remove Access Road	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Maintain 25 feet upwind position during loading and dumping operations. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Heavy/Hauling Equipment Operation - vehicle traffic	Look in the direction of travel before backing up. Arrange traffic flow to prevent foot traffic from crossing the routes of heavy/hauling equipment and moving loads. Adhere to posted speed limits. Use reflective warning vests when exposed to vehicle traffic. Reroute traffic as necessary to minimize potential for an accident. Utilize dedicated flaggers when necessary at site roadway crossings. Set-up signs, traffic cones and/or barricades to define and protect the project area from the non project-related vehicle traffic.

ACTIVITY HAZARD ANALYSIS 12	
JOB TASK: Construct/Remove Access Road	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Material Handling (manual) - muscle strain / back injury from manual lifting	Do not lift beyond your capabilities. Adhere to proper lifting techniques. Consider the following before engaging in a work activity that may cause back injury: • Know the weight to be lifted and postural requirements. • Check that the object will remain stable when moved. • Evaluate if a mechanical device should be used to move the object (e.g., hand truck, cart, dolly, pallet jack, etc.). • Determine number of people needed to move object safely. • Consider personnel medical limitations/restrictions. • Consider environmental conditions (e.g., slippery conditions, lighting, etc.). • Plan the lift and the travel path before starting activity Implement one of the following controls for objects greater than 50 pounds: • Engineer the lift out of the task through work planning. • Use a mechanical device. • Use two or more people.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, worker rotation, etc.). Wear appropriate hearing protection. Brief workers on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.

ACTIVITY HAZARD ANALYSIS 13	
JOB TASK: Excavate/Remove/Stabilize Contaminated Soil and Sediment	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 13	
JOB TASK: Excavate/Remove/Stabilize Contaminated Soil and Sediment	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Maintain 25 feet upwind position during loading and dumping operations. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Heavy/Hauling Equipment Operation - vehicle traffic	Look in the direction of travel before backing up. Arrange traffic flow to prevent foot traffic from crossing the routes of heavy/hauling equipment and moving loads. Adhere to posted speed limits. Use reflective warning vests when exposed to vehicle traffic. Reroute traffic as necessary to minimize potential for an accident. Utilize dedicated flaggers when necessary at site roadway crossings. Set-up signs, traffic cones and/or barricades to define and protect the project area from the non project-related vehicle traffic.

ACTIVITY HAZARD ANALYSIS 13	
JOB TASK: Excavate/Remove/Stabilize Contaminated Soil and Sediment	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.
Excavation (man-made cut, cavity, trench or depression) - general hazards	Adhere to requirements specified in the OSHA Excavations Standard (29 CFR 1926, Subpart P). Inspect (Competent Person) excavation, the adjacent areas, and protective systems daily; as needed throughout the work shifts; and after every rainstorm or other hazard-increasing occurrence when persons will be in or around the excavation. Conduct pre-excavation walk down of area to assess any potential hazards. Do not permit anyone underneath loads handled by lifting or digging equipment. Remain safe distance from edge of excavations. Identify unattended excavations with physical barriers and appropriate signs.
Excavation - contact with underground utility	Contact utility locator service and have underground utilities (e.g., electric, water, sewer, fuel, communication, etc) located and protected from damage or displacement. Hand dig when excavating within 3 feet of buried utility.
Contaminant Exposure (inhalation and skin contact) – PCB contaminated soil and sediment	Wear appropriate PPE (including respiratory protection) for the specific activity performed. Avoid direct contact with liquids and solids. Minimize airborne contaminants when handling dry materials. Provide and ensure that workers use washing facilities, and emphasize personal hygiene such as washing their hands and face after work and before eating to minimize their exposure.

ACTIVITY HAZARD ANALYSIS 13	
JOB TASK: Excavate/Remove/Stabilize Contaminated Soil and Sediment	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Pug Mill Operation	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements. Place the pug mill on a flat horizontal surface. Stay clear of areas surrounding pug mill during every startup. Stay clear of exposed augers, belts, pulleys, sheaves, drive shafts, drive couplings, chains and rotating parts Do not wear loose-fitting clothing or other items such as rings or watches that could become entangled in moving parts. Restrain/cover long hair. Ensure all points-of-operation are guarded in conformance with the appropriate standards. Keep all guards in place during equipment operation and periodically inspect to ensure functioning as designed. Switch the power off before doing any inspection. Turn the power switch off if not using the pug mill for an extended period of time. Wear hear protection during pug mill operation.
Toxic/Corrosive Solid Exposure (inhalation and skin contact) - dry chemical stabilizer handling	Obtain and review MSDS for dry chemical stabilizer. Provide adequate dust control to prevent visible emissions. Wear appropriate PPE (including respiratory protection) for the specific activity performed. Avoid direct contact with dry chemicals. Minimize airborne contaminants when handling dry chemicals. Ensure adherence to proper personal decontamination methods. Provide and ensure that personnel use washing facilities, and emphasize personal hygiene such as washing their hands and face after work and before eating to minimize their exposure

ACTIVITY HAZARD ANALYSIS 14	
JOB TASK: Transport/Dispose Contaminated Soil and Sediment	
PERSONAL PROTECTIVE EQUIPMENT: Level D	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - vehicle traffic	Look in the direction of travel before backing up. Arrange traffic flow to prevent foot traffic from crossing the routes of heavy/hauling equipment and moving loads. Adhere to posted speed limits. Use reflective warning vests when exposed to vehicle traffic. Reroute traffic as necessary to minimize potential for an accident. Utilize dedicated flaggers when necessary at site roadway crossings. Set-up signs, traffic cones and/or barricades to define and protect the project area from the non project-related vehicle traffic.
Heavy/Hauling Equipment Decontamination - injury to ground personnel	Personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Stay alert of equipment operation and listen for back-up alarms. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Wear high visibility vest when required to work in close proximity to operating equipment.
Pressure Washer Operation - general hazards	Use only properly trained and authorized personnel. Provide briefing on the use of pressure washers and identification and operation of emergency shutdown features. Adhere to manufacturer's operating manual. Inspect equipment prior to operation. Coordinate activities when multiple pressure washers are in use to prevent cross-spray impact to others. Use only manufacturer-supplied pressure washer wands and attachments. Ensure all personnel not assigned to pressure washer operation remain a minimum of 25 feet from the operator until system is shut down or operator gives permission to approach. Do not exceed the operating pressure necessary to perform the task. Wear appropriate PPE according to manufacturer's requirements.

ACTIVITY HAZARD ANALYSIS 15	
JOB TASK: Backfill/Grade/Restore Excavated Areas	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 15	
JOB TASK: Backfill/Grade/Restore Excavated Areas	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Maintain 25 feet upwind position during loading and dumping operations. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.

ACTIVITY HAZARD ANALYSIS 15	
JOB TASK: Backfill/Grade/Restore Excavated Areas	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - vehicle traffic	Look in the direction of travel before backing up. Arrange traffic flow to prevent foot traffic from crossing the routes of heavy/hauling equipment and moving loads. Adhere to posted speed limits. Use reflective warning vests when exposed to vehicle traffic. Reroute traffic as necessary to minimize potential for an accident. Utilize dedicated flaggers when necessary at site roadway crossings. Set-up signs, traffic cones and/or barricades to define and protect the project area from the non project-related vehicle traffic.

ACTIVITY HAZARD ANALYSIS 16	
JOB TASK: Restore Vegetation (topsoil, trees, seed)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - general hazards	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirements and wear seat belts at all times. Perform daily inspections of equipment and take out-of-service any equipment determined to be unsafe or with a deficiency that effects the safe operation of the equipment. Maintain minimum 10 feet clearance between overhead power lines (rated 50 kV or below) and any part of the equipment. Use 3-point contact when mounting/dismounting any equipment that requires personnel to climb. Walk-down work area prior to equipment operation. Clean tracks to provide safe walking/working surface and avoid walking on tracks whenever possible. Avoid walking on machine tracks whenever possible and clean tracks for safe walking/working surfaces. Isolate equipment swing and turn radius. Prohibit equipment operation when there is heavy fog with limited visibility. Restrict entry to the work area to authorized personnel. Utilize a dedicated spotter when necessary especially during backing and when view is obstructed. Understand and review the posted hand signals. Wear hearing protection during operation of open-cab equipment for elevated noise levels.

ACTIVITY HAZARD ANALYSIS 16	
JOB TASK: Restore Vegetation (topsoil, trees, seed)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Heavy/Hauling Equipment Operation - injury to ground personnel	Ground personnel shall not approach operating equipment (within 25 feet) without prior hand/eye/radio contact and permission from the operator of the equipment. Stop movement of equipment and lower booms/buckets when approached by ground personnel. Do not pass under overhead loads. Ensure dedicated spotters are readily and easily identifiable visually (e.g., orange hardhat or equivalent means). Approach operating equipment from front (in line of operator's vision) to get operator's attention while at a safe distance. Maintain a minimum 25 feet safe distance from operating equipment. Remain outside equipment swing and turn radius. Use caution when standing next to idle equipment. Avoid positioning between fixed objects and operating equipment and equipment pinch points. Maintain 25 feet upwind position during loading and dumping operations. Stay alert of equipment operation and listen for back-up alarms. Wear high visibility vest/shirt when required to work in close proximity to operating equipment. Wear high visibility vest/shirt with reflective material (stripe or panel) during work activities performed after daylight hours.
Heavy/Hauling Equipment Operation - vehicle traffic	Look in the direction of travel before backing up. Arrange traffic flow to prevent foot traffic from crossing the routes of heavy/hauling equipment and moving loads. Adhere to posted speed limits. Use reflective warning vests when exposed to vehicle traffic. Reroute traffic as necessary to minimize potential for an accident. Utilize dedicated flaggers when necessary at site roadway crossings. Set-up signs, traffic cones and/or barricades to define and protect the project area from the non project-related vehicle traffic.

ACTIVITY HAZARD ANALYSIS 16	
JOB TASK: Restore Vegetation (topsoil, trees, seed)	
PERSONAL PROTECTIVE EQUIPMENT: Level D (Modified)	
HAZARD	**CONTROL MEASURES**
Noise Exposure – heavy equipment (mobile and stationary) operation	Institute engineering controls (when feasible) to reduce noise levels (e.g., use of sound-absorbing materials, tighten up loose parts, maintain equipment, etc.). Institute administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.). Wear appropriate hearing protection. Brief personnel on the proper use/care of hearing protection. Identify equipment and areas having noise levels ≥ 85 dBA with hearing protection postings. Evaluate and document noise exposure conditions.
Hydro Seeder Operation	Use only properly trained and qualified personnel. Operate equipment in strict accordance with manufacturer's requirement. Adhere to manufacturer application requirements. Wear goggles and/or face shield on windy days. Implement fall arrest equipment (full-body harness and lanyard) as a positioning system for operator if the deck presents a fall hazards of ≥ 6 feet; the cannon operator may slip off the deck; or if the operator is to remain on the deck while the hydroseeder is in motion. Remain upwind during application. Perform pre-job walk-down of the work area to identify/plan for the appropriate protection for working on steep slopes or inclines.
Fertilizer/Amendment Exposure (inhalation and contact) - restoration	Obtain and review MSDS for all fertilizers and soil amendments used during restoration. Provide adequate dust control to prevent visible emissions. Provide and ensure that personnel use washing facilities, and emphasize personal hygiene such as washing their hands and face after work and before eating to minimize their exposure.

APPENDIX C

STANDARD OPERATING PROCEDURES

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Health/Safety Forms and Federal Labor Law Posters**	**Document No.**	**HS-Corp-3**
Date of Issue:	**December 2009**	**Revision No.**	**9**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**
	Todd M. Valli, Corporate H&S Director		**Jackie Doan, Corporate QA Director**

HEALTH/SAFETY FORMS AND FEDERAL LABOR LAW POSTERS

This document consolidates the most pertinent health and safety forms to assist field personnel in fulfilling recordkeeping requirements at EQ project sites. These forms must be thoroughly and legibly completed. Copies of these forms must be maintained with project records for the duration of the project. Completed forms shall be appropriately archived with the project files upon project completion. Electronic copies of these forms are located on the server under N:\Forms\Forms\Safety Health.

In addition, current federal labor law posters are included to assist field personnel in meeting federal notification and posting requirements should the customized all-in-one federal poster not be readily available for posting. These federal labor law posters must be conspicuously displayed in a location where it is customary to place notices for employees.

1. Supervisor's Injury/Illness Report
2. Employee's Injury/Illness Report
3. Injury/Illness Report – Witness Statement
4. Vehicle Accident Report
5. General Liability, Property Damage, and Loss Report
6. Personnel Training/Medical Monitoring Log
7. Training/Meeting Record
8. Tailgate Safety Meeting
9. Heat Stress Physiological Monitoring Log
10. Sampling Equipment Calibration Log
11. Real Time Monitoring Log
12. Hot Work Permit
13. Confined Space Entry Permit
14. Respiratory Protection Fit Test Record
15. U.S. Department of Labor Posters

Environmental Quality Management, Inc.
Supervisor's Injury/Illness Report

- ☞ Complete Sections 1-6 and submit to Corporate Health and Safety within 48 hours of the injury/illness.
- ☞ Complete electronic form or print legibly.
- ☞ Complete every item and insert N/A for those that do not apply.
- ☞ Complete a separate report for each injured/ill person.

Section 1 – Injured/Ill Worker Information

NAME *(last, first, MI)*:		**AGE:**	**GENDER** *(M/F)*:
SOCIAL SECURITY NUMBER *(last 4 digits)*:	**EQ ID NUMBER** *(4 digit)*:	**EMPLOYEE TYPE:** ☐ FULL-TIME ☐ PART-TIME ☐ TEMPORARY	**HIRE DATE** *(mm/dd/yyyy)*:
EMPLOYER:		**JOB TITLE/CLASSIFICATION:**	
HOME ADDRESS *(number and street, city, state, zip)*:		**HOME PHONE** *(include area code)*:	
SUPERVISOR NAME *(last, first, MI)*:			

Section 2 - Incident Information

INCIDENT DATE *(mm/dd/yyyy)*:	**INCIDENT TIME** *(military)*:	**TIME REPORTED** *(military)*:	**SHIFT START/END TIME** *(military)*:
INCIDENT REPORTED TO *(last, first)*:			
EQ PROJECT NAME:		**EQ PROJECT NUMBER:**	
PROJECT ADDRESS *(number and street, city, state, zip)*:			
EXACT LOCATION OF INCIDENT:			
ACTIVITY AT TIME OF INCIDENT:			
BODY PART(S) AFFECTED:	**NATURE OF INJURY/ILLNESS** (*e.g., strain, laceration, dislocation, heat stress, burn, bite*):		
SOURCE OF INJURY/ILLNESS (*specific object or substance*):			
DESCRIPTION OF INJURY/ILLNESS (*describe in detail the events leading to cause of injury/illness*):			

Training:

EMPLOYEE TRAINED TO PERFORM ACTIVITY/TASK? ☐ YES ☐ NO	**TYPE OF TRAINING:**

Casual Factor(s):

	YES	NO		YES	NO
DESIGN - Was design of tools, equipment, worksite a factor?	☐	☐	**ENVIRONMENTAL FACTORS** – Did heat, cold, rain, snow, ice, fog, sun glare, lightning, dust, etc. contribute to the incident?	☐	☐
INSPECTION/MAINTENANCE – Did inadequate or improperly maintained tools, equipment or worksite create or worsen the hazard?	☐	☐	**CHEMICAL AND PHYSICAL AGENT FACTORS** – Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents such as noise, radiation, etc. contribute to incident?	☐	☐
PERSON'S PHYSICAL CONDITION – In your opinion was the physical condition of the person or overexertion a factor?	☐	☐	**OFFICE FACTORS** – Did office setting such as lifting furniture, carrying, stooping, etc. contribute to incident?	☐	☐

Casual Factor(s) continued:

OPERATING PROCEDURES – Did the lack of or inadequacy within established Work Plans, HASPs, SSHPs, SOPs, etc. contribute to incident?	☐	☐	**SUPPORT FACTORS** – Were inappropriate tools, equipment and/or personnel resources provided to properly perform activity/task?	☐	☐
JOB PRACTICES – Were any job health/safety practices not followed when incident occurred?	☐	☐	**PERSONAL PROTECTIVE EQUIPMENT** – Did the improper selection, use or maintenance of personal protective equipment contribute to incident?	☐	☐
HUMAN FACTORS – Did the task require reach, strength, endurance, agility, etc. at or beyond the capabilities of the employee?	☐	☐	**DRUGS/ALCOHOL** – In your opinion did drugs (prescription, OTC, illicit) or alcohol contribute to incident?	☐	☐

DIRECT CAUSE ***(single factor which most directly lead to injury/illness)*:**

INDIRECT CAUSE(S) ***(factors which contributed to but did not directly initiate injury/illness)*:**

FIRST-AID PROVIDER ***(last, first, MI)*** **AND EMPLOYER:**	**BLOOD-BORNE PATHOGEN EXPOSURE:** ☐ **YES** ☐ **NO**	**IF YES, NAME** ***(last, first, MI)*:**

Section 3 - Witness Information (*include statements*)

WITNESS #1: NAME ***(last, first, MI)*:**	**JOB TITLE/DESCRIPTION:**
EMPLOYER:	**SUPERVISOR NAME** ***(last, first, MI)*:**
WITNESS #2: NAME ***(last, first, MI)*:**	**JOB TITLE/DESCRIPTION:**
EMPLOYER:	**SUPERVISOR NAME** ***(last, first, MI)*:**

ADDITIONAL WITNESSES ***(List additional witnesses and details on a separate sheet and attach.)*:** ☐ **YES** ☐ **NO**

Section 4 - Corrective Actions

CORRECTIVE ACTION(S) TAKEN/ANTICIPATED/RECOMMENDED TO PREVENT RE-OCCURRENCE:

CA BEGIN DATE ***(mm/dd/yyyy)*:**	**CA COMPLETION DATE** ***(mm/dd/yyyy)*:**

Section 5 - Report Preparer

NAME ***(last, first, MI)*:**	**SIGNATURE:**	
JOB TITLE:	**EMPLOYER:**	**DATE OF REPORT** ***(mm/dd/yyyy)*:**

Section 6 - Management Review

☐ **ACCEPTED** ☐ **ACTION REQUIRED** (***provide detail***) ☐ **PROGRAM IMPROVEMENTS REQUIRED** (***provide detail***)

REQUIRED ACTION/IMPROVEMENTS:

NAME ***(last, first, MI)*:**	**SIGNATURE:**
JOB TITLE:	**DATE** ***(mm/dd/yyyy)*:**

Section 7 - Corporate Health & Safety Review

☐ **CONCUR** ☐ **NON CONCUR**

ADDITIONAL ACTIONS/COMMENTS:

OSHA Classification:

☐ **INCIDENT ONLY** ☐ **FIRST AID** ☐ **REMAINED AT WORK** (***Restriction/Transfer***) ☐ **REMAINED AT WORK** (***Other***) ☐ **DAYS AWAY FROM WORK** ☐ **DEATH**

NAME ***(last, first, MI)*:**	**SIGNATURE:**
JOB TITLE:	**DATE** ***(mm/dd/yyyy)*:**

Environmental Quality Management, Inc.
Employee's Injury/Illness Report

- ☞ Complete and submit with Supervisor's Injury/Illness Report to Corporate Health and Safety.
- ☞ Complete electronic form or print legibly.

Section 1 – Injured/Ill Worker Information			
NAME ***(last, first, MI)*****:**		**AGE:**	**GENDER** ***(M/F)*****:**
SOCIAL SECURITY NUMBER ***(last 4 digits)*****:**	**EQ ID NUMBER** ***(4 digit)*****:**	**HIRE DATE** ***(mm/dd/yyyy)*****:**	
EMPLOYER:	**JOB TITLE/CLASSIFICATION:**		
HOME ADDRESS ***(number and street, city, state, zip)*****:**		**HOME PHONE** ***(include area code)*****:**	
SUPERVISOR NAME ***(last, first, MI)*****:**			

Section 2 - Incident Information			
INCIDENT DATE ***(mm/dd/yyyy)*****:**	**INCIDENT TIME** ***(military)*****:**	**TIME REPORTED** ***(military)*****:**	**SHIFT START/END TIME** ***(military)*****:**
BODY PART(S) AFFECTED:	**NATURE OF INJURY/ILLNESS (*e.g., strain, laceration, dislocation, heat stress, burn, bite*):**		
DESCRIPTION OF INJURY/ILLNESS (*describe in detail the events leading to cause of injury/illness*):			
HOW COULD INJURY/ILLNESS BEEN PREVENTED?			
SIGNATURE:	**DATE** ***(mm/dd/yyyy)*****:**		

Environmental Quality Management, Inc.
Injury/Illness Report – Witness Statement

- ☞ Complete and submit with Supervisor's Injury/Illness Report to Corporate Health and Safety.
- ☞ Complete electronic form or print legibly.

Witness Statement		
NAME ***(last, first, MI)*****:**	**SOCIAL SECURITY NUMBER** ***(last 4 digits)*****:**	**EQ ID NUMBER** ***(4 digit)*****:**
EMPLOYER:	**JOB TITLE/CLASSIFICATION:**	
ACCOUNT OF INJURY/ILLNESS (describe in detail the events leading to cause of injury/illness):		

EQ Vehicle Accident Report

Claim Number (office use only)	File date (office use only)
Date of Accident	Location

If you're in an accident . . .

1. **Call Police if:**
   - A person is injured.
   - There is more than $1,000 damage to the vehicle(s).
   - Your vehicle has been vandalized or subject to a hit and run or theft.
   - The other driver is uninsured or driving with a suspended license.
   - The other driver is impaired.
2. **Photo Document if applicable.**
3. **Call *EQ* at 1-800-229-7495 to report your accident to Todd Valli or John Mullane**
4. **Send a copy of this form to *EQ* (with pictures)**
   Mail: 1800 Carillon Blvd Cincinnati, OH 45240 Attn: T. Valli
   Fax: 513-825-7495
   Email: tvalli@eqm.com

A. Organization

EQ Division/Organization/Branch/Contractor		Report Prep. Name (if different than EQ Driver)
Address		
Phone	Fax	E-mail

B. EQ Vehicle

EQ OH Number	License Plate Number	Make/Model

C. Driver

Name	Driver's License Number	Driver's License Expiration Date	
Day Phone	Evening Phone	Fax	E-mail

D. Occupants – Total Number of Occupants: ____ *(not including driver)*

(Please attach a separate sheet if more than one occupant was involved)

Name	Address		
Day Phone	Evening Phone	Fax	E-mail

E. Other Vehicles and Drivers – Total Number of Vehicles Involved: ____ *(including your EQ vehicle)*

(Please attach a separate sheet if more than two vehicles were involved)

License Plate Number	State of Plate	License Expiration Date	
Name of Insurance Company	Policy Number	Name of Agent and Address	
Year and Make	Model (Body Type: Sedan, Mini Van, etc.)		
Driver's Name	Driver's License Number	Driver's License Expiration Date	
Address			
Day Phone	Evening Phone	Fax	E-mail
Vehicle Owner's Name (if not Driver)	Address		
Day Phone	Evening Phone	Fax	E-mail

F. The Accident

Date	Time (AM/PM)	Location	At the time of the accident was the vehicle being used for: ☐ Business ☐ Personal use
Light Conditions (Dawn, Day, Dusk, Dark)	Weather at Time of Accident	Type of Road Surface	Road Condition

Name of Witnesses (other than occupants)	Witness Phone	Witness Address
Had You Consumed any Alcohol? ☐ Yes ☐ No	If so, How Much	When
Did the Other Driver Appear to Have Been Drinking or Under the Influence? ☐ Yes ☐ No	Give any Details	

Direction of Vehicle	On What Road?	What Side of Road?	Speed
Direction of Other Vehicle	On What Road?	What Side of Road?	Speed
What Traffic Signals Were Present?			

Did you Give A Warning Signal? ☐ Yes ☐ No	What Kind?	Which Lights Did You Have On (if any)?
Did the Other Driver Give A Warning Signal? ☐ Yes ☐ No	What Kind?	Did the Other Driver Have their Headlights On? ☐ Yes ☐ No
Has the Accident been Reported to Police? ☐ Yes ☐ No	Did Police Attend the Scene of the Accident? ☐ Yes ☐ No	Name of Police Force
Police Officer's Name	Police Phone	Police File Number
Have the Police Charged Anyone? ☐ Yes ☐ No	Name of Person Charged	Nature of Charge

G. Injuries and Damage *(please attach a separate sheet if you require more room.)*

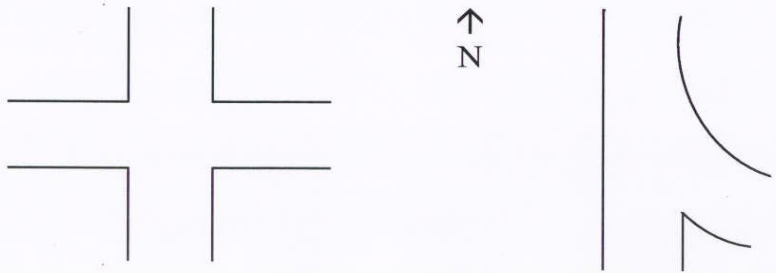
Nature of Damage to other Vehicles
Nature of Injuries to Drivers or Occupants
Nature of Damage to Unit

H. Driver's Detailed Description of How Accident, Loss or Mechanical Damage Occurred

Who Do You Think Was to Blame?	Why?
Driver Signature	Date

If helpful, illustrate the accident at right. Be sure to note:

- The name of all streets,
- Course of all cars involved, and
- Position of vehicles at instant of accident.



EQ, Inc.

1800 Carillon Blvd., Cincinnati, Ohio 45240
Phone: 1-800-229-7495 Fax: 513-825-7495

GENERAL LIABILITY, PROPERTY DAMAGE, AND LOSS REPORT

Date Claim Submitted

Agent

Division/Subsidiary _____ Date __/__/

Address

How Did Damage or Loss Occur: _____

Description of Damage or Loss: _____

Identification of Damaged or Lost Property: _____

Location of Damaged or Lost Property (Before Loss): _____

Date and Time of Damage or Loss: Date ___/___/___ Time _____ AM / PM

Owner of Damaged or Lost Property:

Name _____ Phone No. _____
Address _____ City _____
Employer _____

Injured Parties (Complete also a Supervisors Employee Injury Report if an EQ Employee):

1. Name _____ Phone No. _____
   Address _____ City _____
   Employer _____
   Nature of Injury _____
2. Name _____ Phone No. _____
   Address _____ City _____
   Employer _____
   Nature of Injury _____

Witnesses:

1. Name _____ Phone No. _____
   Address _____ City _____
   Employer _____
2. Name _____ Phone No. _____
   Address _____ City _____
   Employer _____

Were Pictures Taken? ☐ Yes ☐ No

Were Police Notified? ☐ Yes ☐ No Dept. _____

Completed By: _____ _____ Date __/__/
Name Printed Signature

Manager _____ Date __/__/
Signature

USE BACK SIDE IF NECESSARY

PERSONNEL TRAINING* / MEDICAL MONITORING LOG

Name	Representing	Medical Exam Date	40 Hr. Hazwop. Date	8 Hr. Refresh. Date	8 Hr. Super. Date	H&S Plan Review Date	Respir. Fit Test	First Aid/CPR Date	Other:

* Include copies of all training certificates.

EQ TRAINING/MEETING RECORD

Location/Site: _____ Project No.: _____

Date: ____/____/____ Time: _____ am/pm to _____ am/pm

Instructor(s): _____ _____
(Print Name) (Signature) (Print Name) (Signature)

Type of meeting (Circle all that apply):

Project	Departmental	Audio/Visual	O.J.T.
Staff	Safety	Classroom	Other: _____

Subject/Program: _____

Handout(s): _____

Proceedings: _____

_____

_____

_____

ATTENDANCE ROSTER

I have received instruction/participated in the subject/program as described above and have had the opportunity to ask questions and receive answers on the contents of the program. I understand the training I have received and agree to abide by the standards presented therein. I also acknowledge receipt of any handout materials described above.

EMPLOYEE SIGNATURE	EMPLOYEE NAME (print)	REPRESENTINGS/SS NO.
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Project No.: _____ Date: _____/_____/_____

ATTENDANCE ROSTER CONTINUED

I have received instruction/participated in the subject/program as described above and have had the opportunity to ask questions and receive answers on the contents of the program. I understand the training I have received and agree to abide by the standards presented therein. I also acknowledge receipt of any handout materials described above.

EMPLOYEE SIGNATURE	EMPLOYEE NAME (print)	REPRESENTINGS/SS NO.
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
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33.		
34.		
35.		

Side 2

EQ TAILGATE SAFETY MEETING

Date _____ Time _____ Job Number _____

Customer _____ Address _____

Specific Location _____

Type of Work _____

Chemicals Used _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

_____

Chemical Hazards _____

_____

Physical Hazards _____

_____

Emergency Procedures _____

_____

Hospital / Clinic _____ Phone ( ) _____ Paramedic Phone ( ) _____

Hospital Address _____

Special Equipment _____

_____

Other _____

ATTENDEES

Name Printed	Signature

Meeting conducted by _____ _____

NAME PRINTED SIGNATURE

SUPERVISOR _____ MANAGER _____

EQ HEAT STRESS PHYSIOLOGICAL MONITORING LOG

Site: _____ Date: _____ Safety Representative: _____

Ambient Conditions: _____ Start work area temp: _____ Stop work area temp: _____

NAME	REPRESENTING	AGE	MEDICAL NOTES	TIME IN	ORAL TEMP	HEART RATE	BODY WGT.	TIME OUT	ORAL TEMP	HEART RATE	BODY WGT.

Notation/Comments: _____

_____

_____

EQ SAMPLING EQUIPMENT CALIBRATION LOG

Site Name: _____ Project No.: _____

DATE/TIME	INSTRUMENT (Mfg./Model)	CALIBRATED BY	STANDARD (concent.-units)	METER READING	COMMENTS/ AMBIENT CONDITIONS

Page ____ of ____

EQ REAL TIME MONITORING LOG

Site Name: _____ Project No.: _____

DATE/TIME	SAMPLING LOCATION	INSTRUMENT (Mfg./Model)	MEASURED AGENT	RESULTS ( )	SAMPLED BY	COMMENTS/ ACTIVITIES

No. _____

EQ HOT WORK PERMIT

This permit must be completed and authorized prior to commencing hot work in any area not specifically designated for hot work. This permit must be displayed in the permitted work area while hot work is performed and is void 30 minutes after work ceases or at shift's end, whichever comes first. Once this permit has expired, it must be returned to the Safety Representative or Safety Files.

Permit issued to: _____ Start time: _____ AM/PM, for this date only: _____ 19 _____

Project site/location: _____

Work to be performed: ___ welding; ___ cutting; ___ grinding; ___ hot equipment operation; describe: _____

PRE-WORK CHECKLIST

	Yes	or N/A
1. Operations/site personnel are informed of work to be performed.		
2. Project personnel are trained/debriefed in work to be performed.		
3. All required PPE (i.e., flame-retardant clothing, tinted eye protection, etc.) Is available (Type: _____).		
4. All necessary portable fire extinguishers are provided (Type: _____).		
5. All existing fire-suppression systems are operable (Type: _____).		
6. A Fire Watch, which will remain for 30 minutes after hot work ends, is established.		
7. Surrounding equipment and operations are safe for hot work.		
8. Manholes, basins, and other floor/wall openings are covered.		
9. Combustible items within 35 feet of hot work area have been removed or are otherwise covered with wetted tarpaulins or fire curtains.		
10. Open vessels or lines within 35 feet of hot work are protected.		
11. All necessary grounding/bonding wire is in place.		
12. Energized utilities are locked and tagged out.		
13. All tanks/lines/valves are disconnected, blanked, or locked out.		
14. Equipment and all attached piping has been cleaned and purged (with: Water, Steam, Inert Gas, or Air).		
15. Flammable dusts, vapors, liquids, and residues have been removed.		
16. Flammable gases ≥10% of LEL have been purged.		
17. All requirements for Confined Space Entry have been met.		

Completed by: _____ Date: _____

ATMOSPHERIC TESTING RESULTS

Testing frequency: initial and _____ continuous, or _____ periodic (every _____ min.); ____ Atmospheric testing is not required.

Exact Test Location:	Time	% LEL	% Oxygen	Others		Tester's Initials

(Space is provided on the back of this form for additional results)

Special Instructions: _____

Local Emergency Response/Fire Department Phone Number: _____

Work Area Inspected and Permit Issued by: _____ Date: _____
(Signature)

Safety Rep Authorization: _____ Date: _____
(Signature)

Page 1 of 2

ATMOSPHERIC TESTING RESULTS (CONTINUED)

Exact Test Location:	Time	% LEL	% Oxygen	Others		Tester's Initials

Page 2 of 2

CONFINED SPACE ENTRY PERMIT

Date Valid: _____ From: _____ A.M./P.M. To: _____ A.M./P.M. Permit No.: _____

Confined Space Description: _____

_____

Purpose of Entry: _____

_____

Hazards: _____

Authorized Entrants: _____

Attendant: _____ Fire Watch (Hot Work): _____

PRE-ENTRY ATMOSPHERIC TESTING

		PEL	Reading	Time	Intervals
1.	Oxygen	19.5% - 22.0%			
2.	Flammability	≤ 10% LEL			
3.	Carbon Monoxide	25 ppm			
4.					
5.					
6.					

ACCEPTABLE ENTRY CONDITIONS

	Lock & Tag		Ventilation		ISOLATION/LOCKOUT
	Lighting		Communications		Water
	Barricades		Fire Extinguisher		Electrical
	Posting		Emergency Plan		Mechanical
	Pre-Entry Briefing		Other*		Hydraulic
					Other*

*Specify: _____

SAFETY EQUIPMENT

Respirators		Clothing		Other	
	SCBA		Hard Hat		Overall*		Life Line
	Airline/Egress		Safety Shoes		Chem. Suit*		& Harness
	Egress Only		Safety Glasses		Gloves*		Tripod
	APR		Goggles		Overboots		& Pulley
	Other*		Ear Plugs		Other*		Wristlets

*Specify: _____

RESCUE & EMERGENCY SERVICES

Type of Emergency/Rescue Team required: On-site _____ Off-site _____ Phone _____

CONTRACTOR NOTIFICATION: Permit Conditions _____ Potential Hazards _____

PERMIT AUTHORIZATION/CANCELLATION

I certify that I have inspected the work area for safety and reviewed all safety precautions recorded on this permit.

Entry Supervisor: _____ Signature: _____ Date: _____

I certify that this permit is no longer valid and shall not be utilized for further entry procedures.

Entry Supervisor: _____ Signature: _____ Date: _____

Reason: _____

_____

EQ RESPIRATORY PROTECTION FIT TEST RECORD

Employee Name: _____ SS#: _____ Job: _____

Fit test conducted by: _____ Date: _____

Frequency of respiratory protection use: _____ daily basis _____ occasionally _____ rarely

Employee has received appropriate respiratory protection training: _____ yes _____ no

Conditions which could affect respirator fit:

_____ razor stubble _____ side burns _____ dentures absent

_____ beard _____ facial scar _____ other (specify:) _____

mustache glasses none

Respirator (s) selected:

1. Manufacturer: _____

Model _____

Size ____ SM ____ MD ____ LG ____ XL ____ NA

Face ____ 1/4 ____ 1/2 ____ Full ____ Hood

Air _____ purifying (power) _____ supplied

_____ purifying (non-power)

Comments _____

2. Manufacturer: _____

Model _____

Size ____ SM ____ MD ____ LG ____ XL ____ NA

Face ____ 1/4 ____ 1/2 ____ Full ____ Hood

Air _____ purifying (power) _____ supplied

_____ purifying (non-power)

Comments _____

Fit checks:

Negative Pressure : _____ pass _____ fail _____ NA

Positive Pressure: _____ pass _____ fail _____ NA

Fit test:

Quantitative: Fit Factor _____

Qualitative (Isoamyl Acetate) _____ pass _____ fail _____ NA

Qualitative (Stannic Oxychloride) _____ pass _____ fail _____ NA

Comments: _____

_____

Acknowledgment of test results:

_____

(Employee's Signature) (Date)

_____

(Test Conductor's Signature) (Date)

Note: The results of this test indicate the performance of the listed respiratory protective device(s) as fitted on the employee under controlled conditions. The device may not provide adequate protection under other conditions. Consult your safety professional if there are questions. Improper use, maintenance, or application may reduce or eliminate protection.

NA - Not Applicable

Job Safety and Health

It's the law!

OSHA
Occupational Safety and Health Administration
U.S. Department of Labor

EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

This free poster available from OSHA –
The Best Resource for Safety and Health

Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA
www.osha.gov

OSHA 3165-12-06R

EMPLOYEE RIGHTS

UNDER THE FAIR LABOR STANDARDS ACT

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

FEDERAL MINIMUM WAGE

$7.25 PER HOUR

BEGINNING JULY 24, 2009

OVERTIME PAY At least 1½ times your regular rate of pay for all hours worked over 40 in a workweek.

CHILD LABOR An employee must be at least **16** years old to work in most non-farm jobs and at least 18 to work in non-farm jobs declared hazardous by the Secretary of Labor.

Youths **14** and **15** years old may work outside school hours in various non-manufacturing, non-mining, non-hazardous jobs under the following conditions:

No more than
- **3** hours on a school day or **18** hours in a school week;
- **8** hours on a non-school day or **40** hours in a non-school week.

Also, work may not begin before **7 a.m.** or end after **7 p.m.**, except from June 1 through Labor Day, when evening hours are extended to **9 p.m.** Different rules apply in agricultural employment.

TIP CREDIT Employers of "tipped employees" must pay a cash wage of at least $2.13 per hour if they claim a tip credit against their minimum wage obligation. If an employee's tips combined with the employer's cash wage of at least $2.13 per hour do not equal the minimum hourly wage, the employer must make up the difference. Certain other conditions must also be met.

ENFORCEMENT The Department of Labor may recover back wages either administratively or through court action, for the employees that have been underpaid in violation of the law. Violations may result in civil or criminal action.

Employers may be assessed civil money penalties of up to $1,100 for each willful or repeated violation of the minimum wage or overtime pay provisions of the law and up to $11,000 for each employee who is the subject of a violation of the Act's child labor provisions. In addition, a civil money penalty of up to $50,000 may be assessed for each child labor violation that causes the death or serious injury of any minor employee, and such assessments may be doubled, up to $100,000, when the violations are determined to be willful or repeated. The law also prohibits discriminating against or discharging workers who file a complaint or participate in any proceeding under the Act.

ADDITIONAL INFORMATION
- Certain occupations and establishments are exempt from the minimum wage and/or overtime pay provisions.
- Special provisions apply to workers in American Samoa and the Commonwealth of the Northern Mariana Islands.
- Some state laws provide greater employee protections; employers must comply with both.
- The law requires employers to display this poster where employees can readily see it.
- Employees under 20 years of age may be paid $4.25 per hour during their first 90 consecutive calendar days of employment with an employer.
- Certain full-time students, student learners, apprentices, and workers with disabilities may be paid less than the minimum wage under special certificates issued by the Department of Labor.

For additional information:

1-866-4-USWAGE

(1-866-487-9243) TTY: 1-877-889-5627

WHD U.S. Wage and Hour Division

WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Wage and Hour Division

WHD Publication 1088 (Revised July 2009)

Your Rights
under the
Family and Medical Leave Act of 1993

FMLA requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons. Employees are eligible if they have worked for their employer for at least one year, and for 1,250 hours over the previous 12 months, and if there are at least 50 employees within 75 miles. The FMLA permits employees to take leave on an intermittent basis or to work a reduced schedule under certain circumstances.

Reasons for Taking Leave:

Unpaid leave must be granted for *any* of the following reasons:

- to care for the employee's child after birth, or placement for adoption or foster care;
- to care for the employee's spouse, son or daughter, or parent who has a serious health condition; or
- for a serious health condition that makes the employee unable to perform the employee's job.

At the employee's or employer's option, certain kinds of *paid* leave may be substituted for unpaid leave.

Advance Notice and Medical Certification:

The employee may be required to provide advance leave notice and medical certification. Taking of leave may be denied if requirements are not met.

- The employee ordinarily must provide 30 days advance notice when the leave is "foreseeable."
- An employer may require medical certification to support a request for leave because of a serious health condition, and may require second or third opinions (at the employer's expense) and a fitness for duty report to return to work.

Job Benefits and Protection:

- For the duration of FMLA leave, the employer must maintain the employee's health coverage under any "group health plan."
- Upon return from FMLA leave, most employees must be restored to their original or equivalent positions with equivalent pay, benefits, and other employment terms.
- The use of FMLA leave cannot result in the loss of any employment benefit that accrued prior to the start of an employee's leave.

Unlawful Acts by Employers:

FMLA makes it unlawful for any employer to:

- interfere with, restrain, or deny the exercise of any right provided under FMLA:
- discharge or discriminate against any person for opposing any practice made unlawful by FMLA or for involvement in any proceeding under or relating to FMLA.

Enforcement:

- The U.S. Department of Labor is authorized to investigate and resolve complaints of violations.
- An eligible employee may bring a civil action against an employer for violations.

FMLA does not affect any Federal or State law prohibiting discrimination, or supersede any State or local law or collective bargaining agreement which provides greater family or medical leave rights.

For Additional Information:

If you have access to the Internet visit our FMLA website: **http://www.dol.gov/esa/whd/fmla**. To locate your nearest Wage-Hour Office, telephone our Wage-Hour toll-free information and help line at 1-866-4USWAGE (1-866-487-9243): a customer service representative is available to assist you with referral information from 8am to 5pm **in your time zone;** or log onto our Home Page at **http://www.wagehour.dol.gov**.

U.S. Department of Labor
Employment Standards Administration
Wage and Hour Division
Washington, D.C. 20210

WH Publication 1420
Revised August 2001

*U.S. GOVERNMENT PRINTING OFFICE 2001-476-344/49051

EMPLOYEE RIGHTS

FOR WORKERS WITH DISABILITIES PAID AT SPECIAL MINIMUM WAGES

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

This establishment has a certificate authorizing the payment of special minimum wages to workers who are disabled for the work they are performing. Authority to pay special minimum wages to workers with disabilities applies to work covered by the ***Fair Labor Standards Act (FLSA), McNamara-O'Hara Service Contract Act (SCA), and/or Walsh-Healey Public Contracts Act (PCA).*** *Such special minimum wages are referred to as "****commensurate wage rates****" and are less than the basic hourly rates stated in an SCA wage determination and less than the FLSA minimum wage of* ***$5.85 per hour beginning July 24, 2007, $6.55 per hour beginning July 24, 2008, and $7.25 per hour beginning July 24, 2009.*** *A "commensurate wage rate" is based on the worker's individual productivity, no matter how limited, in proportion to the wage and productivity of experienced workers who do not have disabilities that impact their productivity when performing essentially the same type, quality, and quantity of work in the geographic area from which the labor force of the community is drawn.*

WORKERS WITH DISABILITIES

For purposes of payment of commensurate wage rates under a certificate, a worker with a disability is defined as:

- An individual whose earnings or productive capacity is impaired by a physical or mental disability, including those related to age or injury, for the work to be performed.
- Disabilities which may affect productive capacity include blindness, mental illness, mental retardation, cerebral palsy, alcoholism, and drug addiction. The following do not ordinarily affect productive capacity for purposes of paying commensurate wage rates: educational disabilities; chronic unemployment; receipt of welfare benefits; nonattendance at school; juvenile delinquency; and correctional parole or probation.

KEY ELEMENTS OF COMMENSURATE WAGE RATES

- **Nondisabled worker standard**—The objective gauge (usually a time study of the production of workers who do not have disabilities that impair their productivity for the job) against which the productivity of a worker with a disability is measured.
- **Prevailing wage rate**—The wage paid to experienced workers who do not have disabilities that impair their productivity for the same or similar work and who are performing such work in the area. Most SCA contracts include a wage determination specifying the prevailing wage rates to be paid for SCA-covered work.
- **Evaluation of the productivity of the worker with a disability**—Documented measurement of the production of the worker with a disability (in terms of quantity and quality).

The wages of all workers paid commensurate wages must be reviewed, and adjusted if appropriate, at periodic intervals. At a minimum, the productivity of hourly-paid workers must be reevaluated at least every six months and a new prevailing wage survey must be conducted at least once every twelve months. In addition, prevailing wages must be reviewed, and adjusted as appropriate, whenever the applicable state or federal minimum wage is increased.

OVERTIME

Generally, if you are performing work subject to the FLSA, SCA, and/or PCA, you must be paid at least 1½ times your regular rate of pay for all hours worked over 40 in a workweek.

YOUTH EMPLOYMENT

Minors younger than **18 years of age** must be employed in accordance with the youth employment provisions of FLSA. No persons under 16 may be employed in manufacturing or on a PCA contract.

FRINGE BENEFITS

Neither the FLSA nor the PCA have provisions requiring vacation, holiday, or sick pay nor other fringe benefits such as health insurance or pension plans. SCA wage determinations may require such fringe benefit payments (or a cash equivalent). **Workers paid under a certificate authorizing commensurate wage rates must receive the full fringe benefits listed on the wage determination.**

WORKER NOTIFICATION

Each worker with a disability and, where appropriate, the parent or guardian of such worker, shall be informed orally and in writing by the employer of the terms of the certificate under which such worker is employed.

PETITION PROCESS

Workers with disabilities paid at special minimum wages may petition the Administrator of the Wage and Hour Division of the Department of Labor for a review of their wage rates by an Administrative Law Judge. No particular form of petition is required, except that it must be signed by the worker with a disability or his or her parent or guardian and should contain the name and address of the employer. Petitions should be mailed to: Administrator, Wage and Hour Division, U.S. Department of Labor, Room S-3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Employers shall display this poster where employees and the parents and guardians of workers with disabilities can readily see it.

For additional information:

1-866-4-USWAGE

(1-866-487-9243) TTY: 1-877-889-5627

U.S. Wage and Hour Division

WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Employment Standards Administration | Wage and Hour Division

U.S. DEPARTMENT OF LABOR

EMPLOYMENT STANDARDS ADMINISTRATION

Wage and Hour Division
Washington, D.C. 20210

NOTICE

EMPLOYEE POLYGRAPH PROTECTION ACT

The Employee Polygraph Protection Act prohibits most private employers from using lie detector tests either for pre-employment screening or during the course of employment.

PROHIBITIONS

Employers are generally prohibited from requiring or requesting any employee or job applicant to take a lie detector test, and from discharging, disciplining, or discriminating against an employee or prospective employee for refusing to take a test or for exercising other rights under the Act.

EXEMPTIONS*

Federal, State and local governments are not affected by the law. Also, the law does not apply to tests given by the Federal Government to certain private individuals engaged in national security-related activities.

The Act permits *polygraph* (a kind of lie detector) tests to be administered in the private sector, subject to restrictions, to certain prospective employees of security service firms (armored car, alarm, and guard), and of pharmaceutical manufacturers, distributors and dispensers.

The Act also permits polygraph testing, subject to restrictions, of certain employees of private firms who are reasonably suspected of involvement in a workplace incident (theft, embezzlement, etc.) that resulted in economic loss to the employer.

EXAMINEE RIGHTS

Where polygraph tests are permitted, they are subject to numerous strict standards concerning the conduct and length of the test. Examinees have a number of specific rights, including the right to a written notice before testing, the right to refuse or discontinue a test, and the right not to have test results disclosed to unauthorized persons.

ENFORCEMENT

The Secretary of Labor may bring court actions to restrain violations and assess civil penalties up to $10,000 against violators. Employees or job applicants may also bring their own court actions.

ADDITIONAL INFORMATION

Additional information may be obtained, and complaints of violations may be filed, at local offices of the Wage and Hour Division. To locate your nearest Wage-Hour office, telephone our toll-free information and help line at 1 - 866 - 4USWAGE (1 - 866 - 487 - 9243). A customer service representative is available to assist you with referral information from 8am to 5 pm in your time zone; or if you have access to the internet, you may log onto our Home page at www.wagehour.dol.gov.

THE LAW REQUIRES EMPLOYERS TO DISPLAY THIS POSTER WHERE EMPLOYEES AND JOB APPLICANTS CAN READILY SEE IT.

**The law does not preempt any provision of any State or local law or any collective bargaining agreement which is more restrictive with respect to lie detector tests.*

U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
Wage and Hour Division
Washington, D.C. 20210

WH Publication 1462

June 2003

YOUR RIGHTS UNDER USERRA

THE UNIFORMED SERVICES EMPLOYMENT AND REEMPLOYMENT RIGHTS ACT

USERRA protects the job rights of individuals who voluntarily or involuntarily leave employment positions to undertake military service or certain types of service in the National Disaster Medical System. USERRA also prohibits employers from discriminating against past and present members of the uniformed services, and applicants to the uniformed services.

REEMPLOYMENT RIGHTS

You have the right to be reemployed in your civilian job if you leave that job to perform service in the uniformed service and:

- ☆ you ensure that your employer receives advance written or verbal notice of your service;
- ☆ you have five years or less of cumulative service in the uniformed services while with that particular employer;
- ☆ you return to work or apply for reemployment in a timely manner after conclusion of service; and
- ☆ you have not been separated from service with a disqualifying discharge or under other than honorable conditions.

If you are eligible to be reemployed, you must be restored to the job and benefits you would have attained if you had not been absent due to military service or, in some cases, a comparable job.

RIGHT TO BE FREE FROM DISCRIMINATION AND RETALIATION

If you:

- ☆ are a past or present member of the uniformed service;
- ☆ have applied for membership in the uniformed service; or
- ☆ are obligated to serve in the uniformed service;

then an employer may not deny you:

- ☆ initial employment;
- ☆ reemployment;
- ☆ retention in employment;
- ☆ promotion; or
- ☆ any benefit of employment

because of this status.

In addition, an employer may not retaliate against anyone assisting in the enforcement of USERRA rights, including testifying or making a statement in connection with a proceeding under USERRA, even if that person has no service connection.

HEALTH INSURANCE PROTECTION

- ☆ If you leave your job to perform military service, you have the right to elect to continue your existing employer-based health plan coverage for you and your dependents for up to 24 months while in the military.
- ☆ Even if you don't elect to continue coverage during your military service, you have the right to be reinstated in your employer's health plan when you are reemployed, generally without any waiting periods or exclusions (e.g., pre-existing condition exclusions) except for service-connected illnesses or injuries.

ENFORCEMENT

- ☆ The U.S. Department of Labor, Veterans Employment and Training Service (VETS) is authorized to investigate and resolve complaints of USERRA violations.
- ☆ For assistance in filing a complaint, or for any other information on USERRA, contact VETS at **1-866-4-USA-DOL** or visit its **website at http://www.dol.gov/vets**. An interactive online USERRA Advisor can be viewed at **http://www.dol.gov/elaws/userra.htm**.
- ☆ If you file a complaint with VETS and VETS is unable to resolve it, you may request that your case be referred to the Department of Justice or the Office of Special Counsel, as applicable, for representation.
- ☆ You may also bypass the VETS process and bring a civil action against an employer for violations of USERRA.

The rights listed here may vary depending on the circumstances. The text of this notice was prepared by VETS, and may be viewed on the internet at this address: http://www.dol.gov/vets/programs/userra/poster.htm. Federal law requires employers to notify employees of their rights under USERRA, and employers may meet this requirement by displaying the text of this notice where they customarily place notices for employees.

U.S. Department of Labor
1-866-487-2365

U.S. Department of Justice

Office of Special Counsel

1-800-336-4590

Publication Date—October 2008

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Hazard Communication Program**	**Document No.**	**HS-Corp-4**
Date of Issue:	**February 2011**	**Revision No.**	**3**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**
	Todd Valli, Corporate H&S Director		**Jackie Doan, Corporate QA Director**

1.0 POLICY

This Hazard Communication Program covers all work operations where employees may be exposed to hazardous chemicals under normal working conditions or during an emergency situation.

It is the policy of Environmental Quality Management, Inc. (EQ) to reduce employee exposure to hazardous chemicals and the overall incidence of chemical-related injuries and illnesses. All employees who are potentially exposed to hazardous chemicals in their assigned jobs must be fully informed of both the hazardous properties of the chemicals and the protective measures that are available to minimize exposure to these chemicals. This type of information will be made available to employees by means of labels on chemical containers, material safety data sheets, and training. Employees will be informed of any known hazards associated with chemicals to which they may be exposed before their initial assignment, whenever the hazards change, or when new hazardous chemicals are introduced into their respective work areas.

2.0 OVERVIEW

This document represents EQ's Hazard Communication Program in compliance with the OSHA Hazard Communication Standards (29 CFR 1910.1200 and 29 CFR 1926.59). The purpose of this Hazard Communication Program is to inform workers about hazardous chemicals encountered in the workplace so that they may use, handle, store, and dispose of them safely and comply with the OSHA Hazard Communication Standard requirements.

EQ employees encounter hazardous materials and wastes as part of the consulting, engineering, construction and remediation work performed. EQ understands the importance of educating employees regarding the nature of potential risks and protective equipment that must be used to prevent exposure. An informed employee is expected to act and operate with a high regard for safety.

3.0 RELATED DOCUMENTS

For further information on the requirements of the OSHA Hazard Communication Standard, refer to:

- 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances.
- 29 CFR 1910.1200, Hazard Communication.
- 29 CFR 1926, Subpart Z, Toxic and Hazardous Substances.
- 29 CFR 1926.59, Hazard Communication.

4.0 DEFINITIONS

Article – A manufactured item that may contain a hazardous substance, but will not release any hazardous chemicals when used as intended per 29 CFR 1910.1200 and 29 CFR 1926.59.

Chemical – An element, compound, or mixture of elements and/or compounds.

Hazardous Chemical – Any pure chemical, chemical mixture, or product which is a physical hazard and/or a health hazard. Such chemicals may cause injury or death if inhaled, ingested, or absorbed by personnel near the substance.

NOTE: The following are specifically excluded from the OSHA Hazard Communication Standard:

- Hazardous waste, as defined in 40 CFR 260 (RCRA).
- Hazardous substances, as defined by CERCLA when that substance is the focus of remedial or removal action when conducted under CERCLA.
- Tobacco or tobacco products.
- Wood or wood products.
- Articles that will not release a hazardous chemical under normal conditions of use.
- Foods, drugs, or cosmetics for personal use.
- Consumer products (when used in the workplace in the same manner as normal consumer use, and duration or frequency of exposure is not greater than encountered in the general public.
- Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard.
- Ionizing and non-ionizing radiation.
- Biological hazards.

Health Hazard – A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term Health Hazard includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins,

neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.

Material Safety Data Sheet (MSDS) – A written description of a hazardous chemical or chemical product which contains comprehensive technical information about a particular substance and explains the risks, precautions, and remedies to exposure related to hazardous chemicals.

Physical Hazard – A chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.

5.0 RESPONSIBILITIES

5.1 Project Manager / Response Manager / Site Manager

The Project Manager / Response Manager / Site Manager (PM/RM/SM) is responsible for:

- Maintaining a copy of the Hazard Communication Program and implementing the requirements of the program.
- Ensuring current MSDSs for hazardous chemicals employees are using or potentially exposed to are readily available to all employees at the field site.
- Providing training to employees regarding the specific hazards of the chemicals in use at the field site.
- Ensuring any client, contractor, and subcontractor representatives are made aware of the chemicals that are in use by EQ or its subcontractors.
- Coordinating the transfer of chemical lists, chemical hazards, etc., between EQ, the EQ client, contractors, and subcontractors to ensure the chemical safety of all persons on site.

5.2 Corporate Health and Safety Director

The Corporate Health and Safety Director is responsible for:

- Administering the Hazard Communication Program.
- Maintaining the written Hazard Communication Program.
- Establishing general hazard communication training requirements for new employees, and maintaining records of hazard communication training through the EQ training management system.
- Developing, revising, and implementing a hazard communication training program that covers the typical chemical hazards an EQ employee may encounter in his/her work.
- Assisting (when requested) in coordinating appropriate responses to all inquiries by employees regarding use and/or potential exposure to hazardous chemicals.

5.3 All Employees

All employees will adhere to the following minimum requirements:

- Adhere to all client and EQ hazardous chemical requirements at the EQ work site.
- Use hazardous chemicals for intended use following all label and MSDS precautions and in accordance with all site-specific requirements.
- Store hazardous chemicals only with other chemicals with which they are compatible, and away from food items and smoking materials.
- Prior to using hazardous chemicals, refer to container labels or MSDSs, or contact the PM/RM/SM or Corporate Health and Safety Director or their designee if additional information on a hazardous chemical is needed.
- Refuse to work with hazardous chemicals until having reviewed the MSDS and/or container label and resolved any health and safety questions with the PM/RM/SM or Corporate Health and Safety Director or their designee.

Employees who do not comply with the provisions of this program will be disciplined in accordance with our company policy of progressive discipline.

6.0 PROGRAM ELEMENTS

A copy of this written Hazard Communication Program will be available at all field sites where hazardous chemicals are in use. This written Hazard Communication Program will be implemented by the PM/RM/SM (or designee) at all field sites when required. This document will be available upon request to all employees and regulatory agencies.

6.1 Hazardous Chemical List

To comply with 29 CFR 1910.1200, EQ will maintain a list of all hazardous chemicals on site at each of its office locations. The list will generally include the chemical or common name of the chemical or chemical mixture, the manufacturer, and the approximate quantity on site at any given time. The list will serve as an inventory of every hazardous chemical requiring an MSDS. Additional information on each chemical or chemical mixture may be obtained from the MSDS.

To comply with 29 CFR 1926.59, EQ and each team subcontractor will separately maintain a list of all hazardous chemicals brought on site and utilized by EQ and each subcontractor during field activities. The list will generally include the chemical or common name of the chemical or chemical mixture, the manufacturer, and the approximate quantity on site at any given time. The list will serve as an inventory of every hazardous chemical requiring an MSDS. Additional information on each chemical or chemical mixture may be obtained from the MSDS.

6.2 Material Safety Data Sheets

To comply with 29 CFR 1910.1200, EQ will maintain MSDSs for all hazardous chemicals utilized by EQ at each of its office locations. To comply with 29 CFR 1926.59, EQ and each team subcontractor will separately maintain MSDSs for all hazardous chemicals utilized by EQ and its team subcontractors during field activities. MSDSs for those hazardous chemicals brought on site will be obtained and available to all EQ employees and subcontracted employees for review during the work shift.

The MSDSs are to contain the following information at a minimum:

- Manufacturer/vendor name, address, phone number.
- Identity of the hazardous chemical used on the label and common name(s).
- Physical and chemical characteristics.
- Physical and health hazards.
- Primary route(s) of entry.
- OSHA Permissible Exposure Limit (PEL) and ACGIH Threshold Limit Value (TLV).
- Carcinogenic listings.
- Safe handling/use precautions.
- Control measures to limit exposure.
- Personal protective equipment.
- Spill/leak clean-up recommendations.
- Emergency and first-aid procedures.

If an MSDS is not available, or an employee has a problem accessing MSDSs, the employee should contact the PM/RM/SM (or designee) for assistance. If the PM/RM/SM (or designee) is not available, the employee should contact the Corporate Health and Safety Director for assistance. The necessary action will be taken to ensure the missing MSDS is provided to the employee requesting it by his or her next work shift at the latest, unless EQ has not received the MSDS from the chemical supplier.

If, in an emergency situation, an employee is transported to a medical facility with an acute chemical exposure, the appropriate MSDS will be sent or made available to the medical facility.

6.3 Labeling

All incoming containers of hazardous chemicals must be labeled with the identity of the contents, appropriate hazard warnings, and manufacturer's (or distributor's) contact information. The PM/RM/SM (or designee) or the subcontractor using the material will inspect all incoming containers received on site to ensure the following:

- Containers are clearly labeled as to the identity of the contents.
- Containers are clearly labeled with the appropriate hazard warning.
- Containers are clearly labeled with the manufacturer's contact information.

Labels by the manufacturer (or distributor) on incoming containers will not be removed. Additional information will be put on the container if the label does not contain the required information.

The PM/RM/SM (or designee) or the team subcontractor using the material will ensure all secondary containers of hazardous chemicals will be labeled with either a copy of the original manufacturer's (or distributor's) label, a Hazardous Materials Identification System (HMIS) compliant in-house label marked with the identity of the contents and the appropriate hazard warning(s), or a National Fire Protection Association (NFPA) compliant in-house label marked with the identity of the contents and the appropriate hazard warning(s).

6.4 Information and Training

6.4.1 Initial Training

Prior to starting work, all employees who work with or are potentially exposed to hazardous chemicals will receive initial training on the Hazard Communication Standard and this Plan. The initial training will be covered by OSHA Hazardous Waste Operations (29 CFR 1910.120) training, OSHA 10- or 30-Hour General Industry Safety and Health training, OSHA 10- or 30-Hour Construction Safety and Health training, and/or in-house Hazard Communication Program training.

EQ employees will be encouraged to identify any topics where they feel additional training or remedial training is needed above and beyond the prescribed levels.

6.4.2 Site-Specific Training

Site-specific training will take place prior to beginning field work. The PM/RM/SM (or designee) will be responsible for training all employees regarding the site-specific hazards using the MSDSs. Training will be individual or in small groups and during normal working hours. The length of training will vary depending on the chemical hazards present.

6.4.3 Periodic Training

Before a new chemical or chemical hazard is introduced, each employee in the affected work area will be given information and training for the new chemical hazard. Retraining will not be required if the new chemical contains hazards similar to previously existing chemicals for which training has already been conducted.

6.4.4 Training Content

Employees who work with, or will be potentially exposed to, hazardous chemicals will receive information and training on the following:

- Overview of the OSHA Hazard Communication Standard.
- Hazardous chemicals present at the site.
- Location and availability of the written Hazard Communication Program.
- Physical and health effects of the hazardous chemicals.
- Methods and observations that may be used to detect the presence or release of a hazardous chemical.
- Methods of preventing or eliminating exposure to hazardous chemicals through use of engineering controls, work practices, and personal protective equipment.
- Emergency procedures to follow if exposed.
- Explanation of how to read labels and review MSDSs to obtain appropriate hazard information.
- Location of hazardous chemicals list and MSDSs.

The information and training may be designed to cover either specific chemicals or categories of hazards (e.g., reactives, flammables, corrosives, carcinogens, etc.). Detailed chemical-specific information will always be available to employees through MSDSs and container labels.

All training will be documented in the EQ training management system.

6.5 Non-Routine Tasks

Periodically, employees may be required to perform non-routine tasks that may result in temporary exposure to hazardous chemicals. Prior to starting work on such tasks, affected employees will be provided information from the PM/RM/SM (or designee) about the hazardous chemicals he or she may encounter during the activity. This information will include, at a minimum, the specific health and physical hazards of the hazardous chemical(s); the methods of preventing or eliminating exposure to hazardous chemicals through use of engineering controls, work practices, and personal protective equipment; the requirements to use the buddy system; and specific emergency procedures.

6.6 Multi-Employer Sites

When hazardous chemicals are used in such a way that the employees of other employer(s) may be exposed, the PM/RM/SM (or designee) will:

- Provide the other on-site employer(s) access to MSDSs for each hazardous chemical the other employer(s)' employees may be exposed to while working.

- Inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the field site's normal operating conditions and in foreseeable emergencies.
- Inform the other employer(s) of the labeling system used on site.

7.0 EQUIPMENT AND RESOURCES

None

8.0 ATTACHMENTS

None

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Hearing Conservation Program**	**Document No.**	**HS-Corp-11**
Date of Issue:	**February 2011**	**Revision No.**	**0**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**
	Todd Valli, Corporate H&S Director		**Jackie Doan, Corporate QA Director**

1.0 POLICY

This Hearing Conservation Program (HCP) covers all operations and work areas where employees and other personnel may be exposed to hazardous noise levels.

It is the policy of Environmental Quality Management, Inc. (EQ) to protect the hearing of all employees exposed to an 8-hour time weighted average (TWA) at or above an Action Level of 85 decibels A-weighted (dBA). In addition, this program applies to all employees working in areas or with equipment that has noise levels at or above 85 dBA. In accordance with this policy, EQ has established an HCP.

2.0 OVERVIEW

This document represents EQ's HCP in compliance with the OSHA Occupational Noise Exposure Standards (29 CFR 1910.95 and 29 CFR 1926.52). The purpose of this HCP is to provide a continuous, effective means for preventing work-related noise-induced hearing loss. This will occur by evaluating potential noise hazards, communicating information concerning these hazards, and establishing appropriate protective measures for employees. The measures that will be utilized to protect employees include engineering and administrative controls, personal protective equipment, and employee training and education. In addition, medical surveillance will provide an indication of the effectiveness of the HCP.

EQ employees encounter elevated noise levels as part of the consulting, engineering, construction, and remediation work performed. EQ understands the importance of educating employees regarding the nature of potential risks and protective equipment that must be used to prevent exposure. An informed employee will act and operate with a high regard for safety.

3.0 RELATED DOCUMENTS

For further information on the requirements of the OSHA Occupational Noise Exposure Standard, refer to:

- 29 CFR 1910.95, Occupational Noise Exposure.
- 29 CFR 1910.1020, Access to Employee Exposure and Medical Records.
- 29 CFR 1926.52, Occupational Noise Exposure.

4.0 DEFINITIONS

ACGIH - American Conference of Governmental Industrial Hygienists.

Action Level - The administrative levels at which noise could become detrimental (hazardous) to personnel and require engineering, administrative, and/or personal protective equipment controls.

- A noise exposure or noise dose at or above 85 dBA for any duration of time.
- Continuous, intermittent, or impact noise levels above 140 dBC.

Audiogram - A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

Audiologist - A professional, specializing in the study and rehabilitation of hearing, who is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

Baseline Audiogram - The audiogram against which future audiograms are compared.

Decibel (dB) - Unit of measurement of sound level.

Decibels A-Weighted (dBA) - Sound level in decibels read on the A-Weighted network. The A scale significantly attenuates the very low frequencies and approximates the human hearing range.

Decibels C-Weighted (dBC) - Sound level in decibels read on the C-Weighted network. The C scale significantly attenuates the very low frequencies.

Hazardous Noise Area - Any area where personnel could be exposed to:

- An 8-hour time weighted average (TWA) noise exposure or noise dose at or above 85 dBA.
- Continuous, intermittent or impact noise levels greater than 140 dBC.

Hazardous Noise Equipment - Any equipment capable of generating:

- Noise levels at or above 85 dBA.
- Continuous, intermittent or impact noise levels above140 dBC.

Hertz (Hz) - Unit of measurement of frequency, numerically equal to cycles per second.

Noise Dose - A measure of the noise exposure to which a person is subjected in the workplace.

Sound - The sensation produced through the organs of hearing. Sound is usually produced by vibrations transmitted in a material medium, commonly air.

Sound Level - A weighted sound pressure level.

Standard Threshold Shift (STS) - A change in hearing threshold, relative to the baseline audiogram, of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear, taking into account any changes due to aging.

Threshold Limit Values (TLV) - Refer to sound pressure levels and durations of exposure that represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on their ability to hear and understand normal speech. The TLVs are issued by the ACGIH.

Time-Weighted Average (TWA) - Noise exposure averaged over a designated period of time (example: 8-hour TWA).

5.0 RESPONSIBILITIES

5.1 Project Manager / Response Manager / Site Manager

The Project Manager / Response Manager / Site Manager (PM/RM/SM) is responsible for:

- Maintaining access to a copy of the HCP and implementing the requirements of the program.
- Conducting and documenting noise surveys of areas/activities where potential noise exposures may be at or above an 8-hour TWA of 85 dBA.
- Performing a sound-level survey in areas where a change in activity, process, equipment, or controls may have resulted in either an increase or a decrease in employee exposure.
- Notifying the Corporate Health and Safety Director and affected employees when monitoring indicates an exposure at or above the Action Level
- Instituting engineering controls (when feasible) to reduce noise levels (e.g., use sound-absorbing materials, tighten up loose parts, maintain equipment, etc.).

- Instituting administrative controls (e.g., postings, work zones, time limits, personnel rotation, etc.).
- Identifying equipment and areas having noise levels at or above 85 dBA with appropriate hearing protection labels and signage.
- Briefing personnel on the proper use/care of hearing protection.
- Maintaining sound-level meters, noise dosimeters, and field calibration equipment in accordance with manufacturers' instructions.

5.2 Corporate Health and Safety Director

The Corporate Health and Safety Director is responsible for:

- Administering the HCP.
- Maintaining the written HCP.
- Providing technical guidance when necessary to personnel conducting noise surveys and exposure monitoring.
- Providing employee access to noise survey and noise dosimetry records.
- Recommending appropriate engineering and/or administrative noise controls.
- Developing and implementing training program for all employees required to be in the HCP that includes initial and periodic training.
- Maintaining records of training through EQ's training management system.
- Overseeing baseline and annual audiometric testing for employees covered by the HCP.
- Ensuring the appropriate certification of those responsible for audiometric testing and interpretation of audiometric results.
- Providing recommendations for the proper selection and fit of hearing protection.
- Informing employees in writing within 21 days when there is a determination that an STS has occurred based on a comparison of the annual audiogram to the baseline audiogram.
- Assisting when requested in coordinating appropriate responses to all inquiries by employees regarding noise exposure.

5.3 All Employees

All employees will adhere to the following minimum requirements:

- Comply with HCP requirements when identified as being exposed to noise levels equaling or exceeding the Action Level.
- Comply with client site hearing protection requirements.
- Wear hearing protection when working in an identified hazardous noise area, or when exposed to hazardous noise equipment.
- Inspect and properly wear approved hearing protection.
- Store reusable hearing protection in a convenient and sanitary manner.
- Do not loan or interchange provided hearing protection devices with other personnel.

- Guard against damage to hearing protection.
- Attend HCP training.
- Report all cases of unusually high noise levels to PM/RM/SM.

Employees who do not comply with the provisions of this program will be disciplined in accordance with our company policy of progressive discipline.

6.0 PROGRAM ELEMENTS

This written HCP will be maintained by the Corporate Health and Safety Director and implemented by the PM/RM/SM (or designee) at all EQ work sites. This document will be available upon request to all employees and regulatory agencies.

6.1 Noise Monitoring and Employee Notification

A noise exposure evaluation will be conducted by the PM/RM/SM (or designee) using an ANSI-approved sound level meter to identify the areas where employee noise exposure may exceed 85 dBA. Additional exposure evaluations will be conducted if changes in production, equipment, processes, or controls suggest that noise exposures may have significantly increased.

Employee exposure may be more thoroughly evaluated by the PM/RM/SM (or designee) when requested by the Corporate Health and Safety Director with an ANSI-approved noise dosimeter that measures all continuous, intermittent, and impulsive sound levels between 80-130 decibels on the “A-weighted” scale (slow response).

All sound level meters and noise dosimeters used to evaluate employee noise exposure will be inspected and calibrated before and after each use.

The PM/RM/SM (or designee) will ensure that affected employees are permitted to observe the exposure evaluation procedures and are notified of the results. Employees identified with exposure levels at or above an 8-hour TWA of 85 dB will be notified of the results of the evaluation and will be required to enroll in the HCP.

EQ adheres to the current American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) which establish an 8-hour TLV-TWA of 85 dBA and a 3 dB doubling rate.

6.2 Audiometric Testing

EQ has an established audiometric testing and evaluation program free of charge for employees whose exposures may be at or above an 8-hour TWA of 85 dBA. Generally, all employees who perform field work are included in the

audiometric testing program as a component of EQ's comprehensive Medical Surveillance Program, regardless of noise exposure conditions.

EQ's occupational medical surveillance administrator uses a network of credentialed health clinics to perform occupational exams in accordance with EQ's Medical Surveillance Program. This ensures audiometric testing is performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is responsible to an audiologist, otolaryngologist, or physician.

WorkCare's provider selection process and oversight ensures all audiograms obtained pursuant to this standard practice instruction meet the requirements of 29 CFR 1910.95, Appendix C: Audiometric Measuring Instruments.

The success of the HCP with regard to each individual employee is evaluated by comparing annual audiograms to the baseline audiogram. This procedure, among others, helps to determine the effectiveness of the hearing protection program and, as a result, ensures the protection of employee hearing.

6.2.1 Baseline Audiometric Testing

All employees who perform field work are provided baseline audiometric testing as a component of EQ's baseline medical examination, regardless of whether potential noise exposures are anticipated to be at or above an 85 dBA TWA. This approach allows for a more conservative evaluation of employee exposures, given the diverse environmental work conditions.

EQ requires baseline audiometric testing immediately upon new-hire employment, which is well within the 6 months of an employee's first exposure to noise above the action level required by 29 CFR 1910.95(g). Employees will use hearing protection until a baseline audiogram is obtained. Employees will be informed that baseline audiometric testing must be preceded by at least 14 hours without exposure to noise levels above 80 dB. Employees may use hearing protection to meet this requirement.

6.2.2 Annual Audiometric Testing

All at-risk employees who perform field work are provided annual audiometric testing as a required component of EQ's Medical Surveillance Program, regardless of whether the employees' noise exposures are at or above an 85 dBA TWA. As in the case of baseline audiometric testing, this approach to annual audiometric testing allows more thorough monitoring of employee health.

An annual audiogram may be substituted for the baseline audiogram when the audiologist or physician evaluating the program declares:

- An STS is persistent, or
- The hearing threshold in the annual audiogram indicates a significant improvement over the baseline audiogram.

6.2.3 Standard Threshold Shift (STS)

If a comparison of the annual audiogram with the baseline audiogram by EQ's occupational medical surveillance administrator indicates that an STS has occurred, a retest within 30 days will be conducted, and the second test may be considered the annual audiogram. If an STS is confirmed, the employee will be:

- Informed in writing within 21 days of the determination.
- Referred to an audiologist, otolaryngologist, or qualified physician for further evaluation.
- Provided with both the baseline and the most recent audiogram of the employee and the required records on the audiometer and the audiometric test room.
- Fitted or refitted with adequate hearing protection, shown how to use it, and required to wear it.

If a work-related STS is confirmed or the retest cannot be completed within 30 days of the annual audiogram <u>and</u> the loss meets the 25 dB or more loss criteria specified in 29 CFR 1904.10, the STS is a recordable event and will be properly recorded as described in Section 6.6.1.

6.3 Engineering and Administrative Controls

According to 29 CFR 1910.95(b)(1) "when employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table."

According to the OSHA Field Operations Manual (CPL 02-00-148), the current enforcement policy regarding 29 CFR 1910.95(b)(1) allows employers to rely on personal protective equipment and an HCP, rather than engineering and/or administrative controls, when hearing protection will effectively attenuate the noise to which employees are exposed to acceptable levels as specified in Table G-16 of the standard. [However,] citations for violations of 29 CFR 1910.95(b)(1) shall be issued when engineering and/or administrative controls are feasible, both technically and economically, and employee exposure levels are so high that hearing protection alone may not reliably reduce noise levels received by the employee's ear to the levels specified in Table G-16 of the standard.

Given the present state-of-the-art, hearing protection which offers the greatest attenuation may not reliably be used when:

- Employee exposure levels border on 100 dBA (OSHA CPL 02-02-035, Appendix.), or
- The costs of engineering and/or administrative controls are less than the cost of an effective HCP.

The PM/RM/SM, with the assistance of the Corporate Health and Safety Director, will determine what engineering or environmental changes can be made to reduce noise levels if noise monitoring surveys identify work areas with exposure levels of 100 dB TWA. In addition, consideration will be given to implementing appropriate administrative controls, such as rotating employees in and out of high noise level areas.

6.4 Hearing Protection and Attenuation

Employees who work in areas identified by the noise survey as having levels of 85dBA TWA or higher must be equipped with appropriate hearing protection. The Corporate Health and Safety Director will determine the type of hearing protection that will afford the best protection. Employees will be offered a choice of several styles and types of hearing protection that provide the best protection for the type of noise exposure.

Hearing protection will be provided at no cost to employees, and a variety of suitable types will be available for their selection. Hearing protection will be evaluated for its ability to adequately reduce noise exposures in the workplace.

Hearing protection will be required and provided for all employees with noise exposure at or above 85 dBA. This approach will satisfy 29 CFR 1910.95 (i) requirements by encompassing those employees with noise exposure:

- Equal to or greater than an 85 dBA TWA and who have experienced an STS, or
- Equal to or greater than an 85 dBA TWA for 6 months or more and who have not obtained a baseline audiogram.

Hearing protection attenuation will be determined by adhering to 29 CFR 1910.95, Appendix B, ***Methods for Estimating the Adequacy of Hearing Protector Attenuation*** and guidelines specified in OSHA CPL 02-02-035, ***Guidelines for Noise Enforcement; Appendix A.***

6.5 Training and Information

6.5.1 Training

EQ will institute a training program for all employees who are exposed to noise at or above an 8-hour TWA of 85 dBA, and will ensure employee participation in such program.

The training program will be repeated annually for each employee included in the HCP. Information provided in the training program will be updated to be consistent with changes in protective equipment and work processes. Each employee will be informed of the following:

- The effects of noise on hearing.
- The purpose of hearing protection.
- Advantages, disadvantages, and attenuation of the various types of hearing protection.
- Instructions on the selection, fitting, use, and care of hearing protection.
- The purpose of audiometric testing and an explanation of the test procedures.

6.5.2 Information

The Corporate Health and Safety Director will ensure copies of the OSHA Occupational Noise Exposure Standards (29 CFR 1910.95 and 29 CFR 1926.52) are available to affected employees and any pertinent informational materials related to the standards that are available from OSHA.

6.6 Recordkeeping

6.6.1 Injuries and Illnesses Log

When there is a work-related STS <u>and</u> the employee's total hearing level is 25 decibels (dB) or more above audiometric zero (averaged at 2000, 3000, and 4000 Hz) in the same ear(s) as the STS, the loss is recordable and will be recorded on the OSHA Log of Work-Related Injuries and Illnesses (OSHA Form 300) as required by 29 CFR 1904.10.

6.6.2 Record Maintenance

Employee noise exposure records will be maintained by Corporate Health and Safety and are available upon request to our employees or an OSHA representative. Employee noise exposure records will be retained for at least 2 years. All audiometric test records will be maintained by EQ’s occupational medical surveillance administrator, and retained in accordance with requirements

specified in Access to Employee Exposure and Medical Records (29 CFR 1910.1020). Each record will include:

- Audiogram with the name and job classification of the worker, date of the audiogram, and the examiner's name.
- Measurements of the noise levels in the audiometric test booth and the date of the last acoustic or exhaustive calibration of the audiometer.

6.6.3 Transfer of Records

If EQ ceases to do business, employee exposure monitoring records will be transferred to the successor employer and maintained by the successor employer. Should the company cease to function entirely, the records will be provided to the respective employees, or as required by current law. If EQ's contracted medical surveillance administrator ceases to do business, all audiometric test records will be transferred to a new occupational medical surveillance administrator of EQ's choice.

7.0 EQUIPMENT

- Noise Dosimeter(s)
- Sound Calibrator(s)
- Sound Level Meter(s)

8.0 ATTACHMENTS

None

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Personal Protective Equipment**	**Document No.**	**HS-Corp-13**
Date of Issue:	**February 2011**	**Revision No.**	**0**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**
	Todd Valli, Corporate H&S Director		**Jackie Doan, Corporate QA Director**

1.0 OVERVIEW

It is the policy of Environmental Quality Management, Inc. (EQ) to protect its employees from personal injury and illness through the use of personal protective equipment (PPE). Therefore, this standard operating procedure (SOP) or policy has been developed to provide guidance to EQ employees on the selection, use, care, and disposal of PPE.

PPE, including (but not limited to) protective equipment for eyes, face, head, and extremities; protective clothing; respiratory protection; and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition. PPE will be worn wherever necessary to protect against process or environmental hazards, physical hazards, chemical hazards, biological hazards, radiological hazards, mechanical hazards, or electrical hazards encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.

2.0 RELATED DOCUMENTS

For further information on the requirements related to PPE, refer to:

- 29 CFR 1910, Subpart I, Personal Protective Equipment.
- 29 CFR 1926, Subpart E, Personal Protective Equipment.
- ANSI Z41-1999, American National Standard for Personal Protection-Protective Footwear (or most current version).
- ANSI/ISEA Z87.1-2010, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices (or most current version).
- ANSI/ISEA Z89.1-2009, American National Standard for Industrial Head Protection (or most current version).
- ASTM F-2412-2005, Standard Test Methods for Foot Protection (or most current version).
- ASTM F-2413-2005, Standard Specification for Performance Requirements for Protective Footwear (or most current version).
- SOP HS-Corp-4, Hazard Communication Program.
- SOP HS-Corp-11, Hearing Conservation Program.

- SOP HS-Corp-8, Training Program.
- SOP HS-Fld-1, Confined Space.
- SOP HS-Fld-2, Electrical Safety.
- SOP HS-Fld-5, Lockout/Tagout.
- SOP HS-Fld-7, Welding/Cutting/Grinding.
- SOP HS-Fld-8, Floating Plant and Marine Activities.
- SOP HS-ERFR-2, Bloodborne Pathogens.
- SOP HS-Othr-7, Respiratory Protection Program.
- SOP HS-Othr-12, Fall Protection.

3.0 GENERAL INFORMATION

This SOP is applicable to all employees including all hourly and salary workers (exempt and non-exempt). Subcontractor employees must follow this procedure (at a minimum), unless the subcontractor's PPE requirements are more stringent.

Minimum requirements for the selection and use of PPE are described in this document. The use of PPE as specified by this SOP is designed to supplement effective engineering and administrative controls. There may be additional PPE requirements for specific tasks. These additional requirements can be found in the specific SOP for those tasks. An example of specialized PPE is found in SOP HS-Othr-12, Fall Protection, where body harnesses are required for certain types of work.

4.0 DEFINITIONS

Adjust – Make small changes to the way PPE fits the employee to maximize the protection of the affected body part.

Affected employee - Any employee performing work that requires the use of PPE in accordance with this policy.

Approved – PPE that has been certified as meeting specified design criteria published by a recognized consensus standards organization, i.e., ANSI, ASTM, NIOSH, or NFPA.

ANSI – American National Standards Institute, which oversees the creation, promulgation, and use of thousands of norms and guidelines that directly impact businesses in nearly every sector: from acoustical devices to construction equipment, from dairy and livestock production to energy distribution, and many more.

ASTM – Formerly known as the American Society for Testing and Materials, a globally recognized leader in the development and delivery of international voluntary consensus standards.

Don – Putting PPE on the body part that is to be protected so that the PPE maximizes the protection of the affected body part.

Doff – Removing PPE in such a way so as not to contaminate the employee.
NIOSH – National Institute for Occupational Safety and Health, the federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness.

NFPA – National Fire Protection Association, which develops and provides consensus codes and standards, research, training, and education to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating.

OSHA – An acronym that can be used for either the Occupational Safety and Health Act or the Occupational Safety and Health Administration. In this SOP, it is used to refer to the Occupational Safety and Health Administration.

Personal Protective Equipment (PPE) – Any article of protective equipment worn by an employee to prevent injury or illness. Examples include eye and face protection, hand protection, protective clothing, foot protection, fall protection, and seatbelts for vehicle safety.

Wear – The active use of the PPE on the body such that it provides the intended protection for the affected body part.

5.0 RESPONSIBILITIES

5.1 Project Manager / Response Manager / Site Manager

The Project Manager / Response Manager / Site Manager (PM/RM/SM) is responsible for:

- Working with the client contact to determine if employees will be working in areas of the facility that require PPE and communicating the client PPE requirements to the employees.
- Ensuring all employees comply with this SOP, client-specified PPE requirements, and any special PPE requirements based on the work to be performed.
- Ensuring all employees working on a project have completed the required PPE training necessary for the project scope of work.
- Immediately stopping EQ work and removing employees from the area if the PM or other employees are made aware of a situation that may require different or additional PPE that has been issued to the employees.
- Communicating the change in situation to the client contact following removal of all employees.
- Working with the Corporate Health and Safety Director to complete the written and signed PPE Hazard Assessment for work tasks that are identified in the project scope of work.
- Working with the Corporate Health and Safety Director to provide PPE retraining as necessary for employees.

- Determining the adequacy, including proper maintenance, and sanitation of employee owned and provided PPE.
- Utilizing performance management and progressive discipline when necessary to obtain the full compliance of employees with this SOP.

5.2 Corporate Health and Safety Director

The Corporate Health and Safety Director is responsible for:

- Reviewing changes to the federal and state PPE regulations.
- Reviewing this SOP periodically for necessary changes and updating this SOP as required.
- Developing, revising, and implementing a PPE training program for employees to ensure employees understand the hazards and perform their work assignments in accordance with this SOP and the client's PPE requirements.
- Working with the PM/RM/SM to provide PPE retraining as necessary for employees.
- Assisting the PM/RM/SM by specifying the appropriate PPE for the project scope of work.
- Working with the PM/RM/SM to complete the written and signed PPE Hazard Assessment for work tasks that are identified in the project scope of work.
- Assisting the PM/RM/SM with determining the adequacy, including proper maintenance and sanitation, of employee owned and provided PPE.

5.3 All Employees

All employees will adhere to the following minimum requirements:

- Be aware of and comply with this SOP.
- Wear the appropriate level of PPE while performing field work at client facilities/sites or EQ project sites.
- Be aware of and comply with client-specific PPE requirements.
- Read and follow any client-provided guidelines or procedures related to PPE at their facility/site.
- Be aware of their activities and any changing work conditions to ensure that additional PPE is used as necessary based on those changes.
- Properly use (don, doff, adjust, and wear), care for, maintain, and dispose of all PPE used during their EQ employment.

6.0 PROGRAM ELEMENTS

6.1 Hazard Assessment

With the assistance of the Corporate Health and Safety Director, the PM/RM/SM will assess the EQ work sites to determine if hazards are present, or are likely to be present, that necessitate the use of personal protective equipment (PPE). If the

use of PPE is necessary, the PM/RM/SM with the assistance of the Corporate Health and Safety Director will:

- Select the type of PPE that will protect the affected employee from the hazards identified in the PPE hazard assessment.
- Communicate selection decisions to each affected employee.
- Select PPE that properly fits each affected employee.
- Require employees to use the selected PPE to protect themselves from the identified hazard.

The PPE hazard assessment will be documented and include a written certification by the EQ employee performing the PPE hazard assessment that the evaluation has been performed; the date(s) of the PPE hazard assessment; and which identifies the document as a certification of PPE hazard assessment. The original of the written PPE hazard assessment will be kept in the project/site files.

EQ requires a minimum work uniform for all employees performing field work that includes the minimum PPE for EQ field employees based on commonly expected hazards in industrial facilities and EQ employee work experiences. The PM will specify, document, and communicate the PPE requirements to affected employees in circumstances where additional protection is required. Comprehensive PPE hazard assessments are conducted and documented during the planning phase when field work involves construction/remediation activities through the development of HASPs/SSHPs and activity hazard analyses. The RM/SM will specify, document, and communicate any changes in PPE as required.

6.2 PPE Selection

As stated in Section 6.1, the written PPE hazard assessment will determine the types of PPE required to be worn by employees in a particular work area or job site. Specific items to be considered during the selection process are identified in Section 6.5, which explains the specific types of PPE covered by this SOP.

The selection process may identify multiple types of PPE that will provide adequate protection and provide the employee with choices in PPE to provide additional comfort to the employee. An example would be the ability of an employee to select either ear plugs or ear muffs as the hearing protection device to reduce noise exposure and prevent occupational hearing loss.

Selected PPE will be properly fitted to the employee to ensure it will provide the protection it is designed to provide the employee. During the fitting of the PPE, the employee will receive instruction in the proper donning, doffing, cleaning, inspection, and care of the PPE.

When employees provide their own PPE (i.e., employee-owned equipment), the employee and employee's manager shall be responsible to ensure its adequacy, including proper maintenance and sanitation of such equipment. It is possible

that employee-owned equipment may be determined to be inadequate and/or not properly maintained and therefore must be replaced.

6.3 Payment for PPE

Except as identified below, the protective equipment, including PPE, used to comply with 29 CFR 1910 Subpart I and 1926 Subpart E, will be provided by EQ at no cost to employees.

- EQ is not required to pay for non-specialty safety-toe protective footwear (including steel-toe shoes or steel-toe boots) and non-specialty prescription safety eyewear, because EQ allows and encourages employees to wear and use such items off the job-site to provide protection to the employee when performing non-job-related activities where similar hazards exist.

- If EQ provides metatarsal guards and allows the employee, at his/her request, to use shoes or boots with built-in metatarsal protection, EQ is not required to reimburse the employee for the shoes or boots.

- EQ is not required to pay for the following PPE items:

  - Everyday clothing such as long-sleeve shirts, long pants, street shoes, and normal work boots.

  - Ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen.

EQ will pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.

When an employee provides adequate protective equipment he/she owns, EQ may allow the employee to use it and is not required to reimburse the employee for that equipment. EQ shall not require an employee to provide or pay for his/her own PPE, unless the PPE is identified as exempt from reimbursement or payment in this section.

6.4 PPE Use/Care/Maintenance/Disposal

PPE is designed to protect a particular body part; however, it can only provide the protection when it is properly used and maintained. Each piece of PPE will be inspected by the employee for defects, cleanliness, and other issues that may impair its ability to protect the employee prior to each use. Defective or damaged PPE shall not be used. Section 6.5 presents information concerning the proper use, care, maintenance, and disposal of the various types of PPE.

6.5 Protective Equipment

6.5.1 Eye and Face Protection

EQ ensures that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

EQ requires the following with respect to the use of eye protection by employees:

- Eye and face protection will meet the current ANSI Z87.1 standard as the minimum requirement.
- Each eye and face protective device must be marked with the manufacturer's identification. Safety glasses with riveted or firmly attached side shields (thin slip-on side shields are unacceptable) are required for all employees entering EQ work sites including client facilities. Offices and EQ owned or leased warehouses are exempt from this requirement.
- Employees are prohibited from wearing fully tinted safety glasses outside from dusk to dawn and inside buildings. Only clear lenses and safety glasses designed for indoor/outdoor use will be permitted.
- Safety splash goggles and a face shield (designed for chemical splash) shall be worn when handling corrosive liquids.
- Safety dust goggles are to be worn in dusty environments.
- Safety glasses with side shields and face shields (designed for impact) shall be worn when grinding to protect the face from flying objects.
- A welding helmet with a filter lens that has a shade number appropriate for the work being performed for protection from injurious light radiation will be worn when doing welding or electrical arc welding.

6.5.2 Respiratory Protection

EQ has developed and implemented SOP HS-Othr-7, Respiratory Protection Program, to protect employees from respiratory hazards. Please refer to that SOP for the detailed discussion and procedures associated with respiratory protection.

6.5.3 Head Protection

EQ ensures that each affected employee wears protective head gear when working in designated construction areas and other areas where there is a potential for injury to the head from falling objects.

EQ requires the following with respect to the use of head protection by employees:

- Head protection will meet the current ANSI Z89.1 standard as the minimum requirement.

- All employees will wear head protection in designated areas and where there is a possible danger or potential hazard of head injury.
- An employee's hairstyle should not interfere with the proper fit of a hard hat.
- Employees will not alter or modify the hard hat.
- Employees working near high-voltage electric lines which could contact the head will wear head protection that meets the current ANSI Z89.2 standard for protection from electrical hazards.

6.5.4 Foot Protection

EQ ensures that each affected employee wears protective footwear when working in designated construction and other areas where there is a potential for injury to the foot.

EQ requires the following with respect to the use of foot protection by employees:

- Safety footwear will meet the specifications of the current ANSI or ASTM Class 75 standard for footwear. Class 75 footwear will protect the foot from an impact of 75 foot-pounds and a compressive force of 2,500 pounds.
- Safety-toed shoes are required for employees entering client facilities unless the site client policy specifies a different level of foot protection.
- Rubber or chemical-resistant footwear with safety toes will be worn when working with chemicals.
- Open-toed and sandal-type footwear are prohibited in laboratories that store and use chemicals.
- Electrical-hazard-rated safety shoes will be worn by employees performing tasks dealing directly with electrical systems.
- Electrostatic dissipative footwear will be worn when static electricity is a concern.

6.5.5 Electrical Protection

Electrical PPE beyond electrostatic dissipative footwear is designed for use by individuals working with active electrical wiring and electrical equipment. This category of PPE includes insulating blankets, gloves, sleeves, matting, and insulating line hose. EQ does not own or use this type of PPE.

6.5.6 Hand Protection

EQ ensures that each affected employee wears hand-protective PPE when working in areas where there is a potential for injury to the hands.

EQ requires the following with respect to the use of hand protection by employees:

- Gloves will be specified and worn based on the potential hand/arm hazard.
- Gloves comprised of thermal-resistant material to protect against burns will be worn when handling hot or extremely cold objects.

- Abrasive-resistant gloves will be worn when handling rough materials.
- Cut-resistant gloves will be worn when working with sharp or around sharp objects. Never place the non-cutting hand in the path of any sharp objects.
- Chemical-protective gloves will be worn when handling hazardous chemicals and corrosives, depending on what the substance is and its requirements.
- Welder's gloves will be worn when welding to protect against heat, sparks, and flash burns.
- Surgical-type disposable gloves will be worn by emergency response teams when there is a potential for exposure to infectious blood or body fluids.

6.5.7 Body Protection

EQ ensures that each affected employee wears body-protective PPE when working in areas where there is a potential for injury to the body.

- Fire-protective clothing will be worn by welders and in areas where there is exposure to sparks and molten metal.
- Employees handling toxic or corrosive chemicals will wear chemical-protective clothing.
- Employees responding to emergency response activities will wear chemical-protective clothing designed for protection against the level of hazard present.

6.5.8 Hearing Protection

EQ has developed and implemented SOP HS-Corp-11, Hearing Conservation Program, to protect employees from excessive noise exposure. Please refer to that SOP for the detailed discussion and procedures associated with hearing protection.

6.5.9 Fall Protection

EQ has developed and implemented SOP HS-Othr-12, Fall Protection, to protect employees when working at heights and exposed to falls. Please refer to that SOP for the detailed discussion and procedures associated with fall protection.

6.5.10 Working Over or Near Water Protection

EQ ensures that each affected employee working on or near water, where the danger of drowning exists, is provided with a U.S. Coast Guard approved life jacket or buoyant work vests. Please refer to SOP HS-Fld-8, Floating Plant and Marine Activities, for additional information on this topic.

6.5.11 Seat Belts

EQ ensures that each affected employee on company business wears seat belts and shoulder belts (where available) in the vehicle when operating a vehicle or when a passenger in a vehicle.

EQ requires the following with respect to the use of seat belts by employees:

- All company-owned vehicles and any vehicle operated for company business, consisting of personal vehicles, heavy equipment, rental vehicles, and chauffeured vehicles, will be equipped with seat belts.
- This requirement is not applicable to vehicles such as bicycles, all-terrain vehicles, scooters, golf carts, and any other vehicles without roll-over protective devices.
- Seat belts will be installed on special-purpose vehicles as required by other company policies.
- Seat belts will be worn by employees when a vehicle is in motion. This rule also applies to non-company employees operating vehicles being used for company business.
- Seat belts will be worn by employees occupying non-company vehicles operated by non-employees on company business.
- Seat belts will be adjusted to provide maximum protection. The lap belt will cross the pelvic area, not the abdomen. The shoulder harness will fit across the collarbone area. The shoulder harness will fit snugly, but will allow freedom of movement. For automatic seat belts, the lap belt must also be fastened. Seat belts will be worn in vehicles that have airbags.

6.6 Hazardous Waste Operations and Emergency Response Site Protective Equipment

Affected employees working on sites covered by OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, will wear the appropriate level of PPE based on the hazards at the site. Typically, the U.S. EPA terminology for the ensembles of protective equipment worn at these sites will be used (i.e., Levels A, B, C, and D). The ensembles of protective equipment are summarized below.

6.6.1 Level A

Level A protection provides the same level of respiratory protection as Level B protection, but at a higher level of skin protection. Level A skin protection requires a fully-encapsulating suit (one-piece garment) that provides “gas-tight” integrity.

Level A protection shall be used when:

- An extremely hazardous substance requires the highest level of protection for skin, eyes, and the respiratory system;

- Substances with a high degree of hazard to the skin are known or suspected;
- Chemical concentrations are known to be above IDLH levels; and/or
- Biological hazards requiring Level A protection are known or suspected.

6.6.2 Level B

Level B protection provides the same level of skin protection as Level C protection, but at a higher level of respiratory protection.

Level B protection shall be used when:

- The substance(s) has been identified and requires a high level of respiratory protection but less skin protection than Level A;
- Concentrations of chemicals in the air are IDLH or above the maximum use limit of an air-purifying respirator;
- Oxygen-deficient or potentially oxygen-deficient atmospheres (<19.5%) are possible; and/or
- Identification of gases and vapors is incomplete, but not suspected to be harmful to skin or capable of being absorbed through intact skin.

Level B PPE, at a minimum, shall consist of the following items:

- Positive-pressure, full-face Self-Contained Breathing Apparatus (SCBA), or positive-pressure Supplied Air Respirator (SAR) with escape.
- Hooded chemical-resistant clothing (overalls and long-sleeved jacket, coveralls, one- or two-piece chemical-splash suit, disposable chemical-resistant overalls).
- Chemical-resistant over-boots or chemical-resistant steel-toe/steel-shank boots.
- Chemical-resistant inner gloves (e.g., disposable nitrile).
- Chemical-resistant outer gloves (e.g., nitrile, viton, PVA, PVC).
- Sealed arm/leg/zipper joints with tape (as required).
- Hard hat.

6.6.3 Level C

Level C PPE provides a higher level of respiratory and skin protection against chemical hazards compared to Level D PPE.

Level C protection shall be used when:

- Air contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin;
- The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove contaminants; and/or

- The substance has adequate warning properties and all criteria for the use of an air-purifying respirator have been met.

Level C PPE, at a minimum, shall consist of the following items:

- Full-face, air-purifying respirator with appropriate cartridges.
- Hooded chemical-resistant clothing (overalls and long-sleeved jacket, coveralls, one- or two-piece chemical-splash suit, disposable chemical-resistant overalls).
- Chemical-resistant over-boots or chemical-resistant steel-toe/steel-shank boots.
- Chemical-resistant inner gloves (e.g., disposable nitrile).
- Chemical-resistant outer gloves (e.g., nitrile, viton, PVA, PVC).
- Sealed arm/leg/zipper joints with tape, as required.
- Hard hat.

6.6.4 Level D (Modified)

Level D (Modified) PPE includes Level D PPE and a selection of one or more of the following items:

- Chemical-resistant clothing (overalls and long-sleeved jacket, coveralls, one- or two-piece chemical-splash suit, disposable chemical-resistant overalls).
- Chemical-resistant over-boots or chemical-resistant steel-toe/steel-shank boots.
- Boot covers.
- Chemical-resistant inner gloves (e.g., disposable nitrile).
- Chemical-resistant outer gloves (e.g., nitrile, viton, PVA, PVC).
- Safety goggles/face shield.
- Hearing protection.

6.6.5 Level D

Level D protection shall be used when:

- The atmosphere contains no known respiratory hazard; and
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals.

Level D protection equipment, at a minimum, shall consist of:

- Coveralls or work clothes.
- Safety shoes/boots with steel-toe/steel-shank.
- Work gloves – cotton or leather palm.
- Safety glasses.
- Hard hat.

6.6.6 Minimum Work Uniform

The minimum work uniform for EQ employees performing field work including work at EQ client industrial facilities includes:

- Coveralls or work clothes appropriate to the work to be performed.
- Safety shoes/boots in compliance with Section 6.5.4 of this SOP.
- Safety glasses in compliance with Section 6.5.1 of this SOP.
- Construction and remediation work sites require the addition of a hard hat in compliance with Section 6.5.3 of this SOP.

7.0 TRAINING

EQ employees are provided with initial PPE training prior to assignment to any activities where PPE is required. The training is tracked and documented in EQ's training management system. Additional PPE training is provided if:

- There is a significant change in workplace conditions;
- There is a significant change in types of PPE used; or
- The employee's knowledge or use of assigned PPE indicates the employee has not retained the understanding of this policy.

The PPE training ensures the employee knows:

- When PPE is required;
- What PPE is required;
- How to properly adjust, don, wear, and doff PPE;
- The limitations of the specific PPE; and
- The maintenance, life expectancy, care, and disposal of the various PPE.

During the fitting of the PPE, the employee will receive instruction in the proper donning, doffing, cleaning, inspection, and care of the specifically fitted PPE.

8.0 EQUIPMENT

Sections 6.5 and 6.6 describe the various types of PPE required by this SOP.

9.0 ATTACHMENTS

None

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Traffic Control**	**Document No.**	**HS-EqOp-5**
Date of Issue:	**December 2006**	**Revision No.**	**4**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**
	Bob Armstrong, Interim H&S Officer		**Jackie Doan, Corporate QA Director**

The possibility of vehicle-related injury or accident is inherent to all aspects of field work. Vehicle-related accidents may occur during travel to or from the site as well as during on-site activities. The latter will be a major factor given the fairly continuous activities and the potential for heavy equipment which may be used as part of the planned work tasks. Additionally, work may take place in or near areas where there is frequent vehicle traffic. Personnel must be alert and maintain awareness of their surroundings while driving.

Traffic will be controlled in and around the job site at all times. Personnel will be protected from injury, and equipment damage will be prevented. Delineation will be accomplished using any effective means such as barricades, warning signs, warning lights, traffic cones, etc. [See American National Standards Institute (ANSI) "Manual on Uniform Traffic Control Devices" (D 6.1 - 1921) for further information.]

If work takes place in or near high traffic areas, these areas will be appropriately marked with the aforementioned devices as necessary to protect personnel. Personnel will wear fluorescent orange and/or reflective clothing, vests, etc., when working in and around roads.

Vehicles not actively used in operations will be parked so that they do not interfere with traffic. Supervisors should ensure that site access roads are suitable for vehicle travel and that turnaround spots are constructed to ease maneuverability. When vehicles are maneuvered in confined areas with limited visibility, assistance will be given to the operator by personnel positioned outside the vehicle.

Pedestrian traffic has the right-of-way on site. Personnel on foot need to be careful around heavy equipment and when walking near roads. Ground personnel should always make eye contact and wait for a signal to proceed before passing close to or in front of operating equipment or moving vehicles.

All drivers and operators will adhere to the speed limits, signs, and road markings. Equipment operators and ground personnel will be especially careful if air line respirators are in use because of the potential for injury if an air line becomes tangled in the track or wheel of a vehicle or equipment. Under no circumstances will breathing air systems be attached to vehicles or equipment while air is supplied to the respirators of ground employees.

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Working Around Heavy Equipment and Machinery (Excavators/Loaders)**	**Document No.**	**HS-EqOp-8**	
Date of Issue:	**December 2006**	**Revision No.**	**3**	**Page 1 of 7**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**	
	Bob Armstrong, Interim H&S Officer		**Jackie Doan, Corporate QA Director**	

The hazards associated with the operation of heavy equipment are injury to personnel, equipment damage, and property damage. The potential for injury or damage to personnel and property is due to the size of the equipment; limited visibility of the driver; the potential overhead hazards leading to crushing, tripping, falls, cuts, or punctures; and the high noise levels created by the equipment.

1.0 General

- The work area shall be appropriately delineated to prevent non-essential personnel from wandering into the area.
- Equipment operators shall maintain eye contact with ground personnel at all times, giving ground personnel the right of way.
- Vehicles/equipment paths shall be marked as feasible to prevent personnel from crossing.
- Equipment shall be outfitted with the appropriate safety features, back-up alarms, rollover protection, fire extinguishers, etc.
- Loads shall be lowered and equipment de-energized and secured before any adjustments are made to load, repositioning, etc.
- Personnel shall be cognizant of excavations, material/debris piles and other equipment in the work area. These areas shall be appropriately marked or protected to prevent falls.

2.0 EXCAVATORS/LOADERS

- Only trained and qualified individuals shall operate heavy equipment/excavators.

- All heavy equipment shall be inspected before mobilization, while on site, and daily prior to use; inspections shall be documented.

- All heavy equipment shall be equipped with the appropriate safety devices [ROPS, fire extinguishers, seat belts, backup alarms, (etc.)].

- Vehicles shall maintain appropriate operating speeds and load capacities at all times.

- A spotter shall be utilized for any of the following conditions: 1) during critical lifts with cranes or derricks; 2) when overhead powerlines or overhead objects may obstruct heavy equipment operation; 3) when a driver does not have a full view of the backing path, in order to ensure safe backing of equipment; and 4) as directed by the site foreman, when feasible, to prevent injuries and to assist heavy equipment operator(s) in non-routine operations.

- The area of excavation (or other operation) shall be appropriately marked to prevent non-essential personnel from wandering into the vehicle path (safe work buffer zone).

- Ground personnel shall be given the right of way at all times. Safety vests, and/or reflective clothing shall be worn by those working in the immediate area. Eye contact shall be maintained between operators and laborers in the vicinity.

- Radio contact shall be maintained between operators and the appropriate on-site personnel.

- At the end of the day, equipment breathing air and safety equipment shall be checked, the cab shall be cleaned, refueling will occur, brakes will be set, and a daily report shall be completed by the equipment operator.

- The area shall be visually inspected and all structural encumbrances shall be removed or protected prior to work.

- Personnel shall enter and exit vehicles using handrails and steps that are provided.

- Work area shall be kept neat and in an orderly state of housekeeping.

- All underground utilities shall be located prior to excavation; utility companies shall be contacted if necessary.

- Excavators shall be prohibited from operating on severe inclines or questionable surfaces. Excavators operating near the edge of a quarry shall be supported with a swamp pad.

- Employees shall be prohibited from standing or working in areas where they would be exposed to falling loads. Personnel shall stand away from vehicles during excavation or loading. Operators may remain within vehicle cabs during loading as outlined in 29 CFR 1926.601(b)(6) for adequate protection.

- All personnel working around the excavators shall be trained in emergency shutdown of the equipment.

- Stop logs/railroad ties shall be used to barricade a quarry rim to prevent equipment or personnel from coming too close to the edge. Barricade shall be established 5 feet from the edge of the excavation, and a warning sign shall be posted in this area to alert personnel of the dangers.

- Areas within a quarry that are directly beneath the excavation areas shall be barricaded to prevent personnel from standing below in areas with a potential hazard of falling objects/debris.

- When lowering excavator(s) from the rim into a quarry, the load weight shall be checked to ensure lifting equipment has sufficient capacity.

- Air monitoring for carbon monoxide, oxygen, etc., shall be performed by EQ within vehicle cabs throughout work operations.

- Equipment operators shall wear appropriate PPE as outlined in the SWP to protect personnel from exposure to potential chemical and radiological hazards.

- Personnel shall be prohibited from reaching into loading operations with arms or legs while in operation.

- Any adjustments or repairs that need to be made to equipment (or loads) shall be made with the equipment disengaged and shut down. If there is a suspended load, the load shall be lowered to the ground (or securely braced) before any adjustments are made to the equipment.

3.0 CRANES

- All cranes must have proof of a thorough inspection within the last year by an appropriately qualified individual. Crane personnel platform (manbasket) and rigging equipment shall be inspected daily prior to use.

- Load capacities shall be stenciled onto the equipment and observed during operations. The combined weight of the loaded personnel platform/manbasket and its rigging must not exceed 50 percent of the rated load capacity in all locations where the platform will be positioned.

- All hooks, slings, and other fittings shall be the correct size for the work to be done and with sufficient capacity for the load to be lifted.

- The manbasket will be load tested at 150 percent of rated capacity prior to daily use and whenever it is reattached to the hoist line.

- The manbasket shall be equipped with the appropriate safety features to prevent personnel from falling out (guardrails, grabrails, overhead protection if necessary, etc.).

- The crane operator must always have full control over the movement of the personnel platform/manbasket. All vertical movement must use the power of the crane winch.

- Employees shall be prohibited from standing or working beneath crane booms.

- In the event of emergency repair work on hoisting equipment with a suspended load, the area below the load shall be barricaded and the load blocked or otherwise supported.

- Employees are prohibited from riding on loads, hooks, slings (etc.) suspended from hoisting equipment.

- All hooks, rings, pins, shackles, or other lifting attachments shall be inspected, and defective parts shall not be used. Wire ropes shall be free of kinks, sharp bends, or twists.

- When the occupied personnel platform/manbasket is in a stationary position, all brakes and locking devices on the crane must be set.

- All cranes used for personnel hoisting must have a boom angle indicator that is visible to the operator, and shall be equipped with either an anti-two-blocking device that prevents contact with the load block or a two-

block damage feature that deactivates the hoisting action before damage occurs.

- No mobile crane will operate or make a heavy lift without its outriggers fully extended to assure maximum stabilization of the equipment.

- Appropriate hand signals shall be predetermined and used during crane operations. Only one individual shall issue signals to the operator unless a relay system is necessary.

- Tag lines shall be used at all times for controlling swinging loads.

- The crane operator and rigger shall confirm that the load is properly secured and balanced before it is lifted.

- Crane operations shall be stopped or restricted during bad weather or poor visibility.

4.0 MAINTENANCE AND REPAIRS

- All equipment hazards identified shall be controlled.

- Operators shall not wear loose clothing that might get tangled in the equipment or controls.

- Appropriate machine/equipment guards shall be in place and intact at all times during operation. When guards require maintenance or replacement, equipment will be shut down and repaired, to be restarted only when guards are replaced and in good condition.

- Heavy equipment shall be demobilized to a staging area and decontaminated as necessary before performing maintenance or repairs.

- An equipment repair log shall be maintained and updated on a daily basis/whenever a repair or adjustment is made.

- Pinching and cutting hazards shall be controlled by prohibiting personnel from reaching into running equipment and by wearing the appropriate PPE. All equipment repairs shall be made while equipment is shut down.

- Appropriate PPE shall be used as outlined in the SWP to prevent contact with chemicals.

5.0 REFUELING

- The equipment engine must be shut down and locked/tagged out before any refueling operations are conducted.
- Appropriate ABC-type fire extinguishers shall be available.
- All ignition sources shall be eliminated.
- Fuel shall be brought to the equipment using the designated vehicle. Appropriate vehicle safety precautions shall be followed.
- Appropriate grounding/bonding shall be conducted before transferring fuel.

6.0 DECONTAMINATION AND REMOVAL

- Appropriate PPE shall be worn as outlined in the SWP (faceshields, etc.).
- Only trained, authorized personnel shall operate high-pressure washers.
- The lance/nozzle must always be pointed at the work area, and not toward other personnel.
- The operator shall maintain good footing during cleaning.
- Non-operators shall maintain a safe distance (25 feet) from the operator during washing.
- Washer operators shall alternate to avoid fatigue. Assistants shall also be used to help move and handle the equipment.
- Washer equipment shall be cleaned/rinsed periodically to avoid build-up (around trigger, guard).
- An assistant shall monitor the pressure during operations, and shall stand near the generator in case emergency shutdown is necessary.
- All lances/nozzles shall be constructed of seamless stainless steel to avoid rusting.
- Washers shall be operated at the designated pressure. Inspections shall be made for leaks and malfunctions; damaged or faulty equipment must be repaired or taken out of service immediately.

- Personnel shall use proper lifting techniques such as keeping their back straight, lifting with legs, limiting twisting, getting help in moving bulky/heavy loads, and using mechanical equipment to move material and equipment when appropriate.

- Personnel shall work at a rational pace.

- If decontamination is performed in the presence of electrical circuits, appropriate provisions shall be made to disconnect them or protect them from contact with water.

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Electrical Safety**	**Document No.**	**HS-Fld-2**	
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Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**	
	Bob Armstrong, Interim H&S Officer		**Jackie Doan, Corporate QA Director**	

1.0 OBJECTIVE

Environmental Quality Management, Inc. (EQ) personnel performing work on electrical systems and equipment will follow standards set by the National Electrical Code (NEC) and OSHA in selection of materials and methods of installation and maintenance. Only qualified personnel will work on electrical systems and equipment

2.0 PURPOSE

This procedure specifies the requirements for electrical equipment and methods and is an overview of the requirements of 29 CFR 1910, Subpart S-Electrical. If work is to be performed on any electrical circuit, lockout/tagout may be required. Refer to the Lockout/Tagout procedure.

3.0 GENERAL REQUIREMENTS

No electrical work should be done on an energized circuit. Only approved electricians will be permitted to work on electrical equipment or permanent electrical wiring. Proper clearance and grounding procedures must be used. All electrical circuits and equipment shall be de-energized and lockout/tagout accomplished before maintenance or repair work is started.

Single-phase electric hand tools and other single-phase portable electrical equipment must be approved by a recognized testing agency. All exposed non-current-carrying metal parts must be grounded, or be double insulated.

Before each use, portable electrical appliances are to be examined for obvious deficiencies in the appliance, cord, and plug. If any deficiency is noted, the appliance is not to be used.

Extension cords are to be kept clean, dry, free of kinks, and protected from oil, hot or sharp surfaces, and chemicals. Extension cords used outdoors shall be Ground Fault Circuit Interrupter (GFCI) protected. All extension cords shall be free from damage and are not to be placed across aisles, through doors, through holes in the wall, or in areas where the cord may be damaged or become a tripping hazard. Extension cords must not be placed in walkways, or on stairs or steps where the cords may pose a tripping hazard.

4.0 PORTABLE ELECTRICAL EQUIPMENT

Double insulated portable industrial type electric tools meeting the requirements of the Underwriters Laboratory are authorized for use (ground wire not required). Where such a system is employed, the equipment must be distinctly marked.

Portable electrical tools not provided with special insulating or grounding protection are not intended for use in damp, wet, or conductive locations (persons standing on the ground or on metal floors).

All portable electrical appliances and equipment where the non-current carrying metal parts are exposed to contact by personnel shall be grounded by a continuous conductor of adequate capacity from the device to a grounded receptacle. The site safety officer shall resolve any question which arises as to whether or not a particular appliance should be grounded.

Grounding of receptacles shall be accomplished in one of two ways:

- A built-in ground wire of green color may be attached to the ground pole of the receptacle.

- The conduit system, if installed in an approved manner, may be relied upon for grounding of a receptacle serving single-phase appliances with ratings up to 230 volts.

At outside locations, all single-phase 15- and 20-ampere receptacle outlets operating at 230 volts or less which are not a part of the permanent wiring of the building or structure must have GFCI for personnel protection. The GFCI should be located at the power source so that all extension cords and tools are protected by the GFCI.

The outlet box for portable extension cords for outdoor use shall be of weatherproof type maintained in good condition.

5.0 ELECTRICAL GUARDING

Suitable access and working space shall be provided and maintained in the vicinity of all electric equipment to permit ready and safe operation and maintenance of such equipment.

The dimension of the working space in the direction of access to energized parts in switchboards, control panels, fused switches, circuit breakers, panel boards, motor controllers, and similar equipment which require examination, adjustment, servicing, or maintenance while energized, shall not be less than 36" deep (30" for installations built prior to 1981) and the side being 30" or the width of the equipment, whichever is greater.

The working space shall not be used for storage purposes. The "keep clear" area may be identified with suitable floor markings and/or posting of signs or decals on the equipment

Energized parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by the use of approved cabinets or enclosures.

Entrance to rooms and other guarded locations containing exposed energized parts shall be marked with a conspicuous warning sign forbidding unqualified persons to enter.

Temporary covers, warning signs, and/or barricades are to be used when it is necessary to remove covers of electrical panels during construction, major refurbishment, or for the purpose of providing temporary power to an area.

All openings in boxes, enclosures, or fittings shall be effectively guarded or closed to afford protection substantially equivalent to that of the wall of the box, enclosure, or fitting.

All electrical components over 230 volts shall have signs stating "High Voltage" 240 volts.

6.0 EXTENSION CORD REQUIREMENTS

Extension cords are designed for and will be used for TEMPORARY USE ONLY! All other electrical connections will be made permanent by proper construction methods. Use of indoor extension cords greater than 50 feet in length is to be discouraged. All extension cords shall include a grounding conductor within the cable jacket and shall be equipped at each end with either explosion-proof or non-explosion-proof three-wire grounded receptacles and plugs (but not with one

of each), depending on the location and intended use. (No "hybrid" ungrounded or external ground wire extension cords are allowed.)

If a cord is damaged, it shall be shortened or replaced by an electrician - never patched with electrical tape. Cords shall be protected against contact with oil, hot surfaces, and chemicals. Cords must not be hung over nails or other sharp edges or placed where vehicles may run over them.

7.0 ELECTRICAL FUSE REQUIREMENTS

Circuits must be de-energized by lockout and tagout procedures before attempting to replace fuses. Bridging of fuses or circumventing the normal operation of circuit breakers is prohibited. Blown fuses shall not be replaced with fuses having a higher amperage or voltage rating. Fuses should be replaced in kind to maintain proper circuit protection. A fuse puller should be used to remove fuses.

8.0 ASSURED ELECTRICAL GROUNDING REQUIREMENTS

This program provides the minimum requirements for an assured equipment grounding conductor program and reflects the requirements of 29 CFR 1910.304. It also applies to circuits and equipment not attached to a permanent building or structure.

EQ and its contractors will implement either a written assured equipment grounding conductor program or use GFCI's when using temporary wiring (cords and plugs) in field work using any temporary electrical power source.

Cords and equipment will be inspected prior to each use for damage or missing parts. Equipment which is found to be defective will be taken out of service and repaired.

The Assured Equipment Grounding Conductor Program will include the following:

- The written program.
- Designation of a competent person(s) to implement the program.
- Visual inspection of cords on a daily basis for deformed and missing pins, insulation damage, and indications of possible internal damage. Equipment found damaged or defective will be removed from service and repaired or expended.

- Cords and electrical circuits will be tested for the following:
  - Electrical grounding continuity
  - Correct attachment of grounding conductor
- Tests outlined above shall be performed before the first use, before being returned to use after repair, after possible damage (such as being run over by a vehicle), and at least every three months.
- The tests outlined above must be recorded, and cords which have been tested identified.

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Excavation and Trenching**	**Document No.**	**HS-Fld-3**	
Date of Issue:	**December 2006**	**Revision No.**	**3**	**Page 1 of 58**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**	
	Bob Armstrong, Interim H&S Officer		**Jackie Doan, Corporate QA Director**	

1.0 PURPOSE AND SUMMARY

This procedure presents the federal requirements for excavation safety. Excavation operations pose unique and serious hazards. With very few exceptions, protective systems must be designed and installed to protect employees who enter excavations of 5 feet or more in depth. Accepted protective systems include sloping, shoring, and shielding. The protective system must be designed by a registered professional engineer (civil), and plans must be available for inspections on site. In addition to these federal requirements, some states and localities may require notification of trenching/excavation operations prior to beginning work.

2.0 DEFINITIONS

Accepted Engineering Requirements: Those requirements or practices which are compatible with standards required by a registered professional engineer.

Angle of Repose: The greatest angle above the horizontal plane at which a material will lie without sliding.

Benching: A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Competent Person (Federal OSHA, 29 CFR 1926.32(f): A person, such as a supervisor or engineer, who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has the authority to take prompt corrective measures to eliminate them. Nomenclature for responsibilities equivalent to a competent person varies from state to state. For example, in California, the individual with excavation/trenching installation and supervision responsibilities is a "qualified person."

Confined Space: Enclosure having limited means for entry and exit, by reason of location, size, or numbers of openings; and unfavorable natural ventilation that could contain or produce dangerous air contaminants, flammable atmospheres, and/or oxygen deficiency.

Design Engineer: An individual, currently registered as a civil engineer in the applicable state, who, in all other respects, meets the requirements of a pertinent State OSHA Program, or Federal OSHA in terms of his or her ability to design shoring, sloping, benching, or alternate trench/excavation systems.

Excavation: Any man-made cut, cavity, trench, or depression in an earth surface, including its sides, walls, or faces, formed by earth removal.

Project Manager: An individual who is responsible to coordinate and direct the activities of both the Design Engineer and Project Supervisor. The Project Manager is responsible to assure that all pre-excavation requirements are met: site preparation, health and safety office notification, OSHA and internal project permitting, and employee training.

Project Supervisor: A person, such as a supervisor or engineer, who is familiar with the installation of shoring or sloping/benching systems and the attendant hazards of excavation or trenching operations. Project supervisors shall meet the particular requirements of State OSHA programs, or where applicable, the requirements of a Federal OSHA competent person. Project Supervisors shall assure that excavation/trenching work practices are properly followed.

Sheeting: The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield: A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Shields may be pre-manufactured or job-built in accordance with 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

Shoring: A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping: A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Spoil: The earth material that is removed in the formation of an excavation or trench.

Support System: A structure such as underpinning, bracing, or shoring which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated Data: Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench: An excavation made below the surface of the ground. In general, the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 feet.

3.0 EXCAVATION AND TRENCHING

3.1 Pre-Excavation Requirements

3.1.1 Underground Installations

Prior to opening an excavation, the estimated location of utility installations such as sewer, telephone, fuel, electric, water lines, or any underground installations that may reasonably be expected to be encountered during the excavation work shall be determined.

Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations.

When utility companies or owners cannot respond to a request within 24 hours - excluding weekends and holidays - (or longer if required by state or local law), or if the exact location of installations cannot be established, excavation may proceed with caution, provided detection equipment or other means to locate utility installations are used.

3.1.2 Surface Encumbrances

All surface encumbrances (trees, poles, boulders, etc.) that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

3.1.3 Training

Employees shall not be assigned, or permitted, to design, supervise, or work in or about excavations until they have completed formal classroom training on:

- types of hazards associated with excavation operations
- safe work practices and techniques
- a review of applicable Federal, state and local regulations
- a review of this procedure.

Tailgate Safety Meetings detailing the specific hazards of the work to be performed and safety precautions and procedures specific for the job shall be conducted by the project supervisor at the beginning of each shift for each job. The meeting shall be documented on the Tailgate Safety Meeting Form.

Formal training shall be complemented with on-the-job training and instruction by management as part of standard employee supervision, and to the extent necessary to assure compliance with this procedure, and all other applicable health and safety practices.

3.1.4 Hazard Assessment

During the project planning stage, an assessment of potential hazards shall be made to include:

- the presence and quantity of hazardous substances in the area of the excavation.

- toxicity and flammability of hazardous substances present, or to be introduced into, the area of the excavation.

- potential for work meeting the definition of confined space work.

- the presence of nearby above-ground or overhead utility installations.

- exposure of the general public to the excavation operations.

- potential for surface water runoff into the excavation.

At this time, the Project Notification Worksheet must be completed.

3.2 Excavation Work Practices

3.2.1 General

Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with 29 CFR 1926.652. The project supervisor shall ensure that the required protective system is installed and maintained per the design specifications.

No employee shall be permitted to enter the excavation unless he/she is specifically required to do so. Unauthorized persons shall not be allowed access.

3.2.2 Supervision

Work in an excavation shall at all times be supervised by an EQ project supervisor. This individual will remain outside of the excavation at all times, and will be responsible for identifying any unusual developments above ground which may warn of impending earth movement.

3.2.3 Access and Egress

Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design. Ramp design and construction shall comply with 29 CFR 1926.651(c).

A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations that are 4 or more feet in depth so as to require no more than 25 feet of lateral travel for employees.

3.2.4 Protective Systems

Protective systems designed in accordance with 29 CFR 1926.652(b) or (c) shall be installed except when:

1) the excavation is made entirely in stable rock; or

2) the excavation is less than 5 feet in depth, and examination of the ground by a competent person provides no indication of a potential cave-in.

Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

3.2.5 Placement of Spoil

All spoil shall be placed at least 2 feet from the edge of the excavation. It is strongly recommended that spoil be placed 4 or more feet from the excavation edge so as not to cover surface indicators of subsidence (such as fissures or cracks). No method that disturbs the soil in place (such as driving stakes) shall be used to contain the spoil material.

3.2.6 Exposure to Falling Loads

No employees shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded provided the vehicles are equipped with protection as specified in 29 CFR 1926.601(b)(6).

3.2.7 Warning System for Mobile Equipment

When mobile equipment is operated adjacent to an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs.

3.2.8 Hazardous Atmospheres

Where an oxygen deficient (less than 20.5% 0_2) or hazardous atmosphere exists, or could reasonably be expected to exist, the excavation shall be tested before employees enter.

Adequate precautions shall be taken to prevent employee exposure to oxygen-deficient or hazardous atmospheres. As appropriate, ventilation and/or respiratory protective devices shall be used.

Adequate precautions, including ventilation, shall be taken to prevent employee exposure to atmospheres containing a concentration of flammable gas in excess of 10 percent of the lower explosive limit (LEL) of the gas.

Testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

3.2.9 Water Accumulation Hazards

Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.

If water is controlled or prevented from accumulating by the use of water removal equipment. The water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

If the excavation work interrupts the natural drainage of surface water (streams, run-off channels), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation.

Excavations subject to run-off from heavy rains shall be inspected by a competent person in compliance with Subsection 4.2.10 below.

3.2.10 Stability of Adjacent Structures

The stability of structures adjoining the excavation shall be supported to protect employees.

Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees shall not be permitted except when:

- a support system (underpinning) is provided to ensure the safety of employees and the stability of the structure; or
- the excavation is in stable rock; or
- a registered professional engineer has determined that the structure will be unaffected by the excavation; or
- a registered professional engineer has determined that such excavation will not pose a hazard to employees.

Sidewalks, pavements, and appurtenant structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

3.2.11 Protection of Employees from Loose Rock or Soil

Employees shall be protected from loose rock or soil which could fall or roll from the excavation face. Such protection could be scaled to remove loose material or barriers could be installed.

Employees shall be protected from spoil or other materials or equipment which could fall or roll into the excavation. Such materials shall be kept at least 2 feet from the excavation edge, and/or retaining devices shall be used to prevent materials or equipment from falling or rolling into excavations.

3.2.12 Inspections

A competent person shall make daily inspections of excavations, the adjacent areas, and protective systems for evidence of conditions that could result in a cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions.

The inspection shall be made prior to the start of work, and as needed throughout the shift. Inspections shall be made after each rainstorm or other hazard-increasing event.

Where the inspection finds evidence of any hazardous condition, exposed employees shall be removed from the hazardous area until necessary precautions have been taken.

3.2.13 Fall Protection

Where employees or equipment are permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.

Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Temporary well, pits, shafts, etc., shall be backfilled as soon as possible.

3.3 Requirements for Protective Systems

3.3.1 Protection for Employees in Excavations

Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed and installed in compliance with 29 CFR 1926.652(b) or 29 CFR 1926.652(c), except when

- the excavation is made entirely in stable rock; or
- the excavation is less than 5 feet in depth and a competent person determines there is no danger of cave-in.

Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

4.0 EXCEPTION PROVISIONS

No exceptions to the requirements of this policy are permitted.

5.0 CROSS REFERENCES

29 CFR 1926 Subpart P - Excavations
§ 650; Scope, application and definitions
§ 651; General requirements
§ 652; Requirements for protective systems
Appendices A - F, mandatory

6.0 FORMS AND CHECKLISTS

Trench/Excavation Notification Worksheet. This form is mandatory. It is to be completed by the project manager and/or design engineer. After the form is completed, a copy is submitted to the responsible health and safety professional who will review it, and make any necessary state or local notifications.

Attachment 1. Selection of Protective Systems for Excavations 20 Feet or Less in Depth

Attachment 2. Sloping Options

Attachment 3. Shoring or Shielding Options

Attachment 4. Responsibility Matrix

Attachment 5. 29 CFR 1926 Subpart P - Excavations

TRENCH/EXCAVATION NOTIFICATION WORKSHEET

Project Number: _____ Project Name: _____

Customer's Name: _____

Specific Jobsite Location: _____

Nearest Major Cross Street: _____

City: _____ County: _____

Name and Title of Site Supervisor: _____

Starting Date: _____ Estimated Completion Date: _____

High Voltage Lines in Proximity: YES _____ NO _____ How Near _____

Depth Range (ft): _____ _____ Width Range (ft): _____ _____ Length (ft): _____

min max min max

Project Description: _____

_____

Anticipated Soil Condition: Hard Compact _____ Unstable _____ Running _____

Ground Protection Method: Shoring _____ Sloping _____

Trench Shield _____ Alternate _____

ALL METHODS MUST MEET ACCEPTED ENGINEERED REQUIREMENTS.
PLANS MUST BE KEPT ON-SITE.

Describe Chemical Hazards at Site: _____

_____

Subcontractor's Name: _____

Equipment to be Used: _____

Design Engineer: _____ Project Supervisor: _____

Phone: ( ) _____

HEALTH AND SAFETY USE ONLY

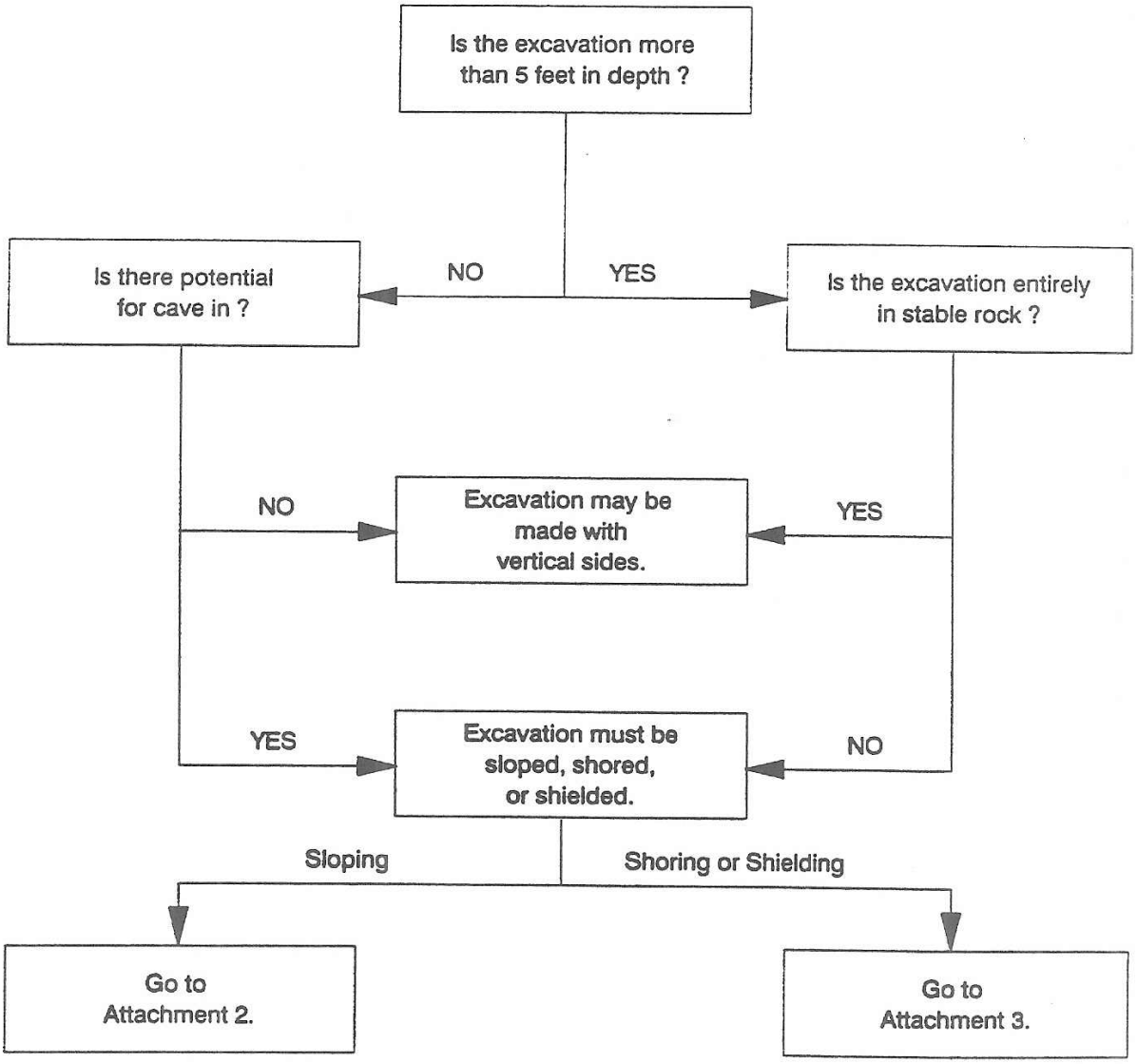
EQ Permit Number: _____ Date Issued: _____ Expires: _____

Issued By: _____

ATTACHMENT 1.

Selection of Protective Systems for Excavations

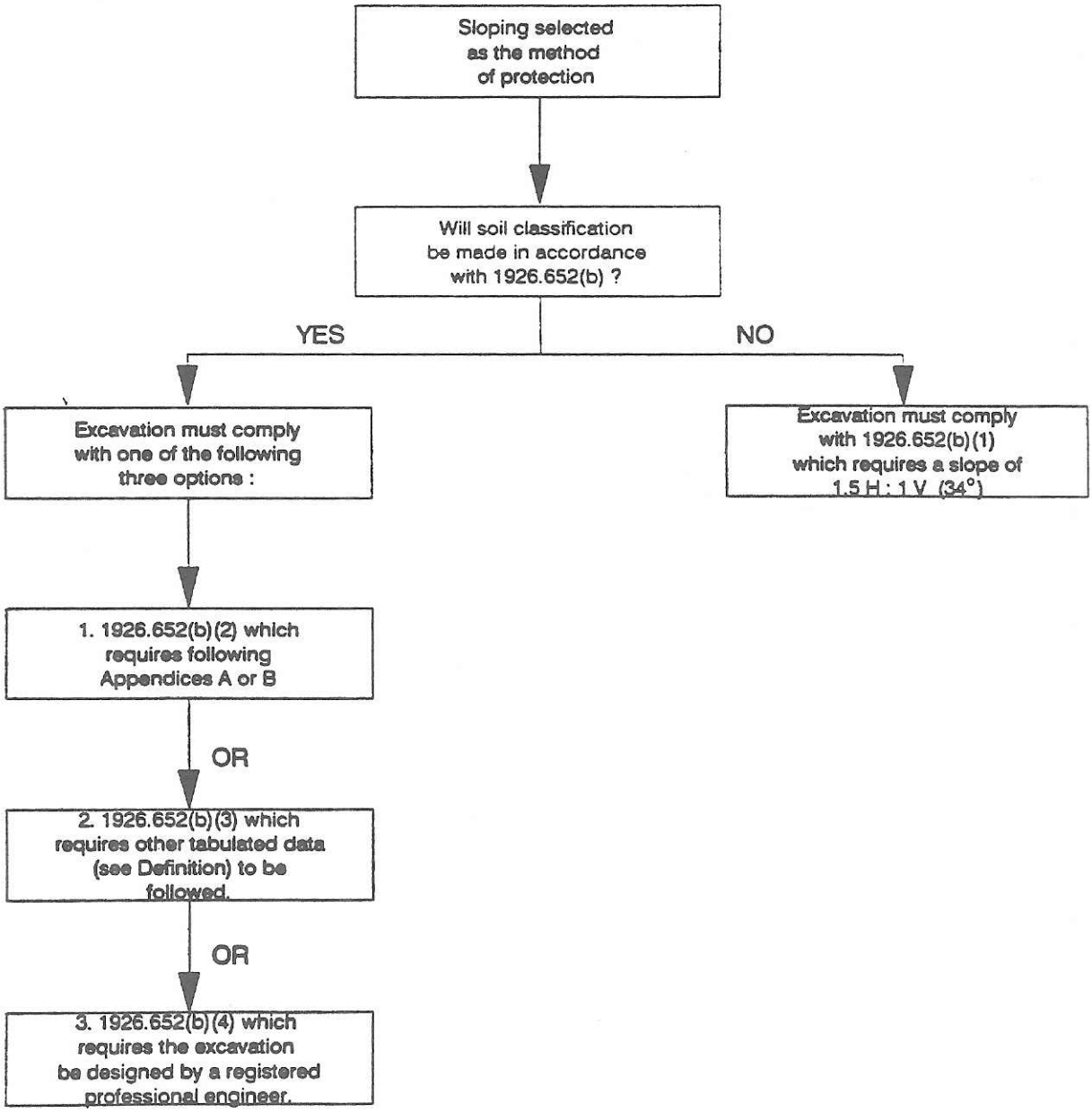
20 Feet or Less in Depth



For excavations greater than 20 feet in depth, design by a registered professional engineer in compliance with 1926.652(b) and (c) is required.

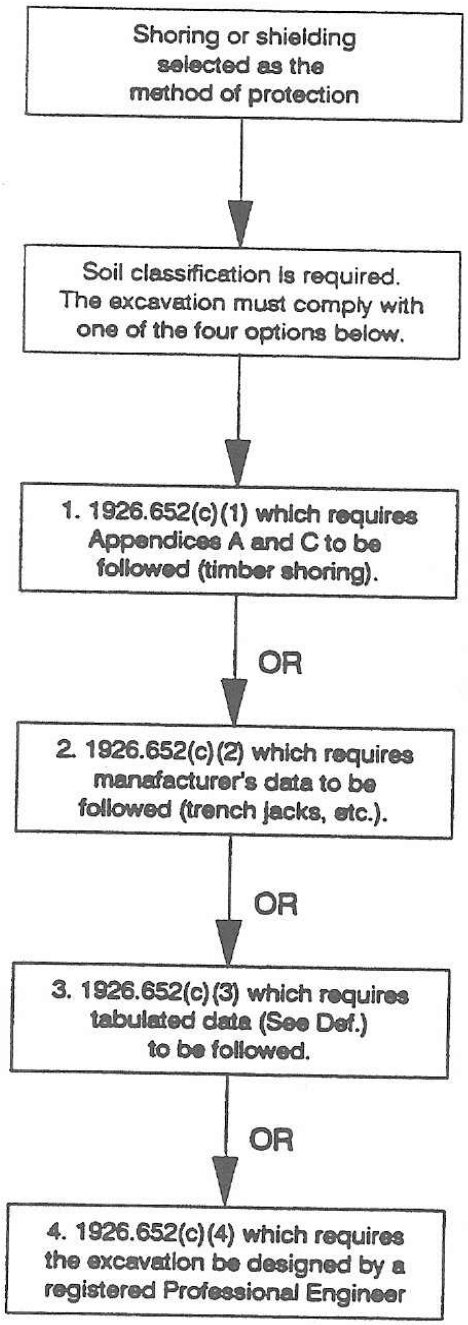
ATTACHMENT 2.

Sloping Options



ATTACHMENT 3.

Shoring or Shielding Options



Subpart P--Excavations

Sec. 1926.650 Scope, application, and definitions applicable to this subpart.

Authority: Sec. 107, Contract Worker Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Hea1th Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), or 9-83 (48 FR 35736), as applicable, and 29 CFR part 1911.

Source: 54 FR 45959, Oct. 31, 1989, unless otherwise noted.

(a) Scope and application. This subpart applies to all open excavations made in the earth's surface. Excavations are defined to include trenches.

(b) Definitions applicable to this subpart.

Accepted engineering practices means those requirements which are compatible with standards of practice required by a registered professional engineer.

Aluminum Hydraulic Shoring means a pre-engineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such system is designed, specifically to support the sidewalls of an excavation and prevent cave-ins.

Bell-bottom pier hole means a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

Benching (Benching system) means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Cross braces mean the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Faces or sides means the vertical or inclined earth surfaces formed as a result of excavation work.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Hazardous atmosphere means an atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Kickout means the accidental release or failure of a cross brace.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a ``registered professional engineer "within the meaning of this standard when approving designs for ``manufactured protective systems "or ``tabulated data "to be used in interstate commerce.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with Sec. 1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as ``trench boxes "or ``trench shields. "

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sides. See ``Faces. "

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Structural ramp means a ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

Support system means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated data means tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench (Trench excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce

the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Trench box. See ``Shield. "

Trench shield. See ``Shield. "

Uprights means the vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called ``sheeting. "

Wales means horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

Sec. 1926.651 Specific excavation requirements.

(a) Surface encumbrances. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(b) Underground installations. (1) The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

(2) Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used.

(3) When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

(4) While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

(c) Access and egress--(1) Structural ramps. (i) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(ii) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(iii) Structural members used for ramps and runways shall be of uniform thickness.

(iv) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(v) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

(2) Means of egress from trench excavations. A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

(d) Exposure to vehicular traffic. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(e) Exposure to falling loads. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with Sec. 1926.601(b)(6), to provide adequate protection for the operator during loading and unloading operations.

(f) Warning system for mobile equipment. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(g) Hazardous atmospheres--(1) Testing and controls. In addition to the requirements set forth in subparts D and E of this part (29 CFR 1926.50-1926.107) to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

(i) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.

(ii) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation in accordance with subparts D and E of this part respectively.

(iii) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(iv) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(2) Emergency rescue equipment. (i) Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

(ii) Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a life-line securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

(h) Protection from hazards associated with water accumulation. (1) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(2) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

(3) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent

surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with paragraphs (h)(1) and (h)(2) of this section.

(i) Stability of adjacent structures. (1) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

(2) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

(i) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

(ii) The excavation is in stable rock; or

(iii) A registered professional engineer has approved the determination that the structure is sufficently removed from the excavation so as to be unaffected by the excavation activity; or

(iv) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

(3) Sidewalks, pavements, and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(j) Protection of employees from loose rock or soil. (1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(2) Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

(k) Inspections. (1) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(2) Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

(l) Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with Sec. 1926.502(b) shall be provided where walkways are 6 feet (1.8 m) or more above lower levels.

[54 FR 45959, Oct. 31, 1989, as amended by 59 FR 40730, Aug. 9, 1994]

Sec. 1926.652 Requirements for protective systems.

(a) Protection of employees in excavations. (1) Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with paragraph (b) or (c) of this section except when:

(i) Excavations are made entirely in stable rock; or

(ii) Excavations are less than 5 feet (1.52m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

(2) Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

(b) Design of sloping and benching systems. The slopes and configurations of sloping and benching systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of paragraph (b)(1); or, in the alternative, paragraph (b)(2); or, in the alternative, paragraph (b)(3), or, in the alternative, paragraph (b)(4), as follows:

(1) Option (1)--Allowable configurations and slopes. (i) Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.

(ii) Slopes specified in paragraph (b)(1)(i) of this section, shall be excavated to form configurations that are in accordance with the slopes shown for Type C soil in Appendix B to this subpart.

(2) Option (2)--Determination of slopes and configurations using Appendices A and B. Maximum allowable slopes, and allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements set forth in appendices A and B to this subpart.

(3) Option (3)--Designs using other tabulated data. (i) Designs of sloping or benching systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and shall include all of the following:

(A) Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;

(B) Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;

(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Secretary upon request.

(4) Option (4)--Design by a registered professional engineer. (i) Sloping and benching systems not utilizing Option (1) or Option (2) or Option (3) under paragraph (b) of this section shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include at least the following:

(A) The magnitude of the slopes that were determined to be safe for the particular project;

(B) The configurations that were determined to be safe for the particular project; and

(C) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time the design need not be at the jobsite, but a copy shall be made available to the Secretary upon request.

(c) Design of support systems, shield systems, and other protective systems. Designs of support systems shield systems, and other protective systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of paragraph
(c)(1); or, in the alternative, paragraph (c)(2); or, in the alternative, paragraph (c)(3); or, in the alternative, paragraph (c)(4) as follows:

(1) Option (1)--Designs using appendices A, C and D. Designs for timber shoring in trenches shall be determined in accordance with the conditions and requirements set forth in appendices A and C to this subpart. Designs for aluminum hydraulic shoring shall be in accordance with paragraph (c)(2) of this section, but if manufacturer's tabulated data cannot be utilized, designs shall be in accordance with appendix D.

(2) Option (2)--Designs Using Manufacturer's Tabulated Data. (i) Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

(ii) Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall only be allowed after the manufacturer issues specific written approval.

(iii) Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations shall be in written form at the jobsite during construction of the protective system. After that time this data may be stored off the jobsite, but a copy shall be made available to the Secretary upon request.

(3) Option (3)--Designs using other tabulated data. (i) Designs of support systems, shield systems, or other protective systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and include all of the following:

(A) Identification of the parameters that affect the selection of a protective system drawn from such data;

(B) Identification of the limits of use of the data;

(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Secretary upon request.

(4) Option (4)--Design by a registered professional engineer. (i) Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2 or Option 3, above, shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include the following:

(A) A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and

(B) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design shall be made available to the Secretary upon request.

(d) Materials and equipment. (1) Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function.

(2) Manufactured materials and equipment used for protective systems shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

(3) When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

(e) Installation and removal of support--(1) General. (i) Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

(ii) Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

(iii) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

(iv) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

(v) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

(vi) Backfilling shall progress together with the removal of support systems from excavations.

(2) Additional requirements for support systems for trench excavations. (i) Excavation of material to a level no greater than 2 feet (.61 m) below the bottom of the members of a support system shall be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

(ii) Installation of a support system shall be closely coordinated with the excavation of trenches.

(f) Sloping and benching systems. Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

(g) Shield systems--(1) General. (i) Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.

(ii) Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

(iii) Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

(iv) Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

(2) Additional requirement for shield systems used in trench excavations. Excavations of earth material to a level not greater than 2 feet (.61 m) below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

Appendix A to Subpart P--Soil Classification

(a) Scope and application--(1) Scope. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth
requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) Application. This appendix applies when a sloping or benching system is designed in accordance with the requirements set forth in Sec. 1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum hydraulic shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in Sec. 1926.652(c), and the use of the data is predicated on the use of the soil classification system set forth in this appendix.

(b) Definitions. The definitions and examples given below are based on, in whole or in part, the following: American Society for Testing Materials (ASTM) Standards D653-85 and D2488; The Unified Soils Classification System, The U.S. Department of Agriculture (USDA) Textural Classification Scheme; and The National Bureau of Standards Report BSS-121.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Dry soil means soil that does not exhibit visible signs of moisture content.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt, (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Soil classification system means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Submerged soil means soil which is underwater or is free seeping.

Type A means cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

(i) The soil is fissured; or

(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or

(iii) The soil has been previously disturbed; or

(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or

(v) The material is subject to other factors that would require it to be classified as a less stable material.

Type B means:

(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or

(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.

(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.

(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or

(v) Dry rock that is not stable; or

(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C means:

(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or

(ii) Granular soils including gravel, sand, and loamy sand; or

(iii) Submerged soil or soil from which water is freely seeping; or

(iv) Submerged rock that is not stable, or

(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) Requirements--(1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.

(2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other recognized methods of soil classification and testing such as those adopted by the America Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

(3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of this appendix, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.

(4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

(5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(d) Acceptable visual and manual tests.--(1) Visual tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

(v) Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

(vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

(2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

(i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as \1/8\-inch in diameter.

Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of \1/8\-inch thread can be held on one end without tearing, the soil is cohesive.

(ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

(iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488--``Standard Recommended Practice for Description of Soils (Visual--Manual Procedure). '') Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a miminum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

(iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

(v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as a unfissured cohesive material and the unconfined compressive strength should be determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

Appendix B to Subpart P--Sloping and Benching

(a) Scope and application. This appendix contains specifications for sloping and benching when used as methods of protecting employees working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protective systems is to be performed in accordance with the requirements set forth in Sec. 1926.652(b)(2).

(b) Definitions.

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phenomena as the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slumping of material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the face of an excavation; and travelling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the face of an excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

(c) Requirements--(1) Soil classification. Soil and rock deposits shall be classified in accordance with appendix A to subpart P of part 1926.

(2) Maximum allowable slope. The maximum allowable slope for a soil or rock deposit shall be determined from Table B-1 of this appendix.

(3) Actual slope. (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope shall be cut back to an actual slope which is at least \1/2\ horizontal to one vertical (\1/2\H:1V) less steep than the maximum allowable slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with Sec. 1926.651(i).

(4) Configurations. Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1

MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) [1] FOR EXCAVATIONS LESS THAN 20 FEET DEEP [3]
STABLE ROCK TYPE A [2] TYPE B TYPE C	VERTICAL (90°) 3/4 : 1 (53°) 1:1 (45°) 1½: 1 (34)

NOTES:

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).
3. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

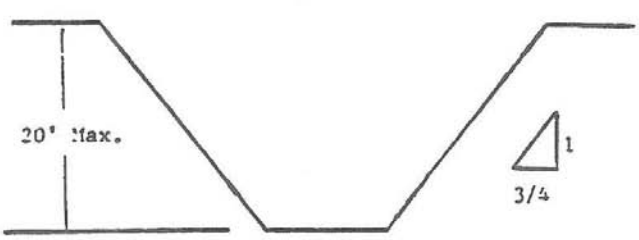
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

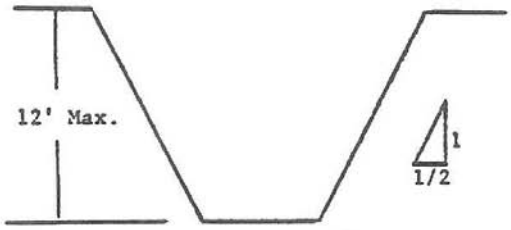
B-1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



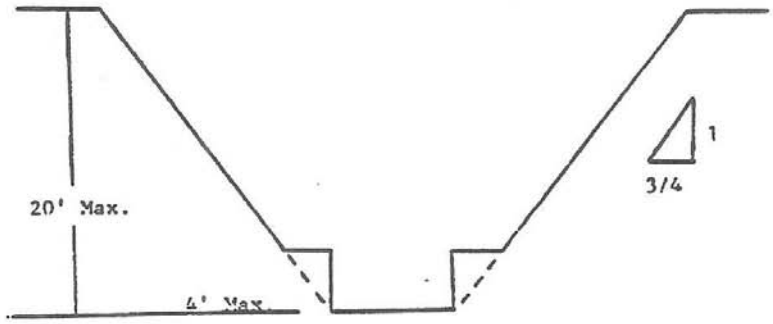
Simple Slope—General

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of ½:1.

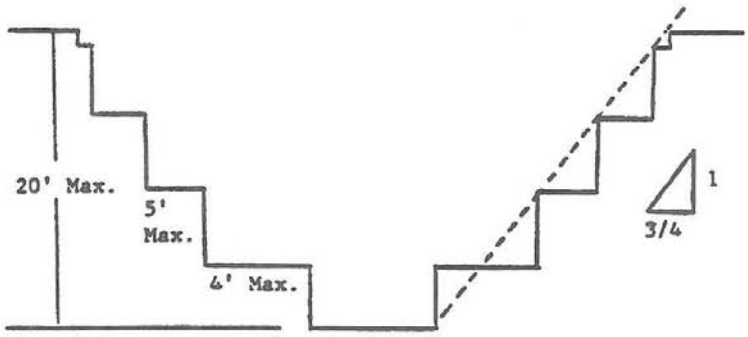


Simple Slope—Short Term

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of ¾ to 1 and maximum bench dimensions as follows·

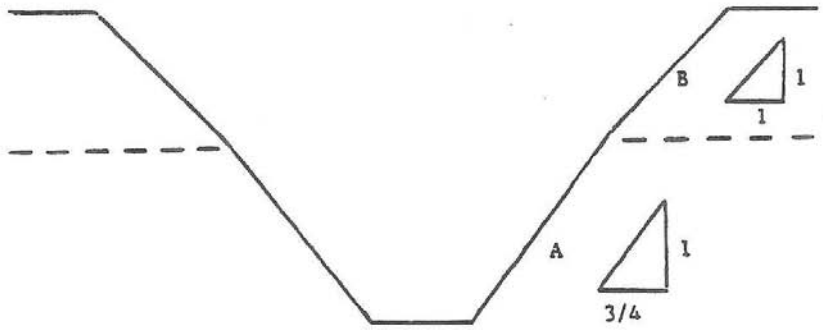


Simple Bench

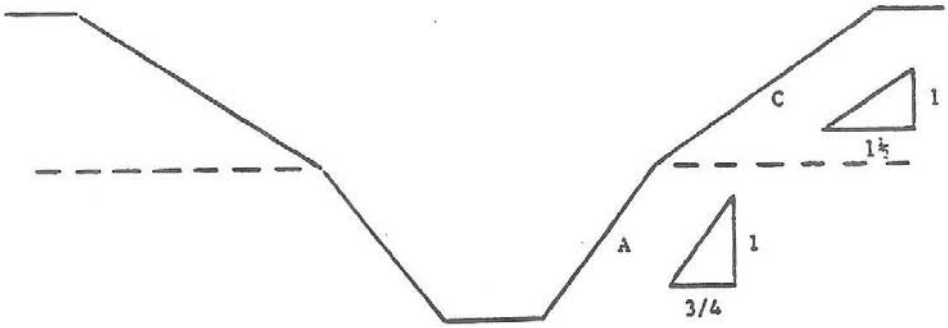


Multiple Bench

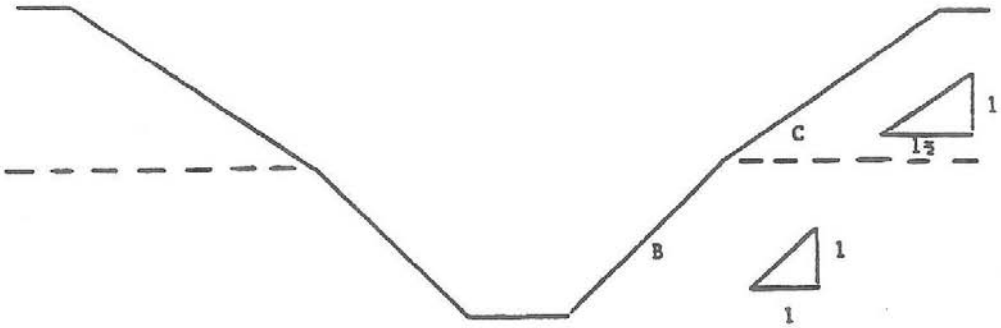
3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3½ feet.



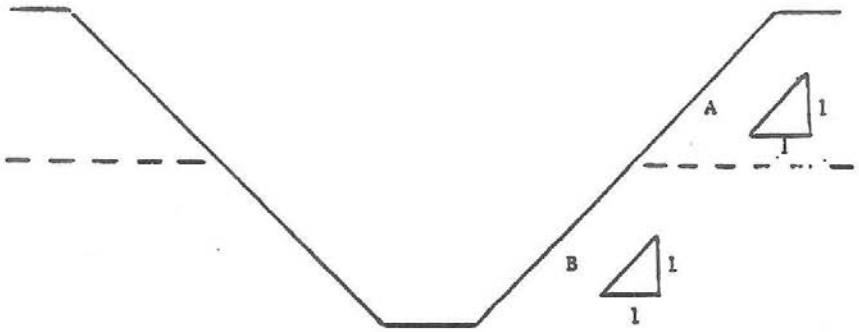
B OVER A



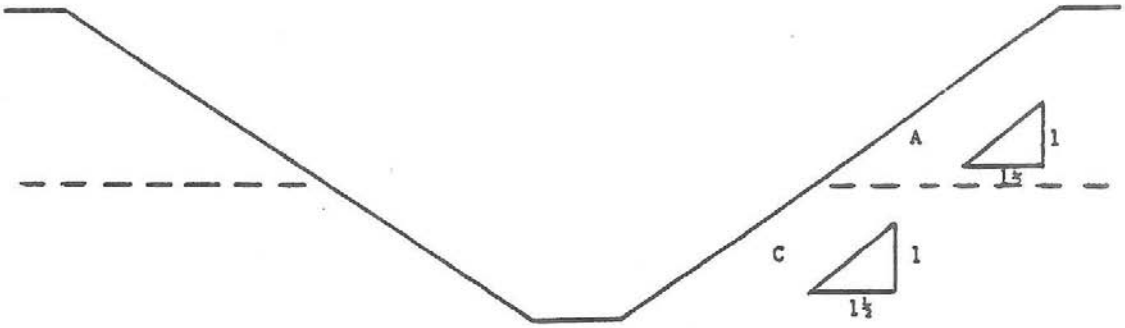
C OVER A



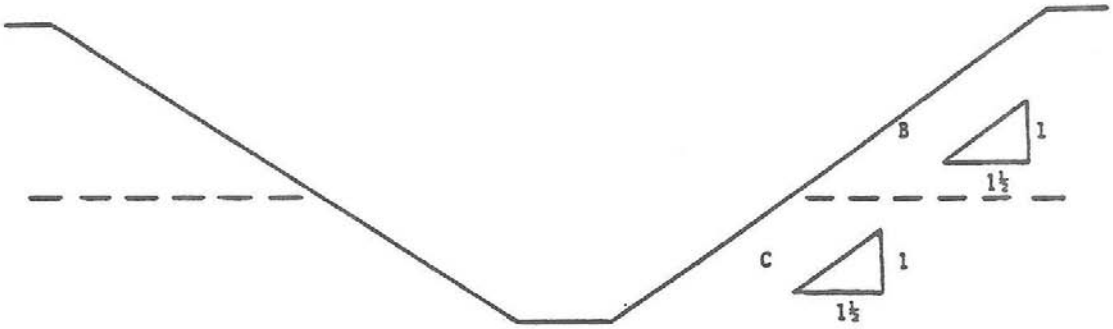
C OVER B



A OVER B



A OVER C



B OVER C

B-1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of \3/4\:1.

Simple Slope--General

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of \1/2\:1.

Simple Slope--Short Term

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of \3/4\ to 1 and maximum bench dimensions as follows:

Multiple Bench

3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3\1/2\ feet.

Unsupported Vertically Sided Lower Portion--Maximum 8 Feet in Depth

All excavations more than 8 feet but not more than 12 feet in depth which unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3\1/2\ feet.

Unsupported Vertically Sided Lower Portion--Maximum 12 Feet in Depth

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of \3/4\:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

Supported or Shielded Vertically Sided Lower Portion

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under Sec. 1926.652(b).

B-1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

Simple Slope

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:

Multiple Bench

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

Vertically Sided Lower Portion

4. All other sloped excavations shall be in accordance with the other options permitted in Sec. 1926.652(b).

B-1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1\1/2\:1.

Simple Slope

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1\1/2\:1.

Vertical Sided Lower Portion

3. All other sloped excavations shall be in accordance with the other options permitted in Sec. 1926.652(b).

B-1.4 Excavations Made in Layered Soils

1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.

2. All other sloped excavations shall be in accordance with the other options permitted in Sec. 1926.652(b).

Appendix C to Subpart P--Timber Shoring for Trenches

(a) Scope. This appendix contains information that can be used timber shoring is provided as a method of protection from cave-ins in trenches that do not exceed 20 feet (6.1 m) in depth. This appendix must be used when design of timber shoring protective systems is to be performed in accordance with Sec. 1926.652(c)(1). Other timber

shoring configurations; other systems of support such as hydraulic and pneumatic systems; and other protective systems such as sloping, benching, shielding, and freezing systems must be designed in accordance with the requirements set forth in Sec. 1926.652(b) and Sec. 1926.652(c).

(b) Soil Classification. In order to use the data presented in this appendix, the soil type or types in which the excavation is made must first be determined using the soil classification method set forth in appendix A of subpart P of this part.

(c) Presentation of Information. Information is presented in several forms as follows:

(1) Information is presented in tabular form in Tables C-1.1, C-1.2, and C-1.3, and Tables C-2.1, C-2.2 and C-2.3 following paragraph (g) of the appendix. Each table presents the minimum sizes of timber members to use in a shoring system, and each table contains data only for the particular soil type in which the excavation or portion of the excavation is made. The data are arranged to allow the user the flexibility to select from among several acceptable configurations of members based on varying the horizontal spacing of the crossbraces. Stable rock is exempt from shoring requirements and therefore, no data are presented for this condition.

(2) Information concerning the basis of the tabular data and the limitations of the data is presented in paragraph (d) of this appendix, and on the tables themselves.

(3) Information explaining the use of the tabular data is presented in paragraph (e) of this appendix.

(4) Information illustrating the use of the tabular data is presented in paragraph (f) of this appendix.

(5) Miscellaneous notations regarding Tables C-1.1 through C-1.3 and Tables C-2.1 through C-2.3 are presented in paragraph (g) of this Appendix.

(d) Basis and limitations of the data.--(1) Dimensions of timber members. (i) The sizes of the timber members listed in Tables C-1.1 through C-1.3 are taken from the National Bureau of Standards (NBS) report, ``Recommended Technical Provisions for Construction Practice in Shoring and Sloping of Trenches and Excavations. ''In addition, where NBS did not recommend specific sizes of members, member sizes are based on an analysis of the sizes required for use by existing codes and on empirical practice.

(ii) The required dimensions of the members listed in Tables C-1.1 through C-1.3 refer to actual dimensions and not nominal dimensions of the timber. Employers wanting to use nominal size shoring are directed to Tables C-2.1 through C-2.3, or have this choice under Sec. 1926.652(c)(3), and are referred to The Corps of Engineers, The Bureau of Reclamation or data from other acceptable sources.

(2) Limitation of application. (i) It is not intended that the timber shoring specification apply to every situation that may be experienced in the field. These data were developed to apply to the situations that are most commonly experienced in current trenching practice. Shoring systems for use in situations that are not covered by the data in this appendix must be designed as specified in Sec. 1926.652(c).

(ii) When any of the following conditions are present, the members specified in the tables are not considered adequate. Either an alternate timber shoring system must be designed or another type of protective system designed in accordance with Sec. 1926.652.

(A) When loads imposed by structures or by stored material adjacent to the trench weigh in excess of the load imposed by a two-foot soil surcharge. The term ``adjacent ''

as used here means the area within a horizontal distance from the edge of the trench equal to the depth of the trench.

(B) When vertical loads imposed on cross braces exceed a 240-pound gravity load distributed on a one-foot section of the center of the crossbrace.

(C) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

(D) When only the lower portion of a trench is shored and the remaining portion of the trench is sloped or benched unless: The sloped portion is sloped at an angle less steep than three horizontal to one vertical; or the members are selected from the tables for use at a depth which is determined from the top of the overall trench, and not from the toe of the sloped portion.

(e) Use of Tables. The members of the shoring system that are to be selected using this information are the cross braces, the uprights, and the wales, where wales are required. Minimum sizes of members are specified for use in different types of soil. There are six tables of information, two for each soil type. The soil type must first be determined in accordance with the soil classification system described in appendix A to subpart P of part 1926. Using the appropriate table, the selection of the size and spacing of the members is then made. The selection is based on the depth and width of the trench where the members are to be installed and, in most instances, the selection is also based on the horizontal spacing of the crossbraces. Instances where a choice of horizontal spacing of crossbracing is available, the horizontal spacing of the crossbraces must be chosen by the user before the size of any member can be determined. When the soil type, the width and depth of the trench, and the horizontal spacing of the crossbraces are known, the size and vertical spacing of the crossbraces, the size and vertical spacing of the wales, and the size and horizontal spacing of the uprights can be read from the appropriate table.

(f) Examples to Illustrate the Use of Tables C-1.1 through C-1.3.

(1) Example 1.

A trench dug in Type A soil is 13 feet deep and five feet wide.

From Table C-1.1, for acceptable arrangements of timber can be used.

Arrangement B1

Space 4 x 4 crossbraces at six feet horizontally and four feet vertically.

Wales are not required.

Space 3 x 8 uprights at six feet horizontally. This arrangement is commonly called “skip shoring.”

Arrangement B2

Space 4 x 6 crossbraces at eight feet horizontally and four feet vertically.

Space 8 x 8 wales at four feet vertically.

Space 2 x 6 uprights at four feet horizontally.

Arrangement B3

Space 6 x 6 crossbraces at 10 feet horizontally and four feet vertically.
Space 8 x 10 wales at four feet vertically.
Space 2 x 6 uprights at five feet horizontally.

Arrangement B4

Space 6 x 6 crossbraces at 12 feet horizontally and four feet vertically.
Space 10 x 10 wales at four feet vertically.
Spaces 3 x 8 uprights at six feet horizontally.
(2) Example 2.
A trench dug in Type B soil in 13 feet deep and five feet wide. From Table C-1.2 three acceptable arrangements of members are listed.

Arrangement B1

Space 6 x 6 crossbraces at six feet horizontally and five feet vertically.
Space 8 x 8 wales at five feet vertically.
Space 2 x 6 uprights at two feet horizontally.

Arrangement B2

Space 6 x 8 crossbraces at eight feet horizontally and five feet vertically.
Space 10 x 10 wales at five feet vertically.
Space 2 x 6 uprights at two feet horizontally.

Arrangement B3

Space 8 x 8 crossbraces at 10 feet horizontally and five feet vertically.
Space 10 x 12 wales at five feet vertically.
Space 2 x 6 uprights at two feet vertically.
(3) Example 3.
A trench dug in Type C soil is 13 feet deep and five feet wide.
From Table C-1.3 two acceptable arrangements of members can be used.

Arrangement B1

Space 8 x 8 crossbraces at six feet horizontally and five feet vertically.
Space 10 x 12 wales at five feet vertically.
Position 2 x 6 uprights as closely together as possible.
If water must be retained use special tongue and groove uprights to form tight sheeting.

Arrangement B2

Space 8 x 10 crossbraces at eight feet horizontally and five feet vertically.
Space 12 x 12 wales at five feet vertically.
Position 2 x 6 uprights in a close sheeting configuration unless water pressure must be resisted. Tight sheeting must be used where water must be retained.
(4) Example 4.
A trench dug in Type C soil is 20 feet deep and 11 feet wide. The size and spacing of members for the section of trench that is over 15 feet in depth is determined using Table C-1.3. Only one arrangement of members is provided.
Space 8 x 10 crossbraces at six feet horizontally and five feet

vertically.

Space 12 x 12 wales at five feet vertically.

Use 3 x 6 tight sheeting.

Use of Tables C-2.1 through C-2.3 would follow the same procedures.

(g) Notes for all Tables.

1. Member sizes at spacings other than indicated are to be determined as specified in Sec. 1926.652(c), ``Design of Protective Systems. "

2. When conditions are saturated or submerged use Tight Sheeting. Tight Sheeting refers to the use of specially-edged timber planks (e.g., tongue and groove) at least three inches thick, steel sheet piling, or similar construction that when driven or placed in position provide a tight wall to resist the lateral pressure of water and to prevent the loss of backfill material. Close Sheeting refers to the placement of planks side-by-side allowing as little space as possible between them.

3. All spacing indicated is measured center to center.

4. Wales to be installed with greater dimension horizontal.

5. If the vertical distance from the center of the lowest crossbrace to the bottom of the trench exceeds two and one-half feet, uprights shall be firmly embedded or a mudsill shall be used. Where uprights are embedded, the vertical distance from the center of the lowest crossbrace to the bottom of the trench shall not exceed 36 inches. When mudsills are used, the vertical distance shall not exceed 42 inches. Mudsills are wales that are installed at the toe of the trench side.

6. Trench jacks may be used in lieu of or in combination with timber crossbraces.

7. Placement cf crossbraces. When the vertical spacing of crossbraces is four feet, place the top crossbrace no more than two feet below the top of the trench. When the vertical spacing of crossbraces is five feet, place the top crossbrace no more than 2.5 feet below the top of the trench.

TABLE C-1.1

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE A $P_a = 25 \times H + 72$ psf (2 ft Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS **													
	CROSS BRACES							WALES		UPRIGHTS				
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	4	5	6	8
5 TO 10	UP TO 6	4X4	4X4	4X6	6X6	6X6	4	Not Req'd	---				2X6	
	UP TO 8	4X4	4X4	4X6	6X6	6X6	4	Not Req'd	---					2X8
	UP TO 10	4X6	4X6	4X6	6X6	6X6	4	8X8	4			2X6		
	UP TO 12	4X6	4X6	6X6	6X6	6X6	4	8X8	4				2X6	
10 TO 15	UP TO 6	4X4	4X4	4X6	6X6	6X6	4	Not Req'd	---				3X8	
	UP TO 8	4X6	4X6	6X6	6X6	6X6	4	8X8	4		2X6			
	UP TO 10	6X6	6X5	6X6	6X8	6X8	4	8X10	4			2X6		
	UP TO 12	6X6	6X6	6X6	6X8	6X8	4	10X10	4				3X8	
15 TO 20	UP TO 6	6X6	6X6	6X6	6X8	6X8	4	6X8	4	3X6				
	UP TO 8	6X6	6X6	6X6	6X8	6X8	4	8X8	4	3X6				
	UP TO 10	8X8	8X8	8X8	8X8	8X10	4	8X10	4	3X6				
	UP TO 12	8X8	8X8	8X8	8X8	8X10	4	10X10	4	3X6				
OVER 20	SEE NOTE 1													

* Mixed oak or equivalent with a bending strength not less than 850 psi.
** Manufactured members of equivalent strength may by substituted for wood.

TABLE C-1.2

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE B $P_a = 45 \times H + 72$ psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS**													
	CROSS BRACES							WALES		UPRIGHTS				
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	2	3		
5 TO 10	UP TO 6	4X6	4X6	6X6	6X6	6X6	5	6X8	5			2X6		
	UP TO 8	6X6	6X6	6X6	6X8	6X8	5	8X10	5			2X6		
	UP TO 10	6X6	6X6	6X6	6X8	6X8	5	10X10	5			2X6		
	See Note 1													
10 TO 15	UP TO 6	6X6	6X6	6X6	6X8	6X8	5	8X8	5		2X6			
	UP TO 8	6X8	6X8	6X8	8X8	8X8	5	10X10	5		2X6			
	UP TO 10	8X8	8X8	8X8	8X8	8X10	5	10X12	5		2X6			
	See Note 1													
15 TO 20	UP TO 6	6X8	6X8	6X8	8X8	8X8	5	8X10	5	3X6				
	UP TO 8	8X8	8X8	8X8	8X8	8X10	5	10X12	5	3X6				
	UP TO 10	8X10	8X10	8X10	8X10	10X10	5	12X12	5	3X6				
	See Note 1													
OVER 20	SEE NOTE 1													

* Mixed oak or equivalent with a bending strength not less than 850 psi.
** Manufactured members of equivalent strength may by substituted for wood.

TABLE C-1.3

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE C $P_a = 80 \times H + 72$ psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS**													
	CROSS BRACES									UPRIGHTS				
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN.)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET) (See Note 2)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE				
5 TO 10	UP TO 6	6X8	6X8	6X8	8X8	8X8	5	8X10	5	2X6				
	UP TO 8	8X8	8X8	8X8	8X8	8X10	5	10X12	5	2X6				
	UP TO 10	8X10	8X10	8X10	8X10	10X10	5	12X12	5	2X6				
	See Note 1													
10 TO 15	UP TO 6	8X8	8X8	8X8	8X8	8X10	5	10X12	5	2X6				
	UP TO 8	8X10	8X10	8X10	8X10	10X10	5	12X12	5	2X6				
	See Note 1													
	See Note 1													
15 TO 20	UP TO 6	8X10	8X10	8X10	8X10	10X10	5	12X12	5	3X6				
	See Note 1													
	See Note 1													
	See Note 1													
OVER 20	SEE NOTE 1													

* Mixed Oak or equivalent with a bending strength not less than 850 psi.
** Manufactured members of equivalent strength may be substituted for wood.

TABLE C-2.2

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE B P_a = 45 X H + 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (S4S) AND SPACING OF MEMBERS **													
	CROSS BRACES							WALES		UPRIGHTS				
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	2	3	4	6
5 TO 10	UP TO 6	4X6	4X6	4X6	6X6	6X6	5	6X8	5			3X12 4X8		4X12
	UP TO 8	4X6	4X6	6X6	6X6	6X6	5	8X8	5		3X8		4X8	
	UP TO 10	4X6	4X6	6X6	6X6	6X8	5	8X10	5			4X8		
	See Note 1													
10 TO 15	UP TO 6	6X6	6X6	6X6	6X8	6X8	5	8X8	5	3X6	4X10			
	UP TO 8	6X8	6X8	6X8	8X8	8X8	5	10X10	5	3X6	4X10			
	UP TO 10	6X8	6X8	8X8	8X8	8X8	5	10X12	5	3X6	4X10			
	See Note 1													
15 TO 20	UP TO 6	6X8	6X8	6X8	6X8	8X8	5	8X10	5	4X6				
	UP TO 8	6X8	6X8	6X8	8X8	8X8	5	10X12	5	4X6				
	UP TO 10	8X8	8X8	8X8	8X8	8X8	5	12X12	5	4X6				
	See Note 1													
OVER 20	SEE NOTE 1													

* Douglas fir or equivalent with a bending strength not less than 1500 psi.
** Manufactured members of equivalent strength may be substituted for wood.

Appendix D to Subpart P--Aluminum Hydraulic Shoring for Trenches

(a) Scope. This appendix contains information that can be used when aluminum hydraulic shoring is provided as a method of protection against cave-ins in trenches that do not exceed 20 feet (6.1m) in depth. This appendix must be used when design of the aluminum hydraulic protective system cannot be performed in accordance with Sec. 1926.652(c)(2).

(b) Soil Classification. In order to use data presented in this appendix, the soi1 type or types in which the excavation is made must first be determined using the soil classification method set forth in appendix A of subpart P of part 1926.

(c) Presentation of Information. Information is presented in several forms as follows:

(1) Information is presented in tabular form in Tables D-1.1, D-1.2, D-1.3 and E-1.4. Each table presents the maximum vertical and horizontal spacings that may be used with various aluminum member sizes and various hydraulic cylinder sizes. Each table contains data only for the particular soil type in which the excavation or portion of the excavation is made. Tables D-1.1 and D-1.2 are for vertical shores in Types A and B soil. Tables D-1.3 and D1.4 are for horizontal waler systems in Types B and C soil.

(2) Information concerning the basis of the tabular data and the limitations of the data is presented in paragraph (d) of this appendix.

(3) Information explaining the use of the tabular data is presented in paragraph (e) of this appendix.

(4) Information illustrating the use of the tabular data is presented in paragraph (f) of this appendix.

(5) Miscellaneous notations (footnotes) regarding Table D-1.1 through D-1.4 are presented in paragraph (g) of this appendix.

(6) Figures, illustrating typical installations of hydraulic shoring, are included just prior to the Tables. The illustrations page is entitled ``Aluminum Hydraulic Shoring; Typical Installations. ''

(d) Basis and limitations of the data.

(1) Vertical shore rails and horizontal wales are those that meet the Section Modulus requirements in the D-1 Tables. Aluminum material is 6061-T6 or material of equivalent strength and properties.

(2) Hydraulic cylinders specifications. (i) 2-inch cylinders shall be a minimum 2-inch inside diameter with a minimum safe working capacity of no less than 18,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(ii) 3-inch cylinders shall be a minimum 3-inch inside diameter with a safe working capacity of not less than 30,000 pounds axial compressive load at extensions as recommended by product manufacturer.

(3) Limitation of application.

(i) It is not intended that the aluminum hydraulic specification apply to every situation that may be experienced in the field. These data were developed to apply to the situations that are most commonly experienced in current trenching practice. Shoring systems for use in situations that are not covered by the data in this appendix must be otherwise designed as specified in Sec. 1926.652(c).

(ii) When any of the following conditions are present, the members specified in the Tables are not considered adequate. In this case, an alternative aluminum hydraulic

shoring system or other type of protective system must be designed in accordance with Sec. 1926.652.

(A) When vertical loads imposed on cross braces exceed a 100 Pound gravity load distributed on a one foot section of the center of the hydraulic cylinder.

(B) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

(C) When only the lower portion or a trench is shored and the remaining portion of the trench is sloped or benched unless: The sloped portion is sloped at an angle less steep than three horizontal to one vertical; or the members are selected from the tables for use at a depth which is determined from the top of the overall trench, and not from the toe of the sloped portion.

(e) Use of Tables D-1.1, D-1.2, D-1.3 and D-1.4. The members of the shoring system that are to be selected using this information are the hydraulic cylinders, and either the vertical shores or the horizontal wales. When a waler system is used the vertical timber sheeting to be used is also selected from these tables. The Tables D-1.1 and D-1.2 for vertical shores are used in Type A and B soils that do not require sheeting. Type B soils that may require sheeting, and Type C soils that always require sheeting are found in the horizontal wale Tables D-1.3 and D-1.4. The soil type must first be determined in accordance with the soil classification system described in appendix A to subpart P of part 1926. Using the appropriate table, the selection of the size and spacing of the members is made. The selection is based on the depth and width of the trench where the members are to be installed. In these tables the vertical spacing is held constant at four feet on center. The tables show the maximum horizontal spacing of cylinders allowed for each size of wale in the waler system tables, and in the vertical shore tables, the hydraulic cylinder horizontal spacing is the same as the vertical shore spacing.

(f) Example to Illustrate the Use of the Tables:

(1) Example 1:

A trench dug in Type A soil is 6 feet deep and 3 feet wide. From Table D-1.1: Find vertical shores and 2 inch diameter cylinders spaced 8 feet on center (o.c.) horizontally and 4 feet on center (o.c.) vertically. (See Figures 1 & 3 for typical installations.)

(2) Example 2:

A trench is dug in Type B soil that does not require sheeting, 13 feet deep and 5 feet wide. From Table D-1.2: Find vertical shores and 2 inch diameter cylinders spaced 6.5 feet o.c. horizontally and 4 feet o.c. vertically. (See Figures 1 & 3 for typical installations.)

(3) A trench is dug in Type B soil that does not require sheeting, but does experience some minor raveling of the trench face. The trench is 16 feet deep and 9 feet wide. From Table D-1.2: Find vertical shores and 2 inch diameter cylinder (with special oversleeves as designated by footnote B2) spaced 5.5 feet o.c. horizontally and 4 feet o.c. vertically, plywood (per footnote (g)(7) to the D-1 Table) should be used behind the shores. (See Figures 2 & 3 for typical installations.)

(4) Example 4: A trench is dug in previously disturbed Type B soil, with characteristics of a Type C soil, and will require sheeting. The trench is 18 feet deep and 12 feet wide. 8 foot horizontal spacing between cylinders is desired for working space. From Table D-1.3: Find horizontal wale with a section modulus of 14.0 spaced at 4 feet o.c. vertically and 3 inch diameter cylinder spaced at 9 feet maximum o.c.

horizontally. 3 x 12 timber sheeting is required at close spacing vertically. (See Figure 4 for typical installation.)

(5) Example 5: A trench is dug in Type C soil, 9 feet deep and 4 feet wide. Horizontal cylinder spacing in excess of 6 feet is desired for working space. From Table D-1.4: Find horizontal wale with a section modulus of 7.0 and 2 inch diameter cylinders spaced at 6.5 feet o.c. horizontally. Or, find horizontal wale with a 14.0 section modulus and 3 inch diameter cylinder spaced at 10 feet o.c. horizontally. Both wales are spaced 4 feet o.c. vertically. 3 x 12 timber sheeting is required at close spacing vertically. (See Figure 4 for typical installation.)

(g) Footnotes, and general notes, for Tables D-1.1, D-1.2, D-1.3, and D-1.4.

(1) For applications other than those listed in the tables, refer to Sec. 1926.652(c)(2) for use of manufacturer's tabulated data. For trench depths in excess of 20 feet, refer to Sec. 1926.652(c)(2) and Sec. 1926.652(c)(3).

(2) 2 inch diameter cylinders, at this width, shall have structural steel tube (3.5 x 3.5 x 0.1875) oversleeves, or structural oversleeves of manufacturer's specification, extending the full, collapsed length.

(3) Hydraulic cylinders capacities. (i) 2 inch cylinders shall be a minimum 2-inch inside diameter with a safe working capacity of not less than 18,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(ii) 3-inch cylinders shall be a minimum 3-inch inside diameter with a safe work capacity of not less than 30,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(4) All spacing indicated is measured center to center.

(5) Vertical shoring rails shall have a minimum section modulus of 0.40 inch.

(6) When vertical shores are used, there must be a minimum of three shores spaced equally, horizontally, in a group.

(7) Plywood shall be 1.125 in. thick softwood or 0.75 inch. thick, 14 ply, arctic white birch (Finland form). Please note that plywood is not intended as a structural member, but only for prevention of local raveling (sloughing of the trench face) between shores.

(8) See appendix C for timber specifications.

(9) Wales are calculated for simple span conditions.

(10) See appendix D, item (d), for basis and limitations of the data.

ALUMINUM HYDRAULIC SHORING
TYPICAL INSTALLATIONS

FIGURE NO. 1
VERTICAL ALUMINUM HYDRAULIC SHORING (SPOT BRACING)

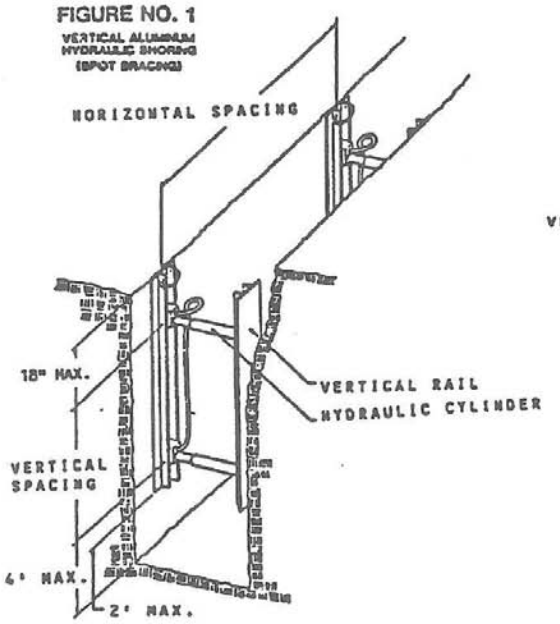


FIGURE NO. 2
VERTICAL ALUMINUM HYDRAULIC SHORING (WITH PLYWOOD)

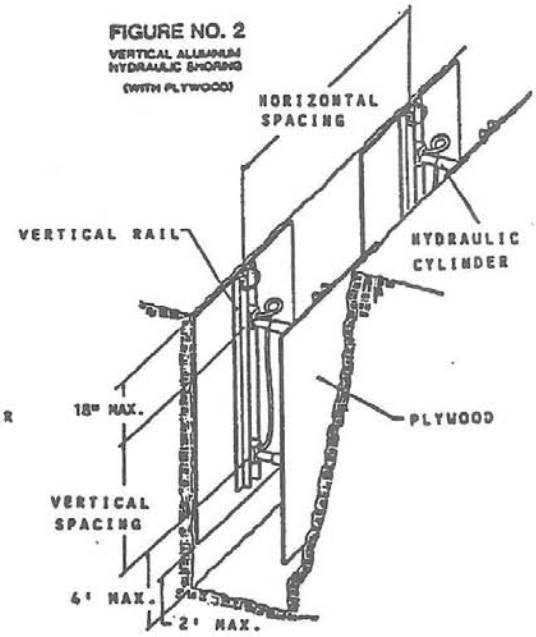


FIGURE NO. 3
VERTICAL ALUMINUM HYDRAULIC SHORING (STACKED)

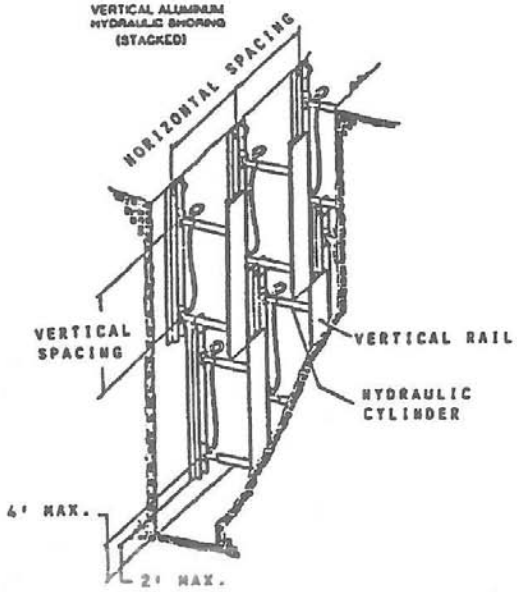


FIGURE NO. 4
ALUMINUM HYDRAULIC SHORING WALER SYSTEM (TYPICAL)

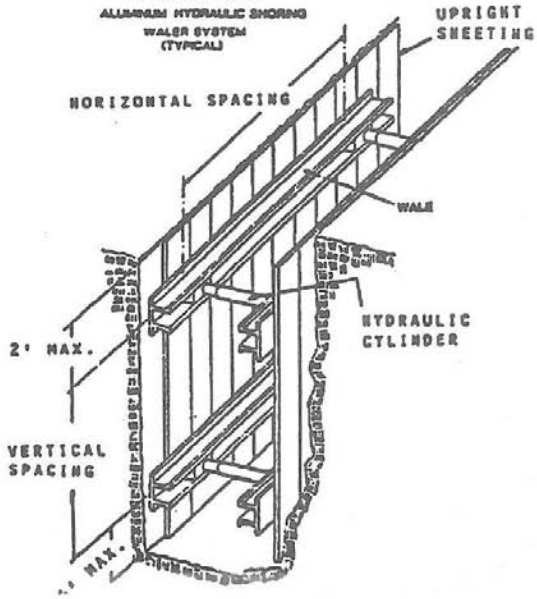


TABLE D - 1.1
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE A

DEPTH OF TRENCH (FEET)	HYDRAULIC CYLINDERS				
	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)	WIDTH OF TRENCH (FEET)		
			UP TO 8	OVER 8 UP TO 12	OVER 12 UP TO 15
OVER 5 UP TO 10	8	4	2 INCH DIAMETER	2 INCH DIAMETER NOTE (2)	3 INCH DIAMETER
OVER 10 UP TO 15	8				
OVER 15 UP TO 20	7				
OVER 20	NOTE (1)				

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Note (1): See Appendix D, Item (g) (1)
Note (2): See Appendix D, Item (g) (2)

TABLE D - 1.2
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE B

DEPTH OF TRENCH (FEET)	HYDRAULIC CYLINDERS				
	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)	WIDTH OF TRENCH (FEET)		
			UP TO 8	OVER 8 UP TO 12	OVER 12 UP TO 15
OVER 5 UP TO 10	8	4	2 INCH DIAMETER	2 INCH DIAMETER NOTE (2)	3 INCH DIAMETER
OVER 10 UP TO 15	6.5				
OVER 15 UP TO 20	5.5				
OVER 20	NOTE (1)				

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Note (1): See Appendix D, Item (g) (1)
Note (2): See Appendix D, Item (g) (2)

TABLE D - 1.3
ALUMINUM HYDRAULIC SHORING
WALER SYSTEMS
FOR SOIL TYPE B

DEPTH OF TRENCH (FEET)	WALES		HYDRAULIC CYLINDERS						TIMBER UPRIGHTS		
			WIDTH OF TRENCH (FEET)						MAX.HORIZ.SPACING (ON CENTER)		
	VERTICAL SPACING (FEET)	* SECTION MODULUS (IN^3)	UP TO 8		OVER 8 UP TO 12		OVER 12 UP TO15		SOLID SHEET	2 FT.	3 FT.
			HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER			
OVER 5 UP TO 10	4	3.5	8.0	2 IN	8.0	2 IN NOTE(2)	8.0	3 IN	—	—	3x12
		7.0	9.0	2 IN	9.0	2 IN NOTE(2)	9.0	3 IN			
		14.0	12.0	3 IN	12.0	3 IN	12.0	3 IN			
OVER 10 UP TO 15	4	3.5	6.0	2 IN	6.0	2 IN NOTE(2)	6.0	3 IN	—	3x12	—
		7.0	8.0	3 IN	8.0	3 IN	8.0	3 IN			
		14.0	10.0	3 IN	10.0	3 IN	10.0	3 IN			
OVER 15 UP TO 20	4	3.5	5.5	2 IN	5.5	2 IN NOTE(2)	5.5	3 IN	3x12	—	—
		7.0	6.0	3 IN	6.0	3 IN	6.0	3 IN			
		14.0	9.0	3 IN	9.0	3 IN	9.0	3 IN			
OVER 20	NOTE (1)										

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Notes (1): See Appendix D, item (g) (1)
Notes (2): See Appendix D, Item (g) (2)
* Consult product manufacturer and/or qualified engineer for Section Modulus of available wales.

TABLE D - 1.4
ALUMINUM HYDRAULIC SHORING
WALER SYSTEMS
FOR SOIL TYPE C

DEPTH OF TRENCH (FEET)	WALES		HYDRAULIC CYLINDERS						TIMBER UPRIGHTS		
			WIDTH OF TRENCH (FEET)						MAX.HORIZ SPACING (ON CENTER)		
	VERTICAL SPACING (FEET)	* SECTION MODULUS (IN^3)	UP TO 8		OVER 8 UP TO 12		OVER 12 UP TO 15		SOLID SHEET	2 FT.	3 FT.
			HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER			
OVER 5 UP TO 10	4	3.5	6.0	2 IN	6.0	2 IN NOTE(2)	6.0	3 IN	3x12	—	—
		7.0	6.5	2 IN	6.5	2 IN NOTE(2)	6.5	3 IN			
		14.0	10.0	3 IN	10.0	3 IN	10.0	3 IN			
OVER 10 UP TO 15	4	3.5	4.0	2 IN	4.0	2 IN NOTE(2)	4.0	3 IN	3x12	—	—
		7.0	5.5	3 IN	5.5	3 IN	5.5	3 IN			
		14.0	8.0	3 IN	8.0	3 IN	8.0	3 IN			
OVER 15 UP TO 20	4	3.5	3.5	2 IN	3.5	2 IN NOTE(2)	3.5	3 IN	3x12	—	—
		7.0	5.0	3 IN	5.0	3 IN	5.0	3 IN			
		14.0	6.0	3 IN	6.0	3 IN	6.0	3 IN			
OVER 20	NOTE (1)										

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Notes (1): See Appendix D, item (g) (1)
Notes (2): See Appendix D, Item (g) (2)
* Consult product manufacturer and/or qualified engineer for Section Modulus of available wales.

BILLING CODE 4510-26-C

Appendix E to Subpart P—Alternatives to Timber Shoring

Figure 1. Aluminum Hydraulic Shoring

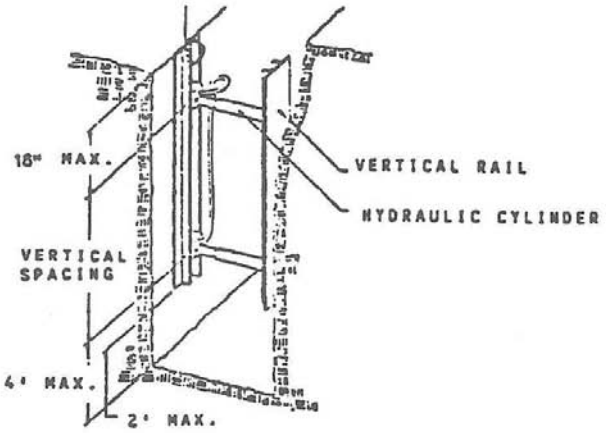
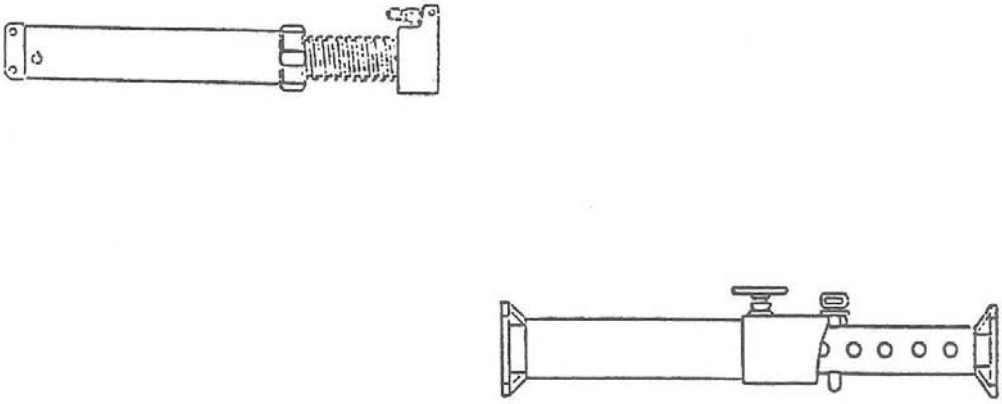


Figure 2. Pneumatic/hydraulic Shoring



BILLING CODE 4510-26-M

Figure 3. Trench Jacks (Screw Jacks)

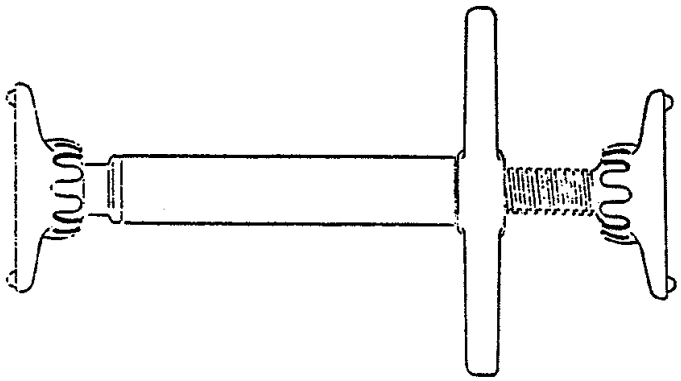
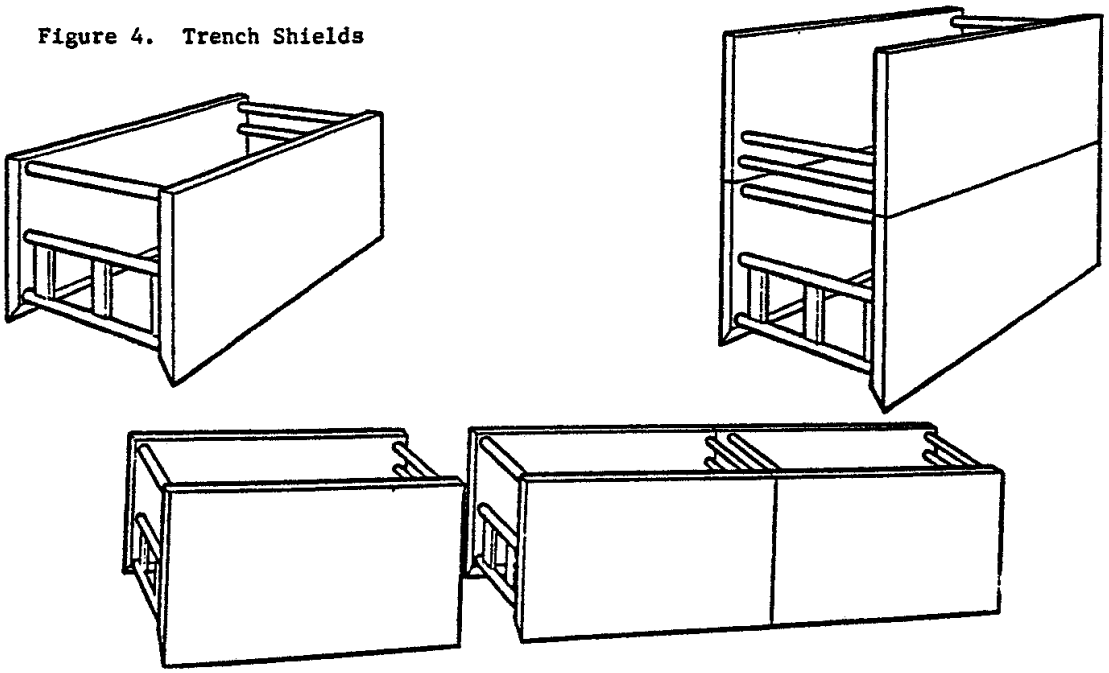


Figure 4. Trench Shields



Appendix F to Subpart P—Selection of Protective Systems

The following figures are a graphic summary of the requirements contained in subpart P for excavations 20 feet or less in depth. Protective systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer in accordance with § 1926.652 (b) and (c).

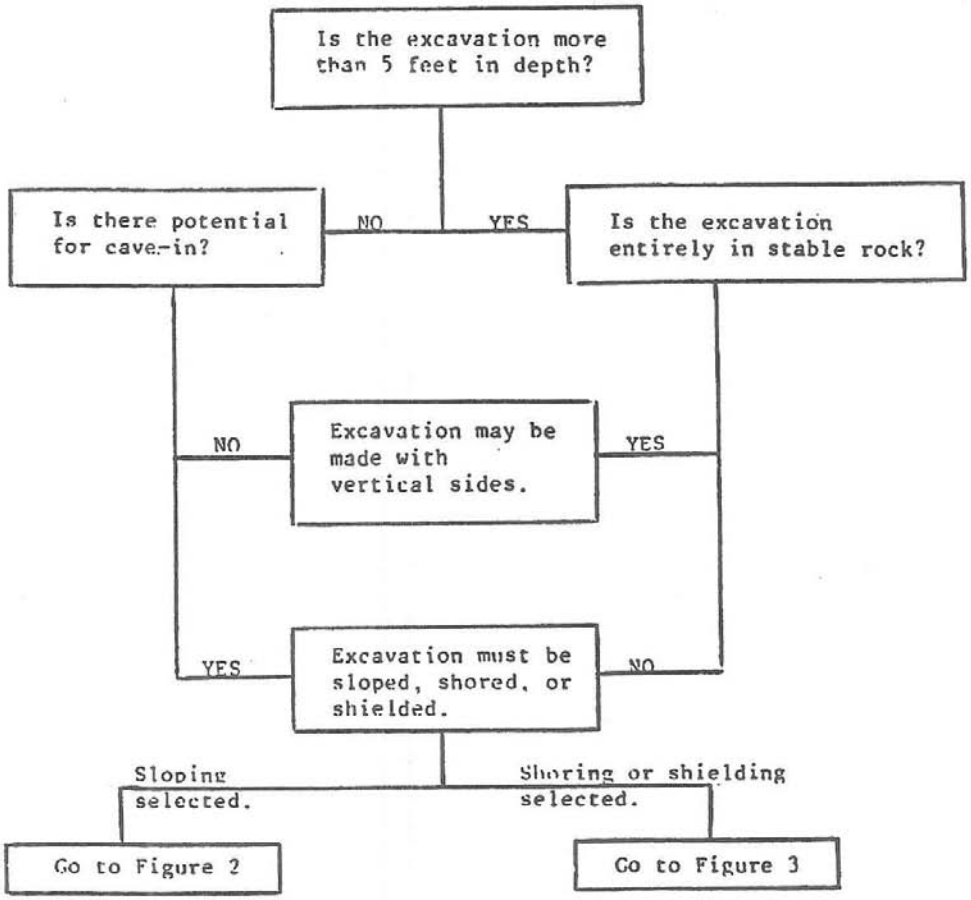


FIGURE 1 - PRELIMINARY DECISIONS

BILLING CODE 4510-26-M

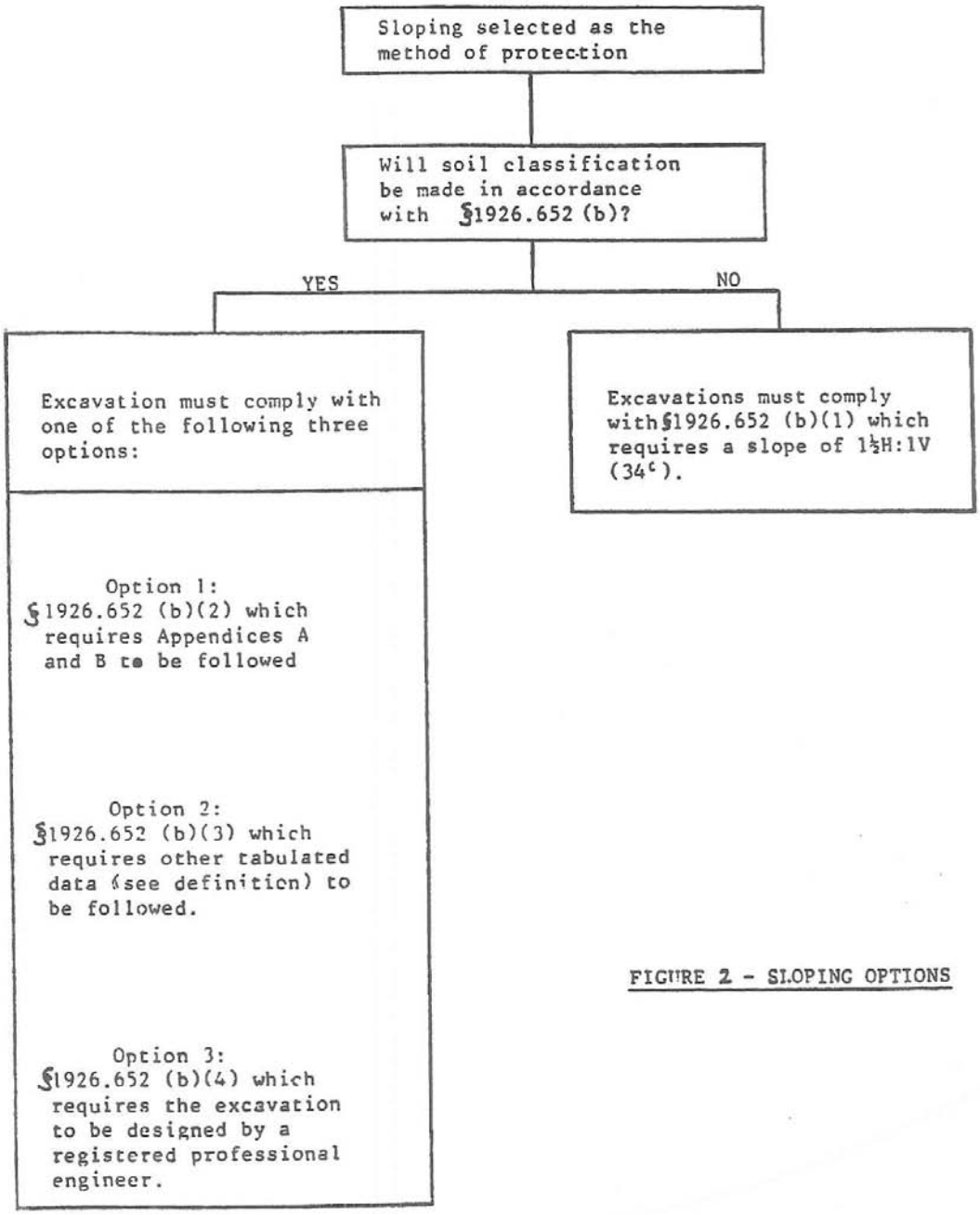


FIGURE 2 - SLOPING OPTIONS

EXCAVATION AND TRENCHING
NOTIFICATION LOG

Date: _____ Project Number: _____

Customer: _____ OSHA Permit Required: YES ___ NO ___

Customer: _____ Project Manager: _____

H&S Internal Permit Number: _____

Comments: _____

****

Date: _____ Project Number: _____

Customer: _____ OSHA Permit Required: YES ___ NO ___

Customer: _____ Project Manager: _____

H&S Internal Permit Number: _____

Comments: _____

****

Date: _____ Project Number: _____

Customer: _____ OSHA Permit Required: YES ___ NO ___

Customer: _____ Project Manager: _____

H&S Internal Permit Number: _____

Comments: _____

****

Date: _____ Project Number: _____

Customer: _____ OSHA Permit Required: YES ___ NO ___

Customer: _____ Project Manager: _____

H&S Internal Permit Number: _____

Comments: _____

****

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**Stress, Cold/Heat**	**Document No.**	**HS-Fld-6**	
Date of Issue:	**January 2007**	**Revision No.**	**5**	**Page 1 of 7**
Point of Contact:	**(signature on file)** **Bob Armstrong, Interim H&S Officer**	**Approval:**	**(signature on file)** **Jackie Doan, Corporate QA Director**	

COLD STRESS

1.0 OBJECTIVE

Environmental Quality Management, Inc. (EQ) recognizes that work must be performed in various weather conditions, including cold climates. In order to minimize cold-related illnesses, site supervisors are to be aware of the symptoms of environmental conditions that lead to cold-related illnesses and the appropriate steps to take to prevent their occurrence.

2.0 PURPOSE

This procedure describes the causes, symptoms, treatment, and/or prevention of cold-related illness.

3.0 GENERAL INFORMATION

When the temperature of the surrounding air or water is much colder than the worker, the body's physical processes must increase to maintain thermal balance. Shivering is the body's attempt to generate increased heat.

Shivering, pain, and numbness are not trustworthy indicators of cold exposure because prolonged cold exposure numbs all body sensations. Rather, wind-chill temperature is a better means of evaluation because it takes into account the wind's ability to strip heat from the body through convection.

Protective clothing that is wet with sweat or from rain will cause heat loss through conduction.

Personnel are at an extreme cold stress hazard when performing spill clean-up in boats in cold weather situations. Falling into cold water can rob the body of dry heat very quickly.

4.0 COLD INJURY

Trench Foot occurs as a result of extended exposure of the feet to cold and moisture. Capillary walls of the feet are injured, resulting in tingling, itching, and pain. Blisters may form, followed by ulceration of the skin.

Frost-Nip is localized superficial freezing of extremities such as ears, nose, toes, and fingers. Initially there is a dark bluish color due to bleeding under the skin which at times can become gangrenous. Workers experiencing frost nip are susceptible to future injury and should avoid chilling.

Frostbite occurs when the moisture in the skin actually freezes, forming ice crystals, resulting in the damage of skin cells. The injured area becomes red, then blue/red. A burning pain is noted initially, then pain decreases and numbness sets in. The skin becomes waxy pale in appearance because of a lack of oxygen. The ears, nose, toes, and fingers are most susceptible. Damaged areas can become gangrenous resulting in the loss of tissue, finger tips, and toes.

Hypothermia occurs when heat production of the body is not sufficient to replace heat lost to the environment. The results are a lowering of the core body temperature, the pulse rate slows, muscular weakness occurs, mental abilities dull, and the workers become uncoordinated. Signs of hypothermia are evident at 95 degrees Fahrenheit body core temperature, and consciousness is lost between 89.6 - 86.0 degrees Fahrenheit. At lower core temperatures, cardiac arrest is possible.

Exposure to cold water decreases the body core temperature rapidly and consciousness is quickly lost. Workers on or over water should be acutely aware of the danger of immersion during cold weather.

Hypothermia results in dulling of the senses and could result in poor decision making. Workers that are exposed to extreme cold should not be given tasks that are critical to their health and safety or that of others.

5.0 PREVENTION

Just as with heat stress, cold stress must be controlled in order to prevent cold-related illness. The following are cold stress prevention guidelines.

Education - All personnel will receive training on the cause, symptoms, and (most importantly) methods of prevention of cold stress injuries.

Clothing - Prevention of hypothermia and other cold injuries is best accomplished by protecting workers from cold and moisture. Clothing is the most important factor in prevention of injury. Personnel working on land should layer clothing with the outer layer being wind and water resistant. The layers should be capable of being vented at the wrist, neck, and waist to reduce wetting by perspiration. Feet should be kept dry and socks should be changed when they become wet. Gloves which protect the hands from cold but allow freedom of movement are necessary. Never allow bare skin to contact metal surfaces at sub-zero temperatures.

Acclimatization - A limited degree of acclimation can occur from exposure and working in cold environments. Some physiological changes do occur, but people also learn how to more effectively protect themselves from temperature extremes.

Fluid Replacement - Cold weather does cause significant water loss as a result of the dryness of the air. Fluid intake should be increased to prevent dehydration which directly affects blood volumes and flow to the extremities. Warm, sweet, caffeine-free, nonalcoholic drinks and soup offer the best fluid replacement and provide caloric energy.

Work-Rest Regimes - When temperatures are less than 20° F (actual or windchill), heated warming shelters should be made available. Workers should use these on a regular basis.

Diet - As with any work in extreme temperatures, personnel will be instructed to eat a well-balanced diet to replace calories burned and provide necessary vitamins and nutrients.

Environmental Monitoring - Regular monitoring of the environment by recording wind speed and actual thermometer readings for comparison to the windchill chart should occur at regular intervals depending on conditions.

Prohibited Activities - Alcohol should not be consumed because it increases blood circulation to the skin and interferes with internal thermostatic control. Alcohol also interferes with mental acuity, which can lead to risk taking. Cigarette smoking should be prohibited since the nicotine restricts the flow of blood to the extremities.

HEAT STRESS

1.0 OBJECTIVE

In work situations where heat stress may be a factor, Environmental Quality Management, Inc. (EQ) will attempt to prevent heat-related illness by use of work-rest schedules, physiological monitoring, and/or personal cooling devices.

2.0 PURPOSE

This procedure describes the causes, symptoms, treatment, and prevention of heat-related illness.

3.0 GENERAL INFORMATION

Heat-related illnesses are caused by the body's inability to dissipate excessive metabolic heat while wearing PPE.

A period of adjustment or acclimatization is necessary before maximum tolerance to heat is acquired. Most workers require 7 to 10 working days of gradually increasing workload to become fully acclimatized.

4.0 HEAT-RELATED ILLNESSES

Heat rash can be caused by continuous exposure to hot and humid air and skin abrasion from sweat-soaked clothing.

> Signs and Symptoms: The condition is characterized by a localized red skin rash and reduced sweating. Aside from being a nuisance, the ability to tolerate heat is reduced.
>
> Treatment: Keep skin hygienically clean and allow it to dry thoroughly after using chemical protective clothing.

Heat cramps are caused by profuse perspiration with inadequate fluid intake and salt replacement. This often robs the larger muscle groups (stomach and quadriceps) of blood which can make them cramp.

> Signs and Symptoms: Muscle spasm and pain in the extremities and abdomen.

Treatment: Remove affected person to a cool place and give sips of clear water or an electrolytic drink (Gatorade®). The person experiencing heat cramps should lightly salt his/her food to make up for the sodium lost when sweating. Manual pressure may also be applied to the cramped muscles.

Heat exhaustion is a mild form of shock caused by sustained physical activity in the heat and profuse perspiration without adequate fluid and salt replacement.

Signs and Symptoms: Weak pulse; shallow breathing; pale, cool, moist (clammy) skin; profuse sweating; dizziness; fatigue.

Treatment: Remove affected person to a cool place and remove as much clothing as possible. Give sips of water or electrolytic solution and fan the person continually to remove heat by convection. CAUTION: Do not allow the affected person to become chilled -- treat for shock if necessary.

Heat stroke is the most severe form of heat stress; the body must be cooled immediately to prevent severe injury and/or death. **THIS IS A MEDICAL EMERGENCY!!**

Signs and Symptoms: Red, hot, dry skin; body temperature of 105 degrees Fahrenheit or higher; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

Treatment: Heat stroke is a true medical emergency. Transportation of the victim to a medical facility must not be delayed. Prior to transport, remove as much clothing as possible and wrap the victim in a sheet soaked with water. Fan vigorously while transporting to help reduce body temperature. Apply cold packs, if available; place under the arms, around the neck, or any other place where they can cool large surface blood vessels. If transportation to a medical facility is delayed, reduce body temperature by immersing victim in an ice/water bath (however, be careful not to over-chill the victim once body temperature is reduced below 102 degrees Fahrenheit). If this is not possible, keep victim wrapped in a sheet and continuously douse with water while fanning the victim.

5.0 SPECIFIC REQUIREMENTS

The environmental hazards section of site health and safety plans will address heat stress if the ambient temperature is expected to exceed 70 degrees Fahrenheit.

The site health and safety plan will discuss work-rest cycles and provisions for monitoring the level of heat stress (i.e., pulse rate).

Workers are to be advised not to drink caffeinated or alcoholic beverages because they increase the rate of body water loss.

Increased dietary salt or lightly salted (0.2 percent) water is adequate to replace lost salt. Salt tablets are not to be used.

If juice or electrolyte drinks are used, they should be diluted prior to drinking.

Thirst is not an adequate indicator of body water loss. Workers are to drink at least small amounts of water on each break.

Workers are to rest when any of the symptoms described above are present. The buddy system is mandatory, as most often the potential victim will not be aware of any symptoms. Watch out for each other.

EQ HEAT STRESS PHYSIOLOGICAL MONITORING LOG

Site: _____ Date: _____ Safety Representative: _____

Ambient Conditions: _____ Start work area temp: _____ Stop work area temp: _____

NAME	REPRESENTING	AGE	MEDICAL NOTES	TIME IN	ORAL TEMP	HEART RATE	BODY WGT.	TIME OUT	ORAL TEMP	HEART RATE	BODY WGT.

Notation/Comments: _____

_____

_____

Page ___ of ___

Environmental Quality Management, Inc.

Standard Operating Procedure

Title:	**High Pressure Washers**	**Document No.**	**OP-EqOp-3**
Date of Issue:	**December 2006**	**Revision No.**	**3** **Page 1 of 2**
Point of Contact:	**(signature on file)**	**Approval:**	**(signature on file)**
	Eric Bowman, ERRS Deputy Program Manager		**Jackie Doan, Corporate QA Director**

1.0 OBJECTIVE

Environmental Quality Management, Inc. (EQ) personnel who have been trained in the proper setup, use, and care of high-pressure washers will be authorized to operate this equipment.

2.0 PURPOSE

This procedure describes requirements for the safe operation of the high-pressure washer.

3.0 PERSONAL PROTECTIVE EQUIPMENT

The following equipment will be worn by operators and assistants:

- Safety shoes or boots
- Metal foot and shin guards
- Eye protection (goggles and face shields)
- Hard hat
- Heavy-duty PVC rain suit or equivalent
- Heavy chemical-resistant gloves

4.0 OPERATION PROCEDURE

- Only trained, authorized personnel will operate the high-pressure washer.
- The lance must always be pointed at the work area.
- The operator must maintain good footing.
- The operator must have an assistant to aid in moving the hose to different areas and to back up the operator. The assistant must remain in back of the operator.
- Non-operators must remain a safe distance from the operator. The distance must be a minimum of 25 feet.
- The operating pressure should never exceed that which is necessary to complete the job.

- No authorized attachment may be made to the unit. (The trigger should never be tied down.)
- The operator should be relieved at frequent intervals to avoid fatigue (at least hourly).
- Equipment should be cleaned often to avoid oil or dirt build-up, especially around the trigger and guard area.
- An assistant should always be standing by at the pressure generator to shut down the equipment and monitor the pressure.
- All users must be trained in emergency shutdown procedures and general equipment maintenance.
- All lances must be made of seamless stainless steel. Do not use carbon steel which can corrode and result in weakening of the lance.
- DO NOT MODIFY THE LANCE. The lance barrel, from trigger block to the tip, should not be less than 48 inches as recommended by manufacturers of hydroblasting equipment.
- Always increase pressure slowly to inspect for leaks. All leaks or malfunctioning equipment must be repaired immediately or the unit taken out-of-service. Never exceed the operating pressure necessary to do the job.
- Attach a cable which connects the water supply hose to the laser wand to prevent whipping should they accidentally disconnect.
- A serious risk of infection and further complications is possible from a hydroblasting laceration. If an injection injury is suspected, the treating physician should be informed so he/she can request a surgeon who specializes in injection injuries. The specialist may have to perform surgery on the affected body part in order to remove the material (oil, particles) that was injected directly through the skin.

APPENDIX D

CHEMICAL INFORMATION

UNITED STATES DEPARTMENT OF LABOR

All DOL

A to Z Index | En Esp

OSHA

OSHA QuickTakes Newsletter RSS Feeds

Occupational Safety & Health Administration We Can Help

Home | Workers | Regulations | Enforcement | Data & Statistics | Training | Publications | Newsroom

OSHA/EPA Occupational Chemical Database

Chemical Identification

Chemical Name: CHLORODIPHENYL (42% CHLORINE)

CAS #: 53469-21-9 **UN No:** 2315 **Formula:** C6H4ClC6H3Cl2 (approx)

Synonyms: Aroclor®1242; PCB; Polychlorinated biphenyl

Physical Properties

Physical Description: Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor. NA

BP: 617-691ºF	**MW:** 258 (approx)	**LEL:** NA	**NFPA Fire Rating:** 1
FRZ/MLT: FRZ: -2ºF	**VP:** 0.001 mmHg	**UEL:** NA	**NFPA Health Rating:** 2
FP: NA	**VD:** NA		**NFPA Reactivity Rating:** 0
Sp. GR: (77ºF): 1.39	**IP:** NA		**NFPA Sp. Inst.:** NA

Exposure Limits

OSHA	NIOSH	Related Information
PEL-TWA ppm: NA	**REL-TWA ppm:** NA	**AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:** NA
PEL-TWA mg/m3: 1	**REL-TWA mg/m3:** 0.001	
PEL-STEL ppm: NA	**REL-STEL ppm:** NA	
PEL-STEL mg/m3: NA	**REL-STEL mg/m3:** NA	
PEL-C ppm: NA	**REL-C ppm:** NA	
PEL-C mg/m3: NA	**REL-C mg/m3:** NA	**Carcinogen Classifications:** IARC-2A, NIOSH-Ca, NTP-R
Skin Notation: Yes	**Skin Notation:** No	
Notes: NA	**Notes:** CARCINOGEN (Ca); TWA applies to other PCBs	
	IDLH ppm: NA	
	IDLH mg/m3: 5	
	IDLH Notes: Ca	

NIOSH Pocket Guide to Chemical Hazards (Current through June 2006)

Chlorodiphenyl (42% chlorine)			CAS: 53469-21-9
Formula: C6H4ClC6H3Cl2 (approx)			RTECS: TQ1356000
Synonyms & Trade Names: Aroclor 1242, PCB, Polychlorinated biphenyl			DOT ID & Guide: 2315 171
Exposure Limits			
NIOSH REL*: Ca TWA 0.001 mg/m3 See Appendix A [*Note: The REL also applies to other PCBs.]		OSHA PEL: TWA 1 mg/m3 [skin]	
IDLH: Ca [5 mg/m3]		Conversion: NA	
Physical Description			
Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor. NA			
MW: 258 (approx)	BP: 617-691F	FRZ: -2F	Sol: Insoluble

VP: 0.001 mmHg	IP: ?	NA	Sp.Gr(77F): 1.39
Fl.P: NA	UEL: NA	LEL: NA	NA

Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs (See flammable and combustible liquid classes)

Incompatibilities & Reactivities

Strong oxidizers

Measurement Methods

NIOSH 5503; OSHA PV2089

Personal Protection & Sanitation	First Aid
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When we	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed (See procedures)

NIOSH Respirator Recommendations

NIOSH : SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE
(See symbols and codes)

Exposure Routes

Inh Abs Ing Con

Symptoms

Irrit eyes; chloracne; liver damage; repro effects; [carc]
(See abbreviations)

Target Organs

Skin, eyes, liver, repro sys
(See abbreviations)

DOT Emergency Response Guidebook (ERG 2004)

Guide Number: 171

171 SUBSTANCES (Low to Moderate Hazard)
POTENTIAL HAZARDS
FIRE OR EXPLOSION

NA

ERG 2004 Isolation and Protective Distances

	SMALL SPILLS (From a small package or small leak from a large pkg.)		LARGE SPILLS (From a large package or from many small packages)	
	First ISOLATE in all Directions	Then PROTECT persons Downwind during-	First ISOLATE in all Directions	Then PROTECT persons Downwind during-
		DAY NIGHT		DAY NIGHT
NA	NA			

ERG 2004 Toxic-by-Inhalation (TIH) Gas(es) Produced When Spilled in Water

TIH: NA

Additional Emergency Response Information (CAMEO Data)

Non-fire Spill Response: Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without undue personnel hazard. Apply water spray or mist to knock down vapors. Land spill: Dig a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, or commercial sorbents. Water spill: Use natural barriers or oil spill control booms to limit spill travel. Remove trapped material with suction hoses. (AAR, 1999)

Firefighting:

Reactivity: This compound is incompatible with the following:Strong oxidizers (NIOSH, 1997)

First Aid: Eye: If this chemical contacts the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. Skin: If this

chemical contacts the skin, immediately wash the contaminated skin with soap and water. If this chemical penetrates the clothing immediately remove the clothing and wash the skin with soap and water. Get medical attention promptly. Breathing: If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible. Swallow: If this chemical has been swallowed, get medical attention immediately. (NIOSH, 1997)

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www.OSHA.gov

UNITED STATES DEPARTMENT OF LABOR

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OSHA/EPA Occupational Chemical Database

Chemical Identification

Chemical Name: CHLORODIPHENYL (54% CHLORINE)

CAS #: 11097-69-1 **UN No:** 2315 **Formula:** C6H3Cl2C6H2Cl3 (approx)

Synonyms: Aroclor®1254; PCB; Polychlorinated biphenyl

Physical Properties

Physical Description: Colorless to pale-yellow, viscous liquid or solid (below 50ºF) with a mild, hydrocarbon odor. NA

BP: 689-734ºF	**MW:** 326 (approx)	**LEL:** NA	**NFPA Fire Rating:** 1
FRZ/MLT: FRZ: 50ºF	**VP:** 0.00006 mmHg	**UEL:** NA	**NFPA Health Rating:** 2
FP: NA	**VD:** NA		**NFPA Reactivity Rating:** 0
Sp. GR: (77ºF): 1.38	**IP:** NA		**NFPA Sp. Inst.:** NA

Exposure Limits

OSHA	NIOSH	Related Information
PEL-TWA ppm: NA	**REL-TWA ppm:** NA	**AIHA Emergency Response Planning Guidelines - ERPG-1/ERPG-2/ERPG-3:** NA
PEL-TWA mg/m3: 0.5	**REL-TWA mg/m3:** 0.001	
PEL-STEL ppm: NA	**REL-STEL ppm:** NA	
PEL-STEL mg/m3: NA	**REL-STEL mg/m3:** NA	
PEL-C ppm: NA	**REL-C ppm:** NA	
PEL-C mg/m3: NA	**REL-C mg/m3:** NA	**Carcinogen Classifications:** IARC-2A, NIOSH-Ca, NTP-R, TLV-A3
Skin Notation: Yes	**Skin Notation:** No	
Notes: NA	**Notes:** CARCINOGEN (Ca), REL ALSO APPLIES TO OTHER PCBs	
	IDLH ppm: NA	
	IDLH mg/m3: 5	
	IDLH Notes: Ca	

NIOSH Pocket Guide to Chemical Hazards (Current through June 2006)

Chlorodiphenyl (54% chlorine)			CAS: 11097-69-1
Formula: C6H3Cl2C6H2Cl3 (approx)			RTECS: TQ1360000
Synonyms & Trade Names: Aroclor 1254, PCB, Polychlorinated biphenyl			DOT ID & Guide: 2315 171
Exposure Limits			
NIOSH REL*: Ca TWA 0.001 mg/m3 See Appendix A [*Note: The REL also applies to other PCBs.]		OSHA PEL: TWA 0.5 mg/m3 [skin]	
IDLH: Ca [5 mg/m3]		Conversion: NA	
Physical Description			
Colorless to pale-yellow, viscous liquid or solid (below 50F) with a mild, hydrocarbon odor. NA			
MW: 326 (approx)	BP: 689-734F	FRZ: 50F	Sol: Insoluble

VP: 0.00006 mmHg	IP: ?	NA	Sp.Gr(77F): 1.38
Fl.P: NA	UEL: NA	LEL: NA	NA

Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs (See flammable and combustible liquid classes)

Incompatibilities & Reactivities

Strong oxidizers

Measurement Methods

NIOSH 5503; OSHA PV2088

Personal Protection & Sanitation	First Aid
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When we	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed (See procedures)

NIOSH Respirator Recommendations

NIOSH : SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE
(See symbols and codes)

Exposure Routes

Inh Abs Ing Con

Symptoms

Irrit eyes, chloracne; liver damage; repro effects; [carc]
(See abbreviations)

Target Organs

Skin, eyes, liver, repro sys
(See abbreviations)

DOT Emergency Response Guidebook (ERG 2004)

Guide Number: 171

171 SUBSTANCES (Low to Moderate Hazard)
POTENTIAL HAZARDS
FIRE OR EXPLOSION

NA

ERG 2004 Isolation and Protective Distances

	SMALL SPILLS (From a small package or small leak from a large pkg.)		LARGE SPILLS (From a large package or from many small packages)	
	First ISOLATE in all Directions	Then PROTECT persons Downwind during-	First ISOLATE in all Directions	Then PROTECT persons Downwind during-
		DAY NIGHT		DAY NIGHT
NA	NA			

ERG 2004 Toxic-by-Inhalation (TIH) Gas(es) Produced When Spilled in Water

TIH: NA

Additional Emergency Response Information (CAMEO Data)

Non-fire Spill Response: Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without undue personnel hazard. Apply water spray or mist to knock down vapors. Land spill: Dig a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, or commercial sorbents. Water spill: Use natural barriers or oil spill control booms to limit spill travel. Remove trapped material with suction hoses. (AAR, 1999)

Firefighting:

Reactivity: This compound is incompatible with the following:Strong oxidizers (NIOSH, 1997)

First Aid: Eye: If this chemical contacts the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. Skin: If this

chemical contacts the skin, immediately wash the contaminated skin with soap and water. If this chemical penetrates the clothing immediately remove the clothing and wash the skin with soap and water. Get medical attention promptly. Breathing: If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible. Swallow: If this chemical has been swallowed, get medical attention immediately. (NIOSH, 1997)

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APPENDIX E

SITE MAPS

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Notes

COMMAND POST - HOSPITAL ROUTE

Trip to:
Bronson Methodist Hospital
601 John St # E-012
Kalamazoo, MI 49007
(269) 341-7654
0.59 miles
2 minutes

	Miles Per Section
[200-399] John Street Ct Kalamazoo, MI 49001	
1. Start out going **west** on **John Street Ct** toward **John St**.	**Go 0.04 Mi**
2. Turn **right** onto **John St**.	**Go 0.06 Mi**
3. Turn **left** onto **E Crosstown Pky**.	**Go 0.1 Mi**
4. Take the 2nd **right** onto **S Burdick St**. *S Burdick St is just past John St* *Kalamazoo Police is on the left* *If you are on W Crosstown Pky and reach Born Ct you've gone about 0.1 miles too far*	**Go 0.3 Mi**
5. Turn **slight right** onto **John St**. *John St is just past E Vine St*	**Go 0.06 Mi**
6. **601 JOHN ST # E-012** is on the **right**.	
Bronson Methodist Hospital 601 John St # E-012, Kalamazoo, MI 49007 (269) 341-7654	**0.6 mi**

Total Travel Estimate: **0.59 miles - about 2 minutes**

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Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
1.1 mi – about **4 mins**
Directions from SA7A

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411 Reed Ave, Kalamazoo, MI 49001

1. Head west on **Reed Ave** toward **Van Zee St** — go 0.3 mi, total 0.3 mi

2. Turn right onto **S Burdick St** — go 0.7 mi
About 3 mins

3. Slight right toward **John St** — go 0.1 mi, total 1.1 mi

4. Continue straight onto **John St** — go 89 ft, total 1.1 mi
Destination will be on the right

Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007

Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
0.9 mi – about 3 mins
Directions from SA6A

A 415 Stockbridge Ave, Kalamazoo, MI 49001

1. Head **west** on **E Stockbridge Ave** toward **John St** — go 0.2 mi, total 0.2 mi

2. Take the 2nd right onto **S Burdick St** — go 0.5 mi, total 0.7 mi
About 2 mins

3. Slight right toward **John St** — go 0.1 mi, total 0.8 mi

4. Continue straight onto **John St** — go 89 ft, total 0.9 mi
Destination will be on the right

B **Trauma & Emergency Lot**
601 John St, Kalamazoo, MI 49007

Google

Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
0.5 mi – about **2 mins**
Directions from SA5D South End

390 E Crosstown Pkwy, Kalamazoo, MI 49001

1. Head **southwest** on **E Crosstown Pkwy** toward **Jasper St** — go 125 ft, total 125 ft

2. Take the 1st right onto **Jasper St** — go 0.3 mi, total 0.3 mi
About 1 min

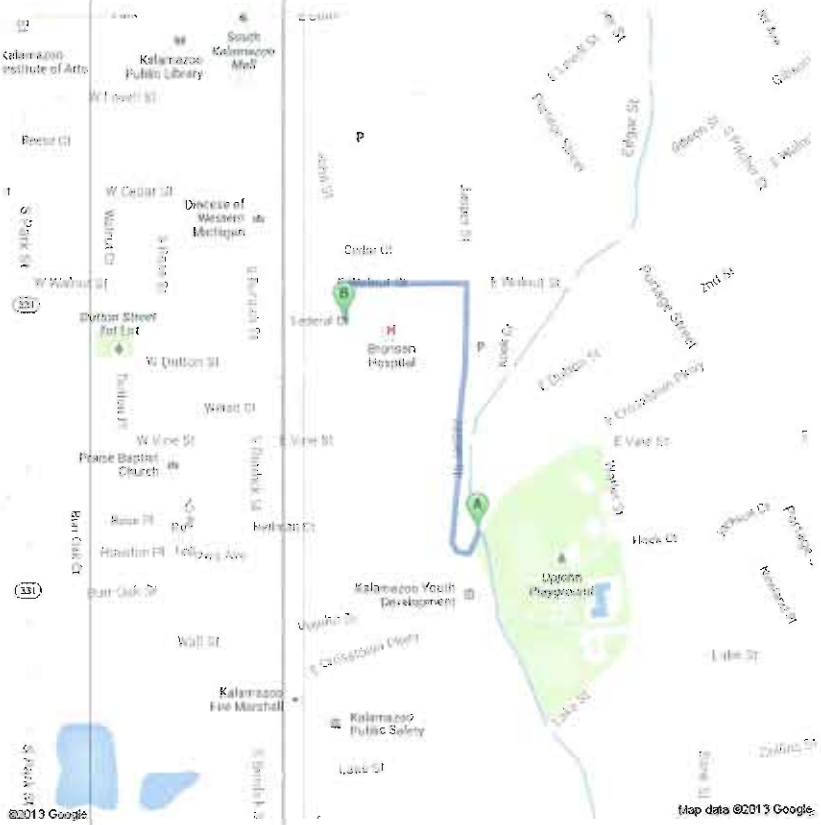
3. Take the 2nd left onto **E Walnut St** — go 0.1 mi, total 0.4 mi

4. Take the 1st left onto **John St** — go 197 ft, total 0.5 mi

Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007

Google

Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
0.5 mi – about **2 mins**
Directions from SA5D North End and and SA5C



390 E Crosstown Pkwy, Kalamazoo, MI 49001

1. Head **southwest** on **E Crosstown Pkwy** toward **Jasper St** — go 125 ft, total 125 ft

2. Take the 1st right onto **Jasper St** — go 0.3 mi, total 0.3 mi
About 1 min

3. Take the 2nd left onto **E Walnut St** — go 0.1 mi, total 0.4 mi

4. Take the 1st left onto **John St** — go 197 ft, total 0.6 mi

Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007

Google

Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
0.3 mi – about **1 min**

Directions from SASH

E Dutton St & Kook Ct, Kalamazoo, MI 49007

1. Head **west** on **E Dutton St** toward **Jasper St**

go 190 ft
total 190 ft

2. Turn right onto **Jasper St**

go 413 ft
total 0.1 mi

3. Take the 1st left onto **E Walnut St**

go 0.1 mi
total 0.2 mi

4. Take the 1st left onto **John St**

go 197 ft
total 0.3 mi

Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007

Google

Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
1.6 mi – about **5 mins**
Directions from SA1C

A E Michigan Ave & Rochester Ave, Kalamazoo, MI 49007

1. Head **northeast** on **E Michigan Ave** toward **Walbridge St** — go 0.2 mi, total 0.2 mi

2. Take the 1st right onto **I-94BUS E/M-96 E** — go 0.5 mi, total 0.7 mi
About 49 secs

3. Slight right onto **Mills St** — go 49 ft, total 0.7 mi

4. Take the 1st right onto **E Walnut St** — go 0.8 mi, total 1.5 mi
About 3 mins

5. Turn left onto **John St** — go 197 ft, total 1.6 mi

B **Trauma & Emergency Lot**
601 John St, Kalamazoo, MI 49007

Google

Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
1.7 mi – about **5 mins**
Directions from SA3A North Entrance

426 E Michigan Ave, Kalamazoo, MI 49007

1. Head **northeast** on **E Michigan Ave** toward **Rochester Ave** — go 0.3 mi, total 0.3 mi

2. Turn right onto **I-94BUS E/M-96 E**
About 49 secs — go 0.5 mi, total 0.8 mi

3. Slight right onto **Mills St** — go 49 ft, total 0.[illegible]

4. Take the 1st right onto **E Walnut St**
About 3 mins — go 0.8 mi, total 1.6 mi

5. Turn left onto **John St** — go 197 ft, total 1.7 mi

Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007

Google

Directions to Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007
0.6 mi – about 3 mins
Directions from SA3A South Entrance

650 Gibson St, Kalamazoo, MI 49007

1. Head southwest on **Gibson St** toward **S Pitcher St** — go 266 ft, total 266 ft

2. Take the 1st left onto **S Pitcher St** — go 335 ft, total 0.1 mi

3. Turn right onto **E Walnut St**
About 2 mins — go 0.4 mi, total 0.5 mi

4. Take the 3rd left onto **John St** — go 197 ft, total 0.6 mi

Trauma & Emergency Lot
601 John St, Kalamazoo, MI 49007

mapquest

Notes
Hospital Route from SA1-B

Trip to:
Bronson Trauma & Emergency
601 John St # E178
Kalamazoo, MI 49007
(269) 341-6386
1.45 miles / 4 minutes

108 Parkway Dr, Kalamazoo, MI 49007-4916

1. Start out going **south** on **Parkway Dr**. Map — **0.03 Mi**

2. Take the 1st **left** to stay on **Parkway Dr**. Map — **0.04 Mi**
If you reach the end of Parkway Dr you've gone a little too far

3. Turn **right** onto **I-94-BR / M-96**. Map — **0.4 Mi**

4. Turn **slight right** onto **Mills St**. Map — **0.01 Mi**
Mills St is just past Gibson St
If you are on King Hwy and reach E Crosstown Pky you've gone about 0.1 miles too far

5. Take the 1st **right** onto **E Walnut St**. Map — **0.8 Mi**
If you reach 2nd St you've gone a little too far

6. Turn **left** onto **John St**. Map — **0.08 Mi**
John St is just past Healthcare Plz
If you reach S Burdick St you've gone a little too far

7. Take the 1st **right** onto **E Dutton St**. Map — **0.04 Mi**
E Dutton St is just past John St

8. Take the 1st **left**. Map — **0.01 Mi**
ATM - Bronson Hospital-Main Hospital is on the corner
If you reach S Burdick St you've gone a little too far

9. Take the 1st **left** onto **John St**. Map — **0.01 Mi**
ATM - Bronson Hospital-Main Hospital is on the corner

10. **601 JOHN ST # E178** is on the **right**. Map

Bronson Trauma & Emergency
601 John St # E178, Kalamazoo, MI 49007
(269) 341-6386

mapquest

Notes
Hospital Route from SA1-A

Trip to:
Bronson Trauma & Emergency
601 John St # E178
Kalamazoo, MI 49007
(269) 341-6386
1.34 miles / 5 minutes

424 Harrison St, Kalamazoo, MI 49007-3691

	1. Start out going **south** on **Harrison St** toward **Harrison Ct**. Map	**0.04 Mi**
	2. Turn **right** onto **E Michigan Ave / I-94-BR / M-43**. Continue to follow **I-94-BR W / M-43 W**. Map	**0.3 Mi**
	3. Turn **left** onto **N Pitcher St**. Map	**0.4 Mi**
	4. Stay **straight** to go onto **Portage St**. Map	**0.2 Mi**
	5. Turn **right** onto **E Walnut St**. Map	**0.3 Mi**
	6. Turn **left** onto **John St**. Map	**0.08 Mi**
	7. Take the 1st **right** onto **E Dutton St**. Map	**0.04 Mi**
	8. Take the 1st **left**. Map	**0.01 Mi**
	9. Take the 1st **left** onto **John St**. Map	**0.01 Mi**
	10. **601 JOHN ST # E178** is on the **right**. Map	

Bronson Trauma & Emergency
601 John St # E178, Kalamazoo, MI 49007
(269) 341-6386

Total Travel Estimate: **1.34 miles - about 5 minutes**

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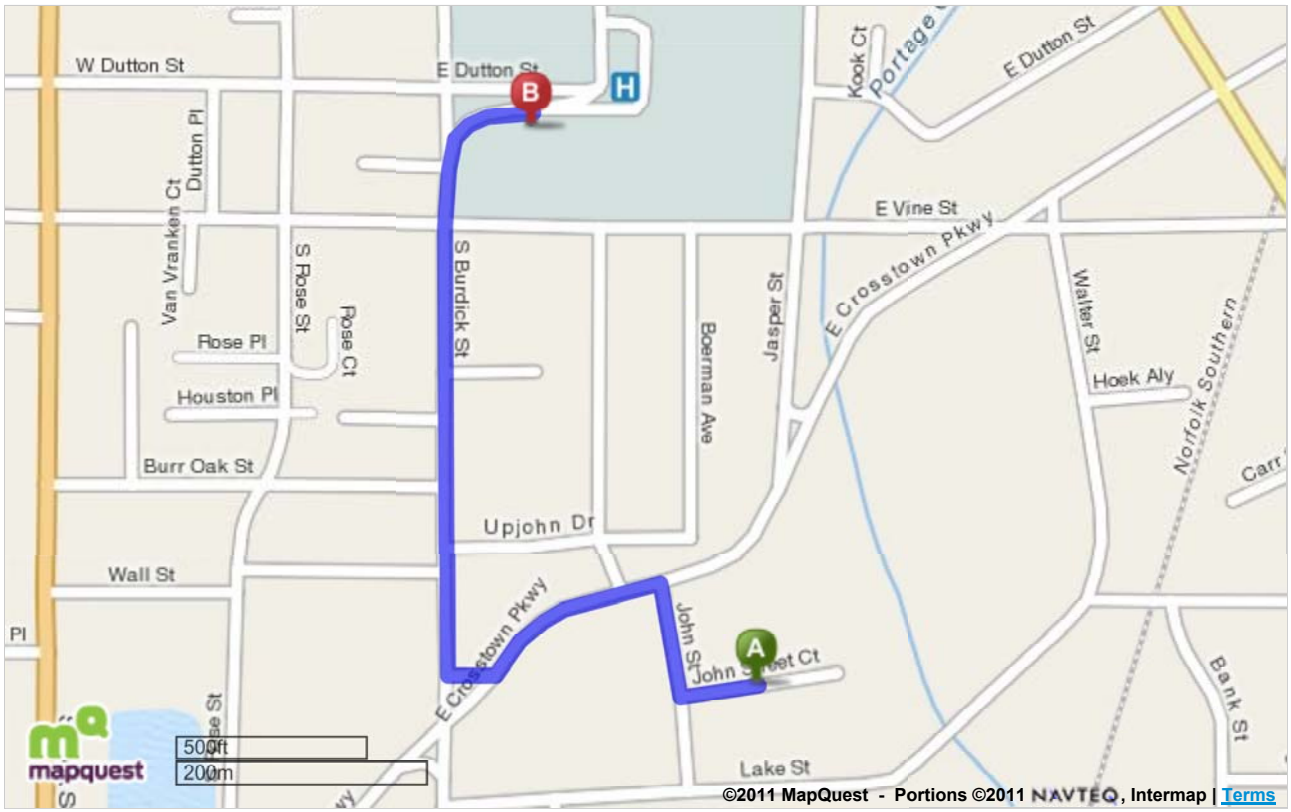
Trip to:
Bronson Methodist Hospital
601 John St # E-012
Kalamazoo, MI 49007
(269) 341-7654
0.59 miles
2 minutes

Notes

COMMAND POST - HOSPITAL ROUTE

A	**[200-399] John Street Ct** Kalamazoo, MI 49001	**Miles Per Section**
	1. Start out going **west** on **John Street Ct** toward **John St**.	**Go 0.04 Mi**
	2. Turn **right** onto **John St**.	**Go 0.06 Mi**
	3. Turn **left** onto **E Crosstown Pky**.	**Go 0.1 Mi**
	4. Take the 2nd **right** onto **S Burdick St**. *S Burdick St is just past John St* *Kalamazoo Police is on the left* *If you are on W Crosstown Pky and reach Born Ct you've gone about 0.1 miles too far*	**Go 0.3 Mi**
	5. Turn **slight right** onto **John St**. *John St is just past E Vine St*	**Go 0.06 Mi**
	6. **601 JOHN ST # E-012** is on the **right**.	
B	**Bronson Methodist Hospital** 601 John St # E-012, Kalamazoo, MI 49007 (269) 341-7654	**0.6 mi**

Total Travel Estimate: **0.59 miles - about 2 minutes**



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APPENDIX F

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT FORM

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT FORM

I have been informed and understand and will abide by the procedures set forth in the Site Health and Safety Plan and respective Amendments, if any, for the Allied Paper Portage Creek Site.

Name	Company	Signature	Date
Jeff Rhinefield	EQM		9/26/11
Eric Bowman	EQM		9/26/11
Robert Bowman	EQM		9/26/11
Burt Cagley	EQM		9/26/11
Michael Browning	Dynamac		9/26/11
PAUL RUESCH	EPA		9/26/11
Gary Butler	EQM.		9/26/11
SAM BORRIES	EPA		9/28/11
Craig Thomas	EPA		10/11/11
MARC WANRER	GRT		10/11/11
William Newcomb	EQM		10/11/11
STEVE BASHAM	CMC		10/26/11
JOHN ALLEN	CMC		10/31/11
Thong Phoeuvphilak	CAAW		10/31/11
Taimay moot	CAAW.		10/31/11
Khamphout Senegamuk	CAAW		10/31/11
Sengpaseuth Sengsay	CAAW		10/31/11
Khamsy Keomoradth	" "		10/31/11
Puet Vongsiriechanh	CAAW		10/31/11
Vongphachan Puet	— " —		10-31-11
Garry Griffith	GP		6/14/12

BARRY ADAMS	CMC	Barry L Adams	6/19
Rocky Neff	CMC	[illegible]	6/19
Marty Smith	TTS	Marty Smith	6-19
Rocky Rodriquez	R-F-R	[illegible]	6-27-12
Chad Ranft	Selge	[illegible]	7-30-12
Ron Wilcox	Selge	[illegible]	7-30-12
ANDREW BOYLES	SELGE	Andrew Boyles	7-30-12
Ron Goetzels	Baker	[illegible]	7-30-12
BRYAN NELSON	BAKER	[illegible]	7/30/12
Ken Zimmerman	KV	Kenneth L. Zimmerman	9/17/12
Jay Tucker	KV	Jay Tucker	9/17/12
Gregory Chose	Baker	[illegible]	10-22-12
Ramon Mendoza	USEPA	[illegible]	10/23/2012

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT FORM

I have been informed and understand and will abide by the procedures set forth in the Site Health and Safety Plan and respective Amendments, if any, for the Allied Paper Portage Creek Site.

Name	Company	Signature	Date
Conrad Mills	CAW		10/31
Billy Baccam	CAAW		10.31.11
Thong Ingle	CAAW		10/31/11
Afum Nln	CAAS		
Robert J. Armstrong	EG		01/30/12
Bryant P Woods	IWO		1/30/12
Corey L. Evans	IWO		1/30/12
Adam Bayes	EQM		1/30/12
Jacob Hassan	EPA		2/6/12
Jason Jernberg	Griffin		2/14/12
Pat Tompkins	Griffin		2/14/12
Jason Cuevas	Griffin		2/15/12
Keith Kesvink	EPA		3/26/12
Hoshemia Teague	EQM		3/26/12
Mackenzie Johnson	EQM		3/26/12
[illegible]	EQM		4/11/12
Jeffrey Sayre	Rain for Rent		5-7-12
Dave Blackmon	Rain For Rent		5-7-12
Ron McQueen	RAIN FOR RENT		5-7-12
Rich Lyle	Rain For Rent		5-7-12
Bill Stanell	RFR		5-7-12
Shawn A. Cinnamon	USEPA		5/16/12
Rob Moore	RFR		5/29-12

Hilary Verduce	Weston	Hilary Verduce	7/19/12
Wendy [illegible]	EPA	Wendy [illegible]	6/19/12
Mike Gibson	EIA	[illegible]	6/14/12
Nathan Bloss	TTS	[illegible]	6-13-12
NAME	COMPANY	SIGNATURE	DATE
John Allen	CMC	John Allen	5/11/2012
Tommy Welch	CMC	Tommy Welch	5/11/12
Garey Cartmill	CMC	[illegible]	
Rodney Brown	CMC	Rodney Brown	5/11/12
Dwight Fogle	CMC	Dwight Fogle	5-11-12
Aaron Rosti	~~EM~~ EQM	[illegible]	5-11-12
Chuck Williams	TERRA	[illegible]	5-14-12
Jerman Wilcox	Terra	[illegible]	5-21-12
Tracy Bradley	Fulton & Sons	[illegible]	5-21-12
Freddie L. Shipman	Fulton & Son's	Freddie L. Shipman	5-21-12
Chris Long	EQM	Chris Long	05/31/12
Justin Shinefield	EQM	Justin Shinefield	06/04/12
Jason Harrington	Fulton	[illegible]	6-4-12
Travis Jaster	Fulton	Travis Jaster	6-4-12
Andy Maguire	EPA	[illegible]	6/4/12
Derek Douglas	EQM	[illegible]	6/4/12
Jackie Doan	EQM	[illegible]	6/6/12
Curtis Allen Proctor	TTS	Curtis Allen Proctor	6-13-12
James Proctor	TTS	James Proctor	6-13-12
Aaron Counter	TTS	[illegible]	6-13-12
Daniel Schwartz	TTS	[illegible]	6-13-12
Ben Schlicter	TTS	[illegible]	6-13-12
Curtis L Proctor	TTS	Curtis L Proctor	6-13-12
Troy Mack	TTS	[illegible]	6-13-12

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT FORM

I have been informed and understand and will abide by the procedures set forth in the Site Health and Safety Plan and respective Amendments, if any, for the Allied Paper Portage Creek Site.

Name	Company	Signature	Date
MARK HAZARD	HANDLEY'S TREE SER		2-28-13
Bill Hasle	Handley tree Service	Bill Hasle	2-28-13
Fred Kirby	Handleys Tree Serv.	Fred Kirby	2-28-13
SCOTTY HITT	Handleys Tree Service		2-28-13
Nathan Lee	Handley Tree Servic		2-28-13
Jeff Burgett	Handley tree service	Jeff Burgett	2-28-13
GENE Gladney	Handly tree Service	Gene Gladney	2-28-13
Erik Belangia	MATTS LLC		6-17-13
Dave Sheek	Matts		6-17-13
ADAM GLASER	MATTS LLC		6-17-13
David Gustafson	matt's LLC	David Gustafson	6-17-13
Matt Bennett	Matt's LLC		6-17-2013
Greg Davis	Matts LLC		6-27-13
D Scott Reynolds	ETT \ NEES	D Scott Reynolds	7-17-13
Dustin Bates	START - Weston	Dustin Bates	7-17-13
Pat Treece	EQM		8/19/13
Rick Speidel	Rain for Rent		8/22/13
Joe DiMaggio	Rain for Rent		8/22/13
Mike Green	Rain for Rent		8/22/13
Jeremy Holke	Rain for Rent		8/22/13

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Name	Company	Signature	Date
Mark Doyle	EQM		8-6-12
Sean Kane	START/Dynamac		8-08-12
[illegible]	EPA		5/22/12
RICH LANENGA	BAKER		10/2/12
Jim Jackson	Dams	J. Jackson	10/2/12
Alex Caudle	"	A. Caudle	10/2/12
~~Jackson~~	"		10/2/12
Tim Hitchcox	"	T. Hitchcox	10/2/12
Frank B. Peterson	VCES		10/18/2012
LARRY KULA	NSF		10/30/12
BOB BRITZ	N.S.I		10/30/12
Tim Janisse	N.S.I		10/30/12
ANTHONY SHIPP	BAKER		3/18/13
MIKE BECKER	BAKER		3/18/13
Ryan Zupanic	Rain for Rent		3/20/13
Scott Lyons	JMC		3/20/13
William Nunn	JMC		3/20/13
ERIK MORTINSON	WESTON/START		5/6/13
Jason Cary	EQM		5/9/13