HEALTH AND SAFETY

AND ACCIDENT AND PREVENTION PLAN

Site Investigation/
Remedial Alternatives Report
and
Interim Remedial Measure

Former Randolph Foundry Site - Number E905030
Village of Randolph, New York

Prepared for:

County of Cattaraugus
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HEALTH AND SAFETY PROGRAM

1.0 INTRODUCTION

The following health and safety procedures will be followed by PEI/TVGA personnel and their immediate subcontractors performing the activities described in the SI/RAR/IRM Work Plan/Field Sampling Plan.

1.1 Purpose

Directed at protecting the health and safety of the field crew during field activities, the following site-specific Health and Safety and Accident and Prevention Plan (HSAP) was prepared to provide safe procedures and practices for personnel engaged in conducting the field activities associated with this plan. The plan has been developed using the Occupational Safety and Health Administration (OSHA) 1910 and 1926 regulations and NYSDEC Brownfields DER-10 as guidance. The purpose of this HSAP is to establish personnel protection standards and mandatory safety practices and procedures for this task specific effort. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise during the field efforts.

1.2 Applicability

The provisions of the plan are mandatory for all personnel engaged in field activities. All personnel who engage in these activities must be familiar with this plan and comply with its requirements. The plan is based on available information concerning the project area and planned tasks. If more data concerning the project area becomes available which constitute safety concerns, the plan will be modified accordingly. One crew member will be designated Field Safety Officer and will be responsible for in-field safety. Any necessary modifications to the plan will be made by the Field Safety Officer after discussion with the PEI Project Manager and Safety Manager. All modifications will be documented in the HSAP plan and field book and provided to the Project Manager and the Health and Safety Manager for approval. A copy of this plan will be available for review by all on-site personnel. In addition, a copy of the plan will be provided to all subcontractors prior to their initial entry onto the site.

Before field activities begin, all personnel will be required to read the plan. All personnel must agree to comply with the minimum requirements of the site-specific plan, be responsible for health and safety, and sign the Statement of Compliance for all on-site employees before site work begins.

1.3 Field Activities

The work has been divided into three primary tasks consisting of completing an initial phase site investigation of foundry sands and drums/containers within/immediately adjacent to the building followed by the building demolition IRM and then conducting the SI - site investigation to include surface/subsurface soils, groundwater program and preparing the SI remedial alternatives report.

1.3.1 Foundry Sand/Drum Container Inventory

A sampling program of foundry sands/slag within the structure will be completed and a detailed inventory of equipment/debris within the facility will be completed to determine the potential for hazardous materials/reuse/disposal needs. PEI/TVGA and a selected subcontractor (company that specializes in Drum/Waste Characterization) will perform this material inventory which will precede any building demolition.

Tasks will include:

- Representative sampling of foundry sands within the building area
- Identify all drums/containers on a site plan
- Consecutively number each drum/container
- Prepare an inventory list to include drum/container ID, size of container and physical description, type and condition, contents (physical state, color, odor
- Sample and analysis
- Prepare summary results for characterization and disposal

1.3.2 IRM Building Demolition and Disposal

A contractor will be selected to complete building demolition in accordance with a set of building demolition specifications. The contractor will be responsible for preparing a demolition/disposal plan to be submitted to PEI/TVGA, County and NYSDEC for review. The plan shall include, but not limited to, the following:

- Detailed construction schedule that meets the overall project schedule provided in the bid documents.
- Method of demolition and handling of asbestos containing materials.
- Off-site transport and end disposal destinations.
- End use verification to meet NYSDEC tracking requirements (Bills of Lading, etc.).
- Other requirements as specified in the construction plans and specifications

The demolition contractor will prepare a separate health and safety plan pertaining to the demolition work for the protection of his workers and the general public.

The plan will include but not limited to:

- OSHA requirements
- Applicable laws and regulations regarding the handling and treatment of asbestos containing building materials
- Air and particulate monitoring
- dust control
- vehicle access to and from the site
- vehicle decontamination (tire wash, etc.)

- site access restrictions (fencing, gates, watchmen service, etc.).

The contractor's health and Safety plan must be submitted to PEI/TVGA, the County and NYSDEC for review prior to beginning any work.

SI/RAR

The tasks associated with the performance of the SI field work include:

- Perform a surficial debris inventory as an adjunct to any debris identified during the foundry sand/drum container inventory task
- Assess surface and subsurface fill/native soil conditions thru visual inventory and by advancing a series of test trenches and/or Geoprobe borings at specific defined locations across the property,
- Install a limited number of groundwater wells
- Sample and analyze specific media including soil and groundwater and collect background soil samples

1.4 Personnel Requirements

Key personnel are as follows:

Project Manager and Corporate health and Safety - Peter J. Gorton, MPH, CHCM
Project Engineer - John B. Berry, P.E.
Project Geologists - Dan Riker, P.G. and Justin Ryszkiewicz
Remedial Engineers - John Berry, P.E. and Terry Ried
Field Project Health and Safety - Dan Riker, P.G. and Justin Ryszkiewicz
Project QA/QC - Frank Schieppati, Ph.D. and Robert Napieralski. C.P.G.

Building Demolition Contractor - To be named through competitive bid
Analytical Laboratory - To be named - DEC Approved Contractor
Drilling/Excavation subcontractors - To be named

Site personnel and their duties are outlined below.

The Project Manager will be responsible for all personnel and subcontractors on-site and designates duties to on-site personnel. The Project Manager has the primary responsibility for:

1. Assuring that personnel are aware of the provisions of the HSAP plan and are instructed in the work practices necessary to ensure safety for planned procedures and in emergencies;
2. Verifying that the provisions of this plan are implemented;
3. Assuring that appropriate personnel protective equipment (PPE), if necessary, is available for and properly utilized by all personnel;
4. Assuring that personnel are aware of the potential hazards associated with site operations;

5. Supervising the monitoring of safety performances by all personnel to ensure that required work practices are employed; and,
6. Maintaining sign-off forms and safety briefing forms.

Field Safety Manager:

1. Monitor safety hazards to determine if potential hazards are present;
2. Determine changes to work efforts or equipment needed to ensure the safety of personnel;
3. Evaluate on-site conditions and recommend to the Field Manager modifications to work plans needed to maintain personnel safety;
4. Determine that appropriate safety equipment is available on-site and monitor its proper use;
5. Monitor field personnel and potential for exposure to physical hazards, such as heat/cold stress, safety rules near heavy equipment and borings;
6. Halt site operations if unsafe conditions occur or if work is not being performed in compliance with this plan:
7. Monitor performance of all personnel to ensure that the required safety procedures are followed. If established safety rules and practices are violated, a report of the incident will be filed and sent to the Project Manager within 48 hours of the incident; and,
8. Conduct daily safety meetings as necessary.

Field Personnel: The responsibility of each field crew member is to follow the safe work practices of this HSAP and in general to:

1. Be aware of the procedures outlined in this plan;
2. Take reasonable precautions to prevent injury to him/herself and to his/her co-workers;
3. Perform only those tasks that he/she believes can be done safely and
4. Immediately report any accidents or unsafe conditions to the safety personnel and Project Manager;
5. Notify the safety personnel and Project Manager of any special medical problems (i.e., allergies or medical restrictions) and make certain that on-site personnel are aware of any such problems;
6. Think Safety First prior to and while conducting field work; and,
7. Do not eat, drink or smoke in work areas.

Each crew member has the authority to halt work should he deem conditions to be unsafe. Visitors will be required to report to the Field Manager or designee and follow the requirements of this plan.

2.0 SITE DESCRIPTION AND HAZARDS/SAFETY CONCERNS

2.1 Site Background And Description

The Randolph Foundry site is located at 2-8 Sheldon Street at the northwest corner of South Washington and Sheldon streets in the Village of Randolph, Cattaraugus County, New York.

The former foundry and machine shop property is approximately179 feet by 229 feet and includes an abandoned cement block office and sheet metal manufacturing/warehouse type building. The abandoned structure, which is severely dilapidated and may be structurally unsound in some portions, contains a large garage/work area, workshop areas, former parts and machining areas, storage rooms and office type areas. Various debris, equipment, foundry sands and materials from former processes are still located at the site including some 55-gallon drums and other small containers of materials. These drums are rusty and in poor condition. Foundry sand covers much of the warehouse/manufacturing area and piles are located in some areas. Parts of the site are heavily vegetated and some vegetation is growing within the more dilapidated sections. A larger hopper is located in the rear of the structure.

A review of historic aerial and Sanborn maps as well as building permit records indicate that the current structures and property have been altered over time. The exact date that the existing structure was built is unknown, however, historical maps indicate that a foundry and machine shop (F. H. Pike Foundry and Machine Shop) was located on the property as early as 1902. By 1929, historic maps indicate that the property was identified as the Randolph Foundry and Machine Shop. As late as 1897 however, a dairy was located on the property. Randolph Foundry was at one time owned by Aeolian (verified also by ownership records) and made piano plates out of recycled metal. The foundry was later sold and went out-of-business around 1986. This suggests that the property was used in some capacity as a foundry and machine shop since at least 1902 or at least 84 years.

PEI completed a Phase 1 Environmental Site Assessment at the site in 2005 (*Phase 1 Environmental Site Assessment, Former Foundry Building and Property, Town of Randolph, Cattaraugus County, New York, Prepared by Panamerican Environmental, Inc., for Cattaraugus County, June-July 2005*). The assessment identified potential contamination associated with foundry sands and slag piles as well as various drums/containers in poor condition containing unknown contents.

2.2 Hazard Evaluation

Based on the nature of the potential project hazards and tasks, the hazard potential is deemed low. Specific health and safety concerns particular to the project tasks include working around foundry sand that may contain elevated levels of metals, PAHs, and possibly some organic compounds such as phenolics. Physical hazards include those associated with working near and in a building that may be structurally unsound and potential underground utilities, as well as manual/mechanical operation of field equipment. During the subsurface investigations, extreme care must be taken so as not to damage an underground utility. The location of utilities will be marked by the utility company prior to the test pit program. A minimum distance of 2.5 feet from the marked utilities will be maintained when selecting locations. Work inside the building will be minimal prior to demolition. The demolition IRM will have separate health and safety procedures developed by the demolition contractor.

2.2.1 Chemical Hazards

Preliminary evaluation of the site indicates that chemicals of concern may be associated with drumed

materials, and sands associated with a machine shop and foundry sands and fill material as an extension of the industrial nature of the site. Potential chemicals of concern could include petroleum compounds and other various chemicals that were present from the foundry.

Foundry sands are likely to be the major contaminant at the property and the **primary contaminants of concern will be lead and other metals.** These are a byproduct of the ferrous and nonferrous metal casting, where sand was used as a molding material because of its thermal conductivity. Sand used at foundries is typically of a high quality to prevent casting defects. Sand is used in two different ways in metal casting: as a molding material, which forms the external shape of the cast part, and as cores, which form internal void spaces in products such as engine blocks. Since sand grains do not naturally adhere to each other, binders must be introduced to cause the sand to stick together and hold its shape during the introduction of the molten metal into the mold and the cooling of the casting. Two general types of binder systems are used in metal casting: clay-bonded systems (green sand) and chemically-bonded systems. **Both types of sands are suitable for beneficial use** but they have different physical and environmental characteristics. Green Sand molds are used to produce about 90% of casting volume in the U.S. Green sand is composed of naturally occurring materials which are blended together: high quality silica sand (85-95%); bentonite clay (4-10%) as a binder; a carbonaceous additive (2-10%) to improve the casting surface finish; and water (2-5%). **It is black in color,** due to the carbon content; has a clay content that results in a percentage of the material that passes a 200 sieve; and adheres together due to the clay and water.

Chemically bonded sands are used both in coremaking, where high strengths are necessary to withstand the heat of the molten metal, and in mold making. Most chemical binder systems consist of an organic binder that is activated by a catalyst, although some systems use inorganic binders. Chemically bonded sands are generally light in color and coarser in texture than clay bonded sands.

Potential routes of exposure include:

- Skin contact;
- Inhalation of vapors or particles;
- Ingestion; and,
- Entry of contaminants through cuts, abrasions or punctures.

The anticipated levels of personnel protection will include Level D personal protective equipment:

1. Long sleeve shirt and long pants (recommended),
2. Work boots,
3. Hard hats, if work is conducted around heavy equipment or overhead hazards,
4. Safety Glasses
5. Gloves to include work gloves and chemical resistant gloves when sampling potentially contaminated materials.

Modifications may include chemically resistant gloves, boots/booties, and overalls. If monitoring levels indicate levels requiring respiratory protection (sustained readings at or above 5 ppm above

a daily established background), work will be halted pending discussions with field and office management. If any readings are recorded above background, work will proceed with caution and breathing zone monitoring will be conducted.

2.2.2 Physical Hazards

Depending on the time of year, weather conditions or work activity, some of the following potential physical hazards could result from project activities:

1. Noise
2. Heat Stress
3. Cold Stress
4. Slips, trips, and falls
5. Exposure to moving machinery or stored energy, particularly during Lime removal and drilling
6. Physical eye hazards
7. Lacerations and skin punctures
8. Back strain from lifting equipment
9. Electrical storms and high winds
10. Contact with overhead or underground utilities

Slips, Trips, and Falls. Field personnel shall become familiar with the general terrain and potential physical hazards which would be associated with accidental risk of slips, trips, and/or falls. Special care shall be taken along the steep embankment during the IRM. Workers will observe all pedestrian and vehicle rules and regulations. Extra caution will be observed while working near roadways and while driving in reverse to ensure safety.

Noise. All personnel shall wear hearing protection devices, such as ear muffs or ear plugs, if work conditions warrant. These conditions would include difficulty hearing while speaking to one another at a normal tone within three feet. If normal speech is interfered with due to work noise, the field safety officer will initiate the mandatory use of hearing protection around the backhoe, or other noise-producing equipment or events.

Heat/Cold Stress. Heat stress work modification may be necessary during ambient temperatures of greater than 29° C (85° F) while wearing normal clothing or exceeding 21° C (70° F) while wearing personnel protective clothing. Because heat stress is one of the most common and potentially serious illnesses at work sites, regular monitoring and preventive measures will be utilized should conditions warrant. This may include additional rest periods, supplemental fluids, restricted consumption of drinks containing caffeine or alcohol, use of cooling vests, or modification of work practices.

Most of the work to be conducted during the investigations is expected to consist of light manual labor and visual observation. Given the nature of the work and probable temperatures, heat stress hazards are not anticipated.

If work is to be conducted during winter conditions, cold stress may be a concern to the health and

safety of personnel. Wet clothes combined with cold temperatures can lead to hypothermia. If air temperature is less than 40° F (4° C) and an employee perspires, the employee must change to dry clothes. The following summary of the signs and symptoms of cold stress are provided as a guide for field and safety personnel.

Incipient frostbite is a mild form of cold stress characterized by sudden blanching or whitening of the skin.

Chilblain is an inflammation of the hands and feet caused by exposure to cold moisture. It is characterized by a recurrent localized itching, swelling, and painful inflammation of the fingers, toes, or ears. Such a sequence produces severe spasms, accompanied by pain.

Second-degree frostbite is manifested by skin with a white, waxy appearance and the skin is firm to the touch. Individuals with this condition are generally not aware of its seriousness because the underlying nerves are frozen and unable to transmit signals to warn the body. Immediate first aid and medical treatment are required.

Third-degree frostbite will appear as blue blotchy skin. The tissue is cold, pale, and solid. Immediate medical attention is required.

Hypothermia develops when body temperature falls below a critical level. In extreme cases, cardiac failure and death may occur. Immediate medical attention is warranted when the following symptoms are observed:

1. Involuntary shivering
2. Irrational behavior
3. Slurred speech
4. Sluggishness

Fire and Explosion. These hazards will be minimal for activities associated with this project. All heavy equipment will be equipped with a fire extinguisher.

Trenching and Excavations. There are a variety of potential health and safety hazards associated with excavations. These include:

- Surface encumbrances, such as structures, fencing, stored materials, etc., may interfere with safe excavations;
- Below- and above-ground utilities, such as water and sewer lines, gas lines, power lines, telephones, and optical cable lines, etc.;
- Overhead power lines and other utilities which may be contacted by the excavation equipment;
- Vehicle and heavy equipment traffic around the excavations;
- Falling loads from lifting or digging equipment;
- Water accumulation within excavations;
- Hazardous atmospheres, such as oxygen deficiency, flammable gases or vapors, and toxic gases which may occur in excavations,

- Falling into or driving equipment or vehicles into unprotected or unmarked excavations; and,
- Cave-in of loose rocks and soil/lime at the excavation face.

OSHA requirements for trenching and excavations are contained in 29 CFR, subpart P, 1926:650 thru 1926.652.

Basic minimum excavation requirements should include:

- Personnel entry into excavations should be minimized, whenever possible and no entry will occur in pits below 4 feet in depth.
- Sloping, shoring or some other equivalent means should be utilized, as required.
- Surface encumbrances such as structures, fencing, piping, stored material etc. which may interfere with safe excavations should be avoided, removed or adequately supported prior to the start of excavations. Support systems should be inspected daily.
- Underground utility locations should be checked and determined and permits as necessary should be in place prior to initiating excavations. Local utility companies will be contacted at least two days in advance, advised of proposed work, and requested to locate underground installations. When excavations approach the estimated location of utilities, the exact location should be determined by careful probing or hand digging and when it is uncovered, proper supports should be provided.
- A minimum safe distance of 15 feet should be maintained when working around overhead high-voltage lines or the line should be de-energized following appropriate lock-out and tag-out procedures by qualified utility personnel.
- Excavations five feet or more deep if entered will require an adequate means of exit, such as a ladder, ramp, or steps and located so as to require no more than 25 feet of lateral travel. Under no circumstances should personnel be raised using heavy equipment.
- Personnel working around heavy equipment, or who may be exposed to public vehicular traffic should wear a traffic warning vest. At night, fluorescent or other reflective material is recommended to be worn.
- Heavy equipment or other vehicles operating next to or approaching the edge of an excavation will require that the operator have a clear view of the edge of the excavation, or that warning systems such as barricades, hand or mechanical signals, or stop logs be used. If possible the surface grade should slope away from the excavation.
- Personnel should be safely located in and around the trench/excavation face and should not work underneath loads handled by lifting or digging equipment.
- Hazardous atmospheres, such as oxygen deficiency (atmospheres containing less than 19.5% oxygen), flammable gases or vapors (airborne concentrations greater than 20% of the lower explosive limit), and toxic gases or vapors (airborne concentrations above the OSHA Permissible Exposure Limit or other exposure limits) may occur in excavations. Monitoring should be conducted for hazardous atmospheres prior to entry and at regular intervals. Ventilation or respiratory protection may be provided to prevent personnel exposures to oxygen deficient or toxic atmospheres. Periodic retesting (at least each shift) of the excavation will be conducted to verify that the atmosphere is acceptable. A log or field book records should be maintained.
- Personnel should not work in excavations that have accumulated water or where water is

accumulating unless adequate precautions have been taken. These precautions can include special support or shield systems, water removal systems such as pumps, or safety harnesses and lifelines. Groundwater entering the excavation should be properly directed away and down gradient from the excavation.

- Safety harnesses and lifelines should be worn by personnel entering excavations that qualify as confined spaces.
- Excavations near structures should include support systems such as shoring, bracing, or underpinning to maintain the stability of adjoining buildings, walls, sidewalks, or other structures endangered by the excavation operations.
- Loose rock, excavated or other material, and spoils should be effectively stored and retained at least two and preferably 5 feet or more from the edge of the excavation. Barriers or other effective retaining devices may be used in order to prevent spoils or other materials from falling into the excavation.
- Walkways or bridges with standard guardrails that meet OSHA specifications will be provided where employees, the public, or equipment are required to cross over excavations.
- Adequate barrier physical protection should be provided and excavations should be barricaded or covered when not in use or left unattended. Excavations should be backfilled as soon as possible when completed.
- Safety personnel should conduct inspections prior to the start of work and as needed throughout the work shift and after occurrence that increases the hazard of collapse (i.e., heavy rain, vibration from heavy equipment, freezing and thawing, etc.).
- Personnel working in excavations should be protected from cave-ins by sloping and/or benching of excavation walls, a shoring system or some other equivalent means in accordance with OSHA regulations. Soil type is important in the determination of the angle of repose for sloping and benching, and the design of shoring systems.

2.2.3 Biological Hazards

Biological hazards can result from encounters with mammals, insects, snakes, spiders, ticks, plants, parasites, and pathogens. Mammals can bite or scratch when cornered or surprised. The bite or scratch can result in local infection with systemic pathogens or parasites. Insect and spider bites can result in severe allergic reactions in sensitive individuals. Exposure to poison ivy, poison oak or poison sumac results in skin rash. Ticks are a vector for a number of serious diseases. Dead animals, organic wastes, and contaminated soil and water can harbor parasites and pathogens. These hazards will be reduced to non-existent if work is conducted during late fall and winter months. The following are highlighted because they represent more likely concerns for the site-specific tasks and location:

Bees, Ants, Wasps and Hornets. Sensitization by the victim to the venom from repeated stings can result in anaphylactic reactions. If a stinger remains in the skin, it should be removed by teasing or scraping, rather than pulling. An ice cube placed over the sting will reduce pain. An analgesic-corticosteroid lotion is often useful. People with known hypersensitivity to such stings should consult with their doctor about carrying a kit containing an antihistamine and aqueous epinephrine in a pre-filled syringe when in endemic areas. Nests and hives for bees, wasps, hornets and yellow

jackets often occur in the ground, trees and brush. Before any nests or hives are disturbed, an alternate sampling location should be selected. If the sample location cannot be relocated, site personnel who may have allergic reactions shall not work in these areas.

Storm Conditions. When lightening is within 10 miles of the work site, all personnel should evacuate to a safe area.

Sun. When working in the sun, personnel should apply appropriate sun screening lotions (30 sun screen or above), and/or wear long sleeve clothing and hats.

Field personnel should refrain from handling any foreign objects such as hypodermic needles, glass, etc.

2.2.4 Activity Hazard Analysis

Table 1 presents a completed activity hazard analysis for the performance of IRM and SI

Table 1. Activity Hazard Analysis*

PRINCIPAL STEPS	POTENTIAL SAFETY/ HEALTH HAZARDS	RECOMMENDED CONTROLS
1. IRM 2. SI soil/groundwater investigation	1. Exposure to sands, drummed waste and physical hazards 2. Potential exposure to low levels of PAHs, metals, petroleum products	Covers all hazards 1. Use of administrative controls (site control and general safety rules), work cloths, dust suppression 2. Use of real-time monitoring and action levels 3. Use Physical Hazards SOPs
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Excavation and other heavy equipment, Backhoe and/or Geoprobe	1. Daily inspection of equipment 2. Continuous safety oversight	1. Safety plan review 2. Daily safety briefings

3.0 MONITORING

The purpose of air monitoring is to monitor for potential airborne contaminants and to verify that protection levels are suitable. Monitoring will be performed for dust/particulates and volatile organic

compounds during excavation activities. Daily background and calibration readings will be recorded prior to the start of field activities. All monitoring equipment used during this investigation will be maintained and calibrated and records of calibration and maintenance will be kept in accordance with 29 CFR 1910.120(b)4(11)E.

3.1 Particulate Monitoring

The excavation contractor and/or PEI will obtain real-time air monitoring readings at upwind and downwind locations in accordance with NYSDEC TAGM #4031 (Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites), DER-10 for community air-monitoring (refer to Section 9.0) and the health and safety plan.

PEI will complete daily field reports that document activities performed, equipment and manpower onsite, screening and/or monitoring results, general conditions and weather conditions.

Real time air monitoring will be conducted when the lime piles/site soils are disturbed including during, excavation and grading and other activities. A real time personal aerosol monitor (i.e., TSI SidePak AM510 Personal Aerosol monitor or equivalent) will be used. This monitor is a laser photometer which measures data as both real-time aerosol mass-concentration and 8-hour time weighted average (TWA). For this project the monitor will be used to measure real-time concentrations in milligrams per meter cubed (mg/m^3). Action levels are based on potential exposure to calcium carbonate and will be as follows:

15 mg/m^3 total dust
5 mg/m^3 respirable fraction for nuisance dusts

Levels above these limits will necessitate halting work and use of dust suppression techniques.

3.2 Total Volatile Organics Monitoring

Monitoring of volatile organic compounds will be conducted using a photo-ionization detector (PID). If a sustained reading of 3 parts per million (ppm) above background occurs, work will be halted and personnel will evacuate the work area. Levels will be allowed to stabilize and another reading will be taken in the breathing zone. If background levels continue to be exceeded, work will not continue at that location and the project manager will be notified of the situation. Action levels will remain the same.

4.0 SAFE WORKING PRACTICES

4.1 General Practices

The following general safe work practices apply:

- Eating, drinking, chewing gum or tobacco and smoking are prohibited within the work area as part of safe work practices.

- Contact with potentially contaminated substances should be avoided. Puddles, pools, mud, etc. should not be walked through if possible. Kneeling, leaning, or sitting on equipment or on the ground should be avoided whenever possible.
- Upon leaving the work area, hands, face and other exposed skin surfaces should be thoroughly washed.
- Unusual site conditions shall be promptly conveyed to the site manager and safety personnel as well as the project management for resolution.
- A first-aid kit shall be available at the site.
- Field personnel should use all their senses to alert themselves to potentially dangerous situations (i.e., presence of strong, irritating, or nauseating odors).
- Personal hygiene practices such as no eating, drinking or smoking will be followed.
- If severe dusty conditions hazardous to the crew are present, soils will be dampened to mitigate dust. All equipment will be cleaned before leaving the work area.
- Field personnel must attend safety briefings and should be familiar with the physical characteristics of the investigation, including:
    - Accessibility to associates, equipment, and vehicles.
    - Areas of known or suspected contamination.
    - Site access.
    - Routes and procedures to be used during emergencies.
- Personnel will perform all investigation activities with a buddy who is able to:
    - Provide his or her partner with assistance.
    - Notify management / emergency personnel if emergency help is needed.
- Excavation activities shall be terminated immediately in event of thunder and/or electrical storm.
- The use of alcohol or drugs at the site is strictly prohibited.

5.0 PERSONAL SAFETY EQUIPMENT AND SITE CONTROL

5.1 Personal Safety Equipment

As required by OSHA in 29 CFR 1920.132, this plan constitutes a workplace hazard assessment to select personal protective equipment (PPE) to perform the site investigation.

The PPE to be donned by on-site personnel during this investigation are those associated with the industry standard of level D. Protective clothing and equipment to initiate the project will include:

- Work clothes
- Work boots
- Work gloves as necessary
- Hard hat if work is conducted in areas with overhead danger
- Hearing protection as necessary

Modifications may include chemically resistant gloves, boots/booties, and overalls. If monitoring levels indicate levels requiring respiratory protection (sustained readings at or above action levels above a daily established background), work will be halted pending discussions with field and office

management.

5.2 Site Control

Site control will be established near each work zone (drilling or excavation locations). The purpose is to control access to the immediate excavation/trenches from individuals not associated with the project. Site control will be established within twenty-five feet of the drilling unit or other heavy equipment. The work area will be appropriately designated as an exclusion area.

5.2.1 Work Zones (For excavations/drilling using heavy equipment or deeper than 3 feet)

Each excavation will be set up in work zones to include an exclusion area and support zone. Exact configuration of each zone is dependent upon location, weather conditions, wind direction and topography. The safety manager will establish the control areas daily at each excavation.

An area of 10 feet (as practical) around each excavation will be designated as the exclusion area. This is the area where potential physical hazards are most likely to be encountered by field personnel. The size of the exclusion area may be altered to accommodate site conditions and the drilling/excavation location. If levels of protection higher than level D are used, this plan will be modified to include decontamination procedure. **The Site excavation contractor will be required to have eye/face wash equipment/means available on-site.**

A support area will be defined for each field activity. Support equipment will be located in this clean area. Normal work clothes are appropriate within this area. The location of this area depends on factors such as accessibility, wind direction (upwind of the operation.), and resources (i.e., roads, shelter, utilities). The location of this zone will be established daily.

Excavation areas will be filled and or secured to prevent access from the general public.

6.0 EMERGENCY INFORMATION

In the event of an emergency, the field team members or the site safety manager will employ emergency procedures. A copy of emergency information will be kept in the field vehicle and will be reviewed during the initial site briefing. Copies of emergency telephone numbers and directions to the nearest hospital will be prominently posted in the field vehicle.

6.1 Emergency Medical Treatment And First Aid

A first aid kit large enough to accommodate anticipated emergencies will be kept in the field vehicle. If any injury should require advanced medical assistance, emergency personnel will be notified and the victim will be transported to the hospital.

In the event of an injury or illness, work will cease until the safety manager and field manager have

examined the cause of the incident and have taken appropriate corrective action. Any injury or illness, regardless of extent, is to be reported to the project manager.

6.2 Emergency Telephone Numbers and Hospital

Emergency telephone numbers for medical and chemical emergencies will be posted in the field vehicle are listed below:

Ambulance **911**
Fire **911**
Police - NYS Troopers **911**
Poison Control Center **1-800-888-7655**
PEI Health & Safety Manager:

Mr. Peter J. Gorton: **Work - 821-1650**
Cellular - 308-8220

NYSDEC Spills Hotline-1-800-457-7362
NYSDEC Project Manager, Mr. Gene Melnyk -716-851-7220
NYSDOH Project Manager, Cameron O'Connor-716-847-4385
County Project Manager, Mr. Joseph Keller or Mr. David Rivet 716) 938- 9111 Ext 2286 or (716) 938-9121 (County Public Works)

Hospital -

Directions		**Mileage**
		0.3 miles
		0.4 miles
		<0.1 miles
		0.3 miles
		<0.1 miles
		0.2 miles
		<0.1 miles
Total Estimated Time: 5 minutes	Total Distance:	1.51 miles

See attached map for route to the Hospital Facility
Verbal communications between workers or use of a site vehicle horn repeated at intervals of three short beeps shall be used to signal all on-site personnel to immediately evacuate the area and report to the vehicle parking area.

6.3 Emergency Standard Operating Procedures

The following standard operating procedures are to be implemented by on-site personnel in the event of an emergency. The field managers shall manage response actions.

- Upon notification of injury to personnel, the designated **emergency signal shall be sounded**, if necessary. All personnel are to terminate their work activities and assemble in a safe location. The emergency medical service and hospital emergency room shall be notified of the situation. If the injury is minor, but requires medical attention, the field safety manager shall accompany the victim to the hospital and provide assistance in describing the circumstances of the accident to the attending physician.
- Upon notification of an equipment failure or accident, the field safety manager shall determine the effect of the failure or accident on site operations. If the failure or accident affects the safety of personnel or prevents completion of the scheduled operations, all personnel are to leave the area until the situation is evaluated and appropriate actions taken.
- Upon notification of a natural disaster, such as tornado, high winds, flood, thunderstorm or earthquake, on-site work activities are to be terminated and all personnel are to evacuate the area.

6.4 Emergency Response Follow-Up Actions

Following activation of the Emergency Response Plan, the field safety manager shall notify the project manager and otherPEI/TVGA managers. The field safety manager shall submit a written report documenting the incident within two working days.

6.5 Medical Treatment For Site Accidents/Incidents

The field safety manager shall be informed of any site-related injury, exposure or medical condition resulting from work activities. All personnel are entitled to medical evaluation and treatment in the event of a site accident or incident.

6.6 Site Medical Supplies and Services

The field safety manager or a trained first aid crew member shall evaluate all injuries at the site and render emergency first-aid treatment as appropriate. If an injury is minor but requires professional medical evaluation, the field safety manager shall escort the employee to the appropriate emergency room. For major injuries occurring at the site, emergency services shall be requested.

A first-aid kit shall be available, readily accessible and fully stocked. The first-aid kit shall be located within specified vehicles used for on-site operations.

6.7 Universal Precautions

Universal precautions shall be followed on-site at all times. This consists of treating all human blood and certain body fluids as being infected with Human Immune Deficiency Virus (HIV), Hepatitis B virus (HBV), and other bloodborne pathogens. Clothing and first-aid materials visibly contaminated with blood or other body fluids will be collected and placed into a biohazard bag. Individuals providing first aid or cleanup of blood- or body-fluid contaminated items should wear latex gloves. If providing CPR, a one-way valve CPR device should be used. Biohazard bags, latex gloves, and CPR devices will be included in the site first-aid kits.

Work areas visibly contaminated with blood or body fluids shall be cleaned using a 1:10 dilution of household bleach. If equipment becomes contaminated with blood or body fluids, and can not be sufficiently cleaned, the equipment shall be placed in a plastic bag and sealed.

Any personnel servicing the equipment shall be made aware of the contamination, so that proper precautions can be taken.

7.0 RECORD KEEPING

The Field Manager and safety manager are responsible for site record keeping. Prior to the start of work, they will review this Plan.

A Site Safety Briefing will be completed prior to the initiation of investigation activities. This shall be recorded in The field log book. An Accident Report should be completed by the Field Manager in the event that an accident occurs and forwarded to the office administrative manager.

8.0 PERSONNEL TRAINING REQUIREMENTS

8.1 Initial Site Entry Briefing

Prior to initial site entry, the field safety manager shall provide all personnel (including site visitors) with site-specific health and safety training. A record of this training shall be maintained. This training shall consist of the following:

- Discussion of the elements contained within this plan
- Discussion of responsibilities and duties of key site personnel
- Discussion of physical, biological and chemical hazards present at the site
- Discussion of work assignments and responsibilities
- Discussion of the correct use and limitations of the required PPE
- Discussion of the emergency procedures to be followed at the site
- Safe work practices to minimize risk
- Communication procedures and equipment

- Emergency notification procedures

8.2 Daily Safety Briefings

The field safety manager will determine if a daily safety briefing with all site personnel is needed. The briefing shall discuss the specific tasks scheduled for that day and the following topics:

- Specific work plans
- Physical, chemical or biological hazards anticipated
- Fire or explosion hazards
- PPE required
- Emergency procedures, including emergency escape routes, emergency medical treatment, and medical evacuation from the site
- Weather forecast for the day
- Buddy system
- Communication requirements
- Site control requirements
- Material handling requirements

9.0 COMMUNITY HEALTH AND SAFETY

The following measures to ensure the general public during site activities.

9.1 General

An initial fact sheet has been developed and will be sent to the public. The fact sheet describes the IRM, the site history, community development objectives, an overview of the study process, the project schedule, and upcoming opportunities for participating in project activities.

9.2 Community Monitoring

The community air monitoring program requires real-time air monitoring. Based on the known makeup of the foundry sands, during the IRM and SI, air monitoring will include real-time monitoring for particulates at the downwind perimeter of the daily work area. And real-time monitoring will be performed for VOC during all intrusive and sampling activities.

Although this site and program are not associated with a hazardous waste site or hazardous wastes, this monitoring program is based on guidance presented in NYSDEC TAGM # 4031 - "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites" and in DER-10 Appendix 1A 'Generic Community Air Monitoring Plan"

Fugitive dust is particulate matter which becomes airborne and contributes to air quality as a nuisance and public health concern. Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work zone during IRM excavation/active site work which involved disturbance of the lime piles.. The monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes or less for comparison to the airborne action level (refer to HSAP Section 3.0). In addition, dust levels will be visually assessed during all intrusive work activities. The following action levels will apply:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind) for the 15-minute period or if dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques as long as downwind PM-10 levels do not exceed 150 mcg/m^3 above background and provided no visible dust is migrating from the work area.
- Levels above the action level will require work to be halted and a re-evaluation will be made with the project manager, City project manager, and NYSDEC.

All readings must be recorded in the project log book/daily monitoring sheets

VOCs will be monitored continuously in the work space during SI sampling activities. Any levels above background will require re-evaluation of activities. Levels greater than 5 ppm above background over at least a 15-minute average will require work to be halted and re-evaluated. Resumption of work will require an update to this plan to include action levels in DER-10 (attached).

Potential Hazards and OSHA Standards for Consideration during IRM/SI Activities

Site Exposure/Control	Potentially Applicable OSHA Standard*	
	1910 General Industry	1926 Construction
Hazard Assessment& Employee Training	29 CFR 1910.132(d)	29 CFR 1926.21(b)
Chemical Exposure	29 CFR 1910.1000	29 CFR 1926.55
Noise Exposure	29 CFR 1910.95	29 CFR 1926.52
Sanitation	29 CFR 1910.141	29 CFR 1926.51
Wiring Methods (temporary wiring)	29 CFR 1910.305(a)(2)	29 CFR 1926.405(a)(2)
Electrical Hazards	29 CFR 1910.333	29 CFR 1926.416
Emergency Action Planning	29 CFR 1910.38	29 CFR 1926.35
Excavation	covered by 1926	29 CFR 1926 Subpart P
Confined Space Entry	29 CFR 1910.146	29 CFR 1926.21(b)(6)29 CFR 1926.353(b)
Material Handling	29 CFR Subpart N	29 CFR Subpart N29 CFR 1926.600-60229 CFR 1926.604
Building Demolition	covered by 1926	29 CFR 1926 Subpart T
Site ContaminantAbatement	29 CFR 1910.1000-1029 29 CFR 1910.1043-1052	29 CFR 1926.5529 CFR 1926.6229 CFR 1926.1101-1152
Elevated Work Surfaces	29 CFR 1910 Subpart D 29 CFR 1910 Subpart F	29 CFR 1926 Subpart L29 CFR 1926 Subpart M29 CFR 1926.552
Chemical Storage	29 CFR 1910 Subpart H29 CFR 1910.1200	29 CFR 1926.5929 CFR 1926 Subpart F
Personal Protective Equipment	29 CFR 1910 Subpart I	29 CFR 1926 Subpart E
Heavy Equipment Operation	29 CFR 1910.9529 CFR 1910 Subpart N	29 CFR 1926.5229 CFR 1926 Subpart O
Tasks-Long Duration	29 CFR 1910.141-142	29 CFR 1926.51

The Federal General Industry and Construction citations are provided above.

PE PANAMERICAN ENVIRONMENTAL, INC.
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PETER J. GORTON
Senior Hazardous Waste Specialist
President

EDUCATION

M.P.H., Public Health/Environmental Health/Science, Yale University School of Medicine, Department of Epidemiology and Public Health, 1979
B.S., Environmental Science, University of Massachusetts, 1977

SUMMARY OF QUALIFICATIONS

As a senior environmental scientist and project manager, Mr. Gorton's main duties include performing hazardous and mixed waste assessments for the private sector as well as government clients over a broad spectrum of disciplines which include Brownfields re-development, remedial investigations, UST closures and forensic assessments, health and safety, regulatory compliance, waste management, project management, spill response, industrial hygiene, sampling programs, and preparation of procedures, plans, and manuals required to support all of the above areas.

As Panamerican Environmental, Inc. (PEI)'s Manager of Field Assessment and Health and Safety Services, Mr. Gorton has performed hundreds of Phase I and Phase II environmental assessments, UST closure projects, hazardous and mixed waste sampling, NEPA and SEQRA environmental assessments, regulatory compliance reviews, and health and safety planning and oversight. Mr. Gorton has been involved with numerous recent Brownfields projects which have included project planning, community participation, environmental review, investigation and remediation. These projects have ranged from single parcels to projects involving the re-development of multiple City blocks and diverse geographic areas such as waterfront renewal areas and rural commercial/agricultural areas. This has resulted in extensive experience in the environmental review for a diverse. Projects have included re-development of multiple City blocks associated with the Lakeview housing projects on the west side of Buffalo, Home ownership zones on the east and north sides of Buffalo, and individual sites in the Cities of Lackawanna, Buffalo, and Niagara Falls. Mr. Gorton has been project manager for several projects with Niagara County involving environmental assessments of both residential and commercial areas across the county.

For the City of Buffalo, Mr. Gorton has conducted/managed numerous Phase I and Phase II Environmental Site Assessments, remediation projects at PCB and metal/PAH contaminated properties, as well as UST closures and petroleum contamination investigations. Currently Mr. Gorton is the project manager for a Site Assessment/Remedial Alternative Report (SI/RAR) investigation under the New York State Brownfields Bond Act.

For the Cities of Niagara Falls, Buffalo, and Lackawanna, Mr. Gorton developed Phase I Environmental Assessment, Scoping Plans, and Work Plans for ten local Brownfields SI/RAR projects. For both public and private clients, Mr. Gorton has planned and completed numerous Phase I Environmental Assessments as well as cost effective Phase II Environmental Assessments and UST closures associated with a wide variety of contaminants.

For the counties of Cattaraugus, Chautauqua, and Niagara, Mr. Gorton has been involved with Brownfields development projects including performing/managing Phase I and Phase II site assessments, petroleum contamination investigation and remediation, and assisting in grant applications. This has included working on an assessment criteria used in site selection and prioritization of sites for inclusion into the Brownfields list of sites. Mr. Gorton has performed training on Phase I and Phase II environmental assessments under a USEPA Brownfields training grant in association with the University of Buffalo.

For the New York District Corps of Engineers, Mr. Gorton prepared health and safety plans and managed or performed the health and safety oversight for Panamerican Consultants, Inc. (PCI) for at least three archaeological surveys. These projects included a Phase I archaeological investigation at Seneca Army Depot Activities, Romulus, New York, for which the health and safety issue was the potential contamination of site areas with heavy metals, semi and volatile organics, unexploded ordnance (UXO), and radiological contaminants; a Phase II archaeological investigation along the Passaic River in the City of Newark, New Jersey, which involved health and safety planning and field oversight during deep testing in an area that not only was the historic location of the Morris Canal but also a location of known industrial development; and, health and safety planning and management for surface and subsurface archaeological investigations at Picatinny Arsenal, Dover, Morris County, New Jersey.

Under a grant for the State of New York Department of Labor, Mr. Gorton developed a health and safety program and training manual directed at health and safety during archaeological and cultural resources field surveys. The manual included information on physical, chemical and biological hazards, risk awareness, hazard communication, emergency planning and safety precautions specific to the archaeological and cultural resources profession.

For other public and private sector industrial clients, Mr. Gorton has provided extensive environmental and technical expertise. Mr. Gorton has:

- Completed Brownfields assessments under both the New York State Bond Act and U.S. Environmental Protection Agency (USEPA) guidance and requirements.

- Conducted numerous cost effective UST closure and sampling programs to investigate subsurface petroleum contamination in accordance with NYDEC (STARS and SPILLS guidance) and USEPA requirements for both municipal and private clients. Performed forensic assessments for various clients resulting in development of cost sharing and spill cleanup responsibilities

- Developed, managed and performed cost effective Phase II sampling programs to investigate surface and subsurface contamination

- Provided regulatory compliance consultation for manufacturing clients including completing

SARA Form R review and revisions, including performance calculations and review of facility information to determine reporting requirements to the USEPA under section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA); and managing New York State Facility Air Permit requirements in a manufacturing environment.

- Provided field support and soil sampling during an overland gamma radiological and tissue equivalent survey conducted at a facility which manufactures ceramics and ceramic products. This facility uses naturally-occurring radioactive materials in their process and produced a waste containing naturally-occurring uranium and thorium;

- Performed numerous Phase I Environmental Site Assessments for both commercial and residential properties in accordance with current ASTM standards and using standard PEI procedures and checklists;

- Developed environmental assessments under SEQRA and NEPA.

PAST EXPERIENCE

DAMES & MOORE, 1989-1996

Project Manager and Group Manager for Facility Assessment/Geotechnical Services at the West Valley Demonstration Project (WVDP), West Valley, New York. As manager, responsibilities were to provide environmental assessment and geotechnical services for the West Valley Nuclear Services Company (WVNS), a wholly-owned subsidiary of Westinghouse Electric Corporation. Duties included site characterization, assessment, environmental compliance, data evaluation, mixed waste sampling and management programs, pathway assessment, health and safety, real time air monitoring, procedure and plan development, and program management including budget and schedule management. Selected projects are provided below:

- Managed and assisted in the preparation of numerous sampling and analysis plans and data quality objectives (DQOs) for environmental assessments and underground storage tanks for the WVDP and industrial clients.

- Researched ISO 14000 standards application for at the WVDP.

- Managed the preparation of Best Management Practices Plans and Pollution Prevention Plans for storm water management at the WVDP.

- Managed field efforts and prepared portions of two environmental information documents (EIDs) for WVNS to support an Environmental Impact Statement (EIS). These reports included a radiological survey EID and a soil characterization EID.

- Co-preparer of various project-controlling documents such as sampling and analysis plans for soil and groundwater investigations for WVNS in support of an EIS and RCRA Facility Investigation (RFI) as well as the development of portions of an EIS, RCRA integration plan,

and facility unit historical review document.

- Managed for WVNS the investigations associated with the RFI. This included preparation of workplans, interim measures plans, 9 RCRA RFI reports for 27 mixed waste and solid waste management units (SWMUs), as well as support during negotiations and quarterly progress meetings with the USEPA, NYSDEC, and DOE.

- Managed and participated in the planning for and the installation of monitoring wells, soil borings, and surface soil, water, and sediment sampling including a comprehensive sediment sampling of waste water lagoons, data validation, and management at WVDP.

- For WVNS, managed portions of a radiological groundwater plume delineation including the installation of 80 borings using cost-effective conventional and direct push methodology to reduce investigative-derived waste while sampling groundwater and soils. This program included a groundwater seep investigation, installation of recovery wells, and source identification.

- Managed the decommissioning of over 35 out-of-service groundwater monitoring wells, piezometers and vados monitoring arrays at the WVDP.

- Managed the installation of 4 piezometers at the WVDP to assist in monitoring the effectiveness of a groundwater interceptor trench.

- Managed the development of initial waste management/closure plans for decommissioning

- Conducted real time air monitoring for volatile organic compounds associated with spills and leaks.

- Coordinated seminars on total cost control and data validation.

- Oversaw the spill response and mitigation of a diesel oil spill for a Chemlawn facility in Orchard Park, New York, that affected local property waterways.

- Conducted Phase I property assessments for local banks and industry.

CAMP, DRESSER & McKEE, 1984-1989

Field Investigation Manager and Regional Health & Safety Supervisor, Edison, New Jersey; New York, New York; and Western New York Operations. **As regional health and safety supervisor**, responsibilities were to manage the health and safety policies of CDM, including medical monitoring, training, and health and safety plan development and approval for hazardous and mixed waste operations in accordance with OSHA industrial and construction industry standards. **As field operations manager**, responsibilities were to market, supervise staff, coordinate and conduct remedial investigations and property assessments. Several examples of completed

projects are presented below:

- Provided technical support, environmental sampling, management, and developed and approved health and safety plans and provided health and safety oversight for employees, subcontractors, and consultants at over 20 large and small RI/FS and RFI/CMS projects including Pfohl Brothers Landfill, Cheektowaga, New York; Port Washington Landfill, Port Washington, New York; Lipari Landfill, New Jersey; Lang Site, New Jersey; Glen Ridge and Montclair Radiation Sites, New Jersey; Woodland Waste Site, New Jersey; U.S. Radium Site, New Jersey; Lone Pine Site, New Jersey; Fort Drum Landfill, New Jersey.

- For AT&T Bell Laboratories, managed the development of environmental compliance manuals for six major research and development facilities in New Jersey, Pennsylvania, Illinois, Massachusetts, Ohio, and Georgia.

- Participated in the investigation and remediation of an acid spill at the Niagara Falls, New York, wastewater treatment plant.

- Oversaw the spill response and mitigation of a gasoline spill in North Tonawanda, New York.

ECOLOGY AND ENVIRONMENT, INC., 1979-1984

Assistant Corporate Health and Safety Director and Hazardous Waste Team Member, Cheektowaga, New York. **As assistant corporate health and safety director**, responsibilities included coordinating the corporate OSHA health and safety program for over 300 employees engaged in hazardous waste RI/FS programs nationwide including site audits and training programs. **As a member of the hazardous waste group**, responsibilities included participation in over 100 waste site investigations, sampling projects, and spill responses. Duties included air monitoring surveys at waste sites, spills, industries, and public buildings as well as field assessment and sampling for unknown contaminants in surface and subsurface soil, surface and groundwater, drums, tanks, buildings, and lagoons; development of bid specifications, drilling support and supervision, and sample packaging and shipping. Several examples of completed projects are presented below:

- Managed the purchase of state-of-the art air, water, and soil sampling equipment to support nationwide investigations of uncontrolled waste sites for the U.S. EPA Field Investigation Team Program. Task involved equipping 16 offices and response vehicles with field sampling, monitoring, and safety equipment.

- Member of the emergency oil and waste spill response team and participated and/or audited over 10 spill responses.

- Managed the special project fund for providing technical assistance to the USEPA Oil and Hazardous Substances Spill Prevention and Emergency Response Team.

- Planned and participated in a sampling program for dioxin contamination on Johnson Atoll in

the Central Pacific.

- Principal scientist responsible for air monitoring and safety oversight for an asbestos abatement program at Squire Hall, University of Buffalo.

- Field manager, site safety officer, or sample manager for over 20 RI/FS projects including Southern Pacific Railroad, Sacramento, California; Bowers Landfill, Circlesville, Ohio; Chemdyne, Hamilton, Ohio; Envirochem Drum site, Indianapolis, Indiana; Fultz Landfill, Cambridge, Ohio; Buckeye Landfill, St. Clairsville, Ohio; Toftdahl-Davis Farm Site, Clark, Washington; Western Processing, Seattle, Washington; Petro Processing, Baton Rouge, Louisiana; Old Mill Site, Rock Creek, Ohio; Hyde Park Landfill, Niagara Falls, New York; Tar Pits, Jacksonville, Florida.

- Principal scientist responsible for conducting sampling (air, water, soil) surveys for chemical compounds including asbestos, formaldehyde, polychlorinated biphenyls (PCBs), heavy metals, and various organic solvents.

CERTIFICATIONS AND OTHER TRAINING

Year	Course Title
Current	Certified Hazard Control Manager (CHCM) - Masters Level
1998	State Environmental Quality Review Workshop - SEQR Basic and Advanced Topics
1997	Clean Air Act, Section 112 (r)(7) Risk Management Programs/Plans
1997	Lead Inspector Certification # LIC-97/04/14-02
1996	ERIISnet Environmental Risk Information & Imaging Software Training
1996	Data Quality Objectives (DQOs) Training For Managers
1996	Environmental Issues in Western New York Seminar - Air & Waste Management Association
1996	Blood Borne Pathogen Training
1995	ArcView GIS Training
1992	Conduct of Operations for Managers and Supervisors
1987	OSHA Safety Management/Supervisor Training
1985	Performance of Remedial Response Activities at Uncontrolled Hazardous Waste Sites
1982	Fundamentals of Industrial Hygiene, Harvard School of Public Health
1982	OVA and HNU Air Monitoring and Screening Techniques
1980	Field Investigations of Uncontrolled Hazardous Waste Sites
Yearly	Eight-hour 29 CFR 1910.120 Requalification Training
Yearly	Radiation Worker Requalification

Attachment 1

Heat Stress Management Program and Procedures

PCI BUFFALO • TUSCALOOSA • MEMPHIS
Buffalo Branch Office • 2390 Clinton Street • Buffalo, NY 14227 • (716) 821-1650 • (716) 821-1607

PANAMERICAN HEAT STRESS MANAGEMENT PROGRAM

INTRODUCTION

Panamerican employees engage in a variety of activities with potential exposure to excessive ambient temperatures and humidity, with the overall result being "heat stress". This procedure establishes the Panamerican Heat Stress Management Program. It establishes responsibilities and basic requirements for personnel who may be required to work in situations where the ambient temperature exceeds 21° C (70° F) while wearing protective equipment (e.g., hazardous waste site investigations) or when the ambient temperature exceeds 29° (85° F) while wearing normal clothing. Because heart stress is one of the most common and potentially serious illnesses at job sites and particularly hazardous waste sites, regular monitoring and other preventive measures are warranted.

There are no regulations addressing heat stress. However, it should be noted that OSHA does recognize heat stress as a potentially serious health hazard and can site employers under the "general duty clause" of the Occupational Safety Health Act if heat-related illness is occurring or likely to occur.

PROGRAM ADMINISTRATION AND RESPONSIBILITIES

The Heat Stress Management Program is administered by Panamerican Managers and Health and Safety personnel.

These Individuals:

- Oversee the implementation of the Heat Stress Management Program;
- Periodically audit and evaluate program implementation;
- Evaluate this procedure on an ongoing basis to see that it reflects current practice and regulations;
- Assist field crews in their implementation of this procedure.

Project Managers (PM) and Safety Personnel are responsible for:

- Implementing this Procedure in all field operations:
- Providing guidance to staff regarding heat stress management as described in the Procedure; and
- Providing feedback to management regarding program effectiveness.

Staff Members are responsible for:

- Complying with this Procedure as it applies to their activities; and
- Providing feed back to their supervisor regarding program effectiveness.

HEAT STRESS HAZARDS AND RISK FACTORS

Heat Stress is defined as the total net load on the body with contributions from both exposure to external sources, such as sunshine and hot surfaces, and from internal metabolic heat production. A person?s exposure to the increased ambient temperatures and humidity produces physiological responses referred to as heat stress which are characterized by an increase in the: a) ?core? or ?deep body temperature?. b) heart rate, c) blood flow to the skin, and d) water and salt loss due to sweating. Conditions of excessive heat stress may occur either when the physical work is too heavy or the environment is too hot in relation to the work being performed. If work is performed under hot environmental conditions, the work load effort must be reviewed and the heat exposure limit maintained at or below the levels to protect the worker from the risk of acute heat illness.

In general, there are four types of physiological disorders associated with heat stress. They include:

- Heat Rash - a skin reaction occurring as a result of obstructed sweat glands, often associated with impermeable clothing.
- Heat Cramps - painful muscle spasms of extremities and abdomen, resulting from inadequate balance of electrolytes which are lost from sweating.
- Heat Exhaustion - a mild form of heat stroke due to depletion of body fluids and electrolytes. Blood vessels dilate despite decreased volume of blood. Symptoms include weakness, dizziness, nausea, rapid pulse, and a small increase in body temperature.
- Heatstroke - a potentially fatal disorder resulting from failure of the body?s thermoregulatory system. The classical description of heatstroke includes (1) a major disruption of central nervous function (unconsciousness of convulsions), (2) a lack of sweating (3) hot, dry, red or mottled skin, and (4) a core temperature in excess of 41°C (105.8° F). Heatstroke is a serious medical condition which calls for emergency medical action.

Seven factors play significant roles in the development of or predisposition to, heat stress disorders. These factors include:

- Acclimatization - Heat acclimatization leads to increased and quicker sweating, cooler skin due to an increase in evaporative cooling and a lower, more stable core body temperature. Maximal sweating rates in unacclimatized persons are lower, but salt concentrations in their perspiration are higher, requiring a higher rate of salt replacement.
- Age - Older individuals are generally more susceptible to heat stress than younger individuals. However, older healthy workers are able to perform well in hot jobs if permitted to proceed at a self-regulated pace.
- Gender - The average woman has a lower aerobic capacity than a similar-sized man. Nevertheless,

when working at similar proportions of their maximum aerobic capacity, women perform similarly or only slightly less well than men.

- Body Fat - The lower level of physical fitness, decreased maximum work capacity and decreased cardiovascular capacity frequently associated with obesity predispose individuals to heat disorders.

- Water and Electrolyte Balance - Sustained, effective work performance in heat requires a replacement of body water and electrolytes lost through sweating. If this water is not replaced by drinking, continued sweating will draw on water reserves from both tissues and body cells leading to dehydration.

- Use of Alcohol and Medication - Not withstanding the potential hazards from impaired coordination and judgment, the ingestion of alcohol before or during work in the heat should not be permitted because it reduces heat tolerance and increases the risk of heat illness, Many drugs, including diuretics and antihypertensives, can interfere with the body?s thermoregulation.

- Physical Fitness - Physical conditioning enhances heat tolerance by increasing the functional capacity of the cardiovasculatory system, and reduces the time required to develop heat acclimatization by about 50% over those not physically fit.

The factors listed above are to be taken into account by all project personnel when planning or executing a project subject to heat stress conditions. The factors should be taken into consideration for:

- the development of the project schedule;
- the ordering of supplies/equipment;
- the support facilities to be made available at the site;
- the execution of work tasks; and
- the after work hours activities.

The following is a summary of signs and symptoms of heat stress:

Heat Rash may result from continuous exposure to heat or humid air .

Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:

- Muscle Spasms

- Pain in the hands, feet and abdomen.

Heat Exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool and moist skin

- Heavy sweating
- Dizziness, fainting and nausea

Heat stroke is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained. Signs and symptoms are:

- Red, hot and unusually dry skin
- Lack of or reduced perspiration
- Dizziness and confusion
- Strong, rapid pulse and coma.

HEAT AND STRESS PREVENTION

Preventive measures should be taken to prevent personnel from experiencing heat stress illness. Prevention of heat stress is also important because if an individual has experienced a heat illness incident, he has an increased likelihood of future occurrences. Preventive measures include: favorable work scheduling, acclimatization of workers to hot environments, drinking sufficient quantities of fluids, providing cool, sheltered work and rest areas, and utilizing cooling devices as appropriate of feasible. Heat stress monitoring/work rest regimens are discussed below.

Work Schedules and Activity

If possible, work should be scheduled during the coolest part of the day. Early morning and evening work can be considerably more effective than working midday when the additional time for breaks and heat stress monitoring are taken into account.

Employees should also be encourages to maintain a certain level of activity during the work shift. Prolonged standing in hot environments can lead to heat illness because the blood pools in the lower extremities. Workers should periodically walk about to encourage blood circulation from the feet and legs.

Acclimatization of Workers

A properly designed and applied heat acclimatization program will dramatically increase the ability of workers to work at a hot job and will decrease the risk of heat-related illnesses and unsafe acts. Heat acclimatization can usually be induced in 5 to 7 days of exposure to the hot job. For workers who have had previous experience with the job, the acclimatization regimen should be exposure for 50% on day 1, 60% on day 2, 80% on day 3 and 100% on day 4. For workers new to job the schedule should be 20% on day 1 with a 20% increase in each additional day.

Acclimatization can be induced by sustained elevations of the skin and core body temperatures above levels for the same work in cool environments for an hour or more per day. Acclimatization needs periodic reinforcement such as occurs daily during the work week. Persons may show some loss of acclimatization on the first day of the new shift after being idle for two days or over a weekend. After vacations of two weeks or longer he loss of acclimatization is substantial, several days at work will be needed before heat tolerance is fully restored.

Drinking Sufficient Quantities of Fluids

Under hot conditions where sweat production may reach 6 to 8 liters per day, voluntary replacement of the water lost is usually incomplete. The normal thirst mechanism is not sensitive enough to urge us to drink enough water to prevent dehydration. Individuals are seldom aware of the exact amount of seat they produce of how much water is needed to replace that lost in sweat; 1 liter/hour is not an uncommon rate of water loss. Every effort should be made to encourage individuals to drink water, low-sodium noncarbonated beverages or electrolyte replacement fluids (e.g., Gatorade). Lightly salted water (1 gram/liter of water (0.1%) or one level teaspoon per 15 quarts of water), should be provided to unacclimated workers. The salt should be dissolved completely and the water kept cool. Salt tablets as dietary supplements are not generally recommended.

Workers should drink at least 500 ml (one pint) of water before beginning work. The fluid should be maintained at temperatures of 10° to 15° (50 to 59° F). If possible, small quantities of fluids should be consumed at frequent intervals (e.g., 150 to 250 milliliters (ml), or at least a quarter pint, every 20 minutes) rather than the intake of 750 ml (3 cups) or more once per hour. Individuals vary, but water intake should total 4 to 8 liters (quarts) per day. When heat stress is considered a potential problem, a minimum of 1 liter/hour/person of water are to be maintained onsite. Individual paper or plastic cups will be provided in order to prevent the spread of communicable disease.

Alcohol and diuretics such as caffeine (contained in coffee, tea and soft drinks) can increase dehydration. Therefore employees with potential exposure to heat stress should be discouraged from the consumption of these types of fluids during and after working hours.

Cool, sheltered Work and Rest Areas

Exposure to direct sunlight significantly increases the overall thermal loading of the body, thereby increasing an individuals susceptibility to heat stress illnesses. Whenever possible work should be conducted under suspended tarps, in shady areas or in other sheltered areas in order to reduce thermal loading caused by the sun. Cool sheltered areas should be provided also for rest breaks. A rest area should be situated so that part of it is in the contamination reduction area so that workers can take breaks without being required to undertake a full decontamination procedure. Canopies or tarps and open air tents, are types of cool shelters which can provide shaded rest areas.

Cooling Devices

Auxiliary cooling devices can be successfully used to provide body cooling, especially to workers wearing protective garments at hazardous waste sites. Vortex coolers utilize high velocity air which is directed inside the protective clothing. Vortex coolers have been used successfully in some operations. Cooling vests utilizing "blue ice" type packs can provide some cooling to the torso, but add weight for the wearer and can inhibit body movements.

Newer, more sophisticated tube and refrigerant systems woven into undergarments are also available. However, some of these systems, may not be effective in situations where the work involves considerable motion, since bending and lifting can crimp the tubes, impending the flow of refrigerant.

Heat Stress Monitoring

Several heat stress monitoring systems have been devised to help manage heat stress in hot work

environments. Panamerican performs heat stress monitoring when: 1) employees are wearing normal work clothing in ambient temperatures exceeding 29° C, (85° F) and 2) employees wearing chemical protective clothing (including paper coveralls) working in ambient temperatures exceeding 21° C (70° F). The temperature differential is related to the reduced ability of a person to maintain a core temperature of ± 37° C (98.6° F) when wearing chemical protective clothing.

It should be noted by personnel that there are no "fast and true" methods of heat stress monitoring; likewise there are no regulations concerning heat stress monitoring. Individual susceptibility to heat stress is highly variable. Some individuals are highly susceptible to any increase in their internal body temperature while other individuals can work very well with internal body temperatures of 39°C (102.2° F) or higher.

The heat stress monitoring systems should be used by Site Safety Officers as guidelines and not necessarily as hard, fast rules. Individuals working in elevated temperatures should be queried on a regular basis regarding their perceived state of heat stress. If the calculated heat stress index value indicates that work can continue but a person states that they believe they are experiencing heat stress, the work effect should be discontinued and a rest break taken.

Likewise, if the calculated heat stress index value indicates that a rest break should be taken but the workers believe they can work longer, they should be permitted to work longer providing that their heart rates do not exceed 110 beats per minute. If the individual's heart rate rates exceed 110 beats per minute a rest break will be taken. In all cases, individual workers should not be permitted or expected to perform excessive work which could result in heat stress. If a SSO has any concerns that an individual may be pushing himself/herself past the ?breaking point? the calculated work/rest regimen will be followed.

For strenuous field activities that are part of ongoing site work activities in hot weather, the following procedures shall be used to monitor the body?s physiological response to heat, and to monitor the work cycle of each site worker. There are two phases to this monitoring: the initial work/rest cycle is used to estimate how long the first work shifts of the day should be. Heart rate monitoring of each worker will establish the length of the successive work periods. Both phases are to be used are to be used for heat stress monitoring. Failure to use either one could place workers at risk of heat-related disorders.

Phase 1 - Determination of the Initial Work - Rest Regimen

The determination of the initial work - rest regimen can be performed using either of two methods:

-The Modified Dry Bulb Index; or
-The Wet Bulb Globe Thermometer (WBGT) Index

After the initial work - rest regimen has been determined, environmental conditions must be monitored for changes which would require a modification to the work - rest regimen. This, coupled with the heart rate monitoring, determines the work cycles to be followed on a site.

The Modified Dry Bulb Index accounts for the effects caused by solar, load, air temperature, and chemical protective clothing, under a light work load (walking at approximately 3 mph). A mercury thermometer, shielded from direct sunlight, is used to measure ambient temperature. The percentages of (of time) of sunlight and cloud cover are then estimated to determine a sunshine quality factor (e.g., 100% sunshine - no cloud cover = 1.0; 50% sunshine - 50% cloud cover = 0.5; 0% sunshine - 100% cloud cover = 0.0). When these two sets of values have been obtained, they are inserted into the following equation to calculate the adjusted temperature:

T (° C, adjusted) = T (° C, actual) + (7.2 x sunshine quality factor)

-OR-

T (° F, adjusted) = T (° F, actual) + (13 x sunshine quality factor)

After the adjusted temperature has been calculated, the length of the first work shift can be determined using the following table:

Initial Break and Physiological Monitoring Cycles

Adjusted Temperature	Normal Work Clothes	Protective Clothing
90°F (32.2° C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90° F (30.8°-32.2° C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5° F (28.1°-30.8° C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5° F (25.3°-28.1° C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5° F (22.5°-25.3° C)	After each 150 minutes of work	After each 120 minutes of work

Note: The standard rest period is 15 minutes

WET BULB GLOBE THERMOMETER INDEX

The Wet Bulb Globe Thermometer (WBGT) Index was developed by the U.S. Army in the 1950s to prevent heat stress in army recruits. The WBGT Index accounts for the effects caused by humidity, air movement, evaporation, air temperature and work rate. It does not, however, account for the effects of chemical protective clothing, non-acclimatized workers, age, or other factors which may affect the likelihood of heat stress. Because of this, it is necessary to make adjustments to the index and conduct Heart Rate Monitoring.

WBGT measurements are usually obtained through the use of are-contained electronic devices. Such devices are easy to set up and can provide the user with the capabilities to store data and download to print out a hard copy.

Heat produced by the body and the environmental heat together determine the total heat load. Therefore, after the WBGT Index has been obtained, the anticipated work load category of each job shall be determined and the initial-rest regimen established using the table below.

The work load category may be determined by ranking each job into light, medium and heavy categories on the basis of type of operation. Examples of each category are:

Light work:	sitting or standing to control machines, performing light hand work
Moderate work:	walking about with moderate lifting and pushing; and
Heavy work:	pick and shovel work.

PERMISSIBLE HEAT EXPOSURE			
WORK-REST REGIMEN	WORK LOAD		
	LIGHT	MODERATE	HEAVY
	30.0° C/86° F	26.7° C/80.1° F	25°C/77°F
75% Work-25% Rest Each Hour	30.6° C/87.1° F	28° C/82.4° F	25.9° C/78.6° F
50% Work-50% Rest Each Hour	31.4° C/88.5° F	29.4° C/85.0° F	27.9° C/82.2° F
25%Work-75 % Rest Each Hour	32.2° C/90.0° F	31.1° C/88.0° F	30.0° C/86.0° F

The table reads as follows:

Light, continuous work is possible at any WBGT reading up to 30° C (86°F) but above that limit work breaks are needed to recover from the heat; light work at temperatures of between 30.0 and 30.6° C (86 to 87° F) can be conducted, but 15 minute breaks must be taken every hour, etc. It is important to note that this table is applicable primarily to healthy, acclimatized personnel; wearing standard work clothing.

NOTE: An additional 6 to 11° C (42.8 to 51.8° F) must be added to the calculated WBGT temperature for personnel wearing chemical protective clothing prior to determining the initial work - rest regimen from this table. Because the WBGT Index does not take into account unacclimatized workers, or individual susceptibilities, the addition to the WBGT value does not eliminate the requirement for Heart Rate Monitoring after work has begun.

Phase 2 - Heart Rate Monitoring

An increase in the heart rate is a significant indication of stress, whether induced by exposure to heat or through physical labor. Although baseline heart rates can vary significantly between individuals and during the day for an individual, a heart rate of 110 beats per minute or greater is an indication of physiological stress. To prevent heat stress illnesses, the heart rate (HR) should be measured by radial (wrist) or carotid (neck) pulse for 30 seconds as early as possible in the rest period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 33 percent while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work period should be further shortened by 33 percent while the length of the rest period stays the same.

Attachment 2

Trenching and Excavation Health and Safety Requirements

Buffalo Branch Office • 2390 Clinton St • Buffalo, NY 14227 • (716) 821-1650 • (716) 821-1607

PANAMERICAN TRENCHING AND EXCAVATION HEALTH AND SAFETY REQUIREMENTS

The following will apply to all activities associated with excavations:

REGULATORY AUTHORITY

Excavations will be performed in accordance with OSHA 29 CFR, subpart P, 1926:650-1926.652 and USACOE EM 385-1-1 section 25 requirements as they apply to project activities.

GENERAL

- At all times the need for personnel to enter excavations will be minimized. Inspections or sample removal will be done from above the excavation, whenever possible.
- Personnel will only enter excavations after the requirements of this plan have been met.
- Personnel protective equipment including hard hat, safety glasses and steel-toe work boots may be required.

SURFACE ENCUMBRANCES

Surface encumbrances such as structures, fencing, piping, stored material etc. which may interfere with safe excavations will be avoided, removed or adequately supported prior to the start of excavations. Support systems will be inspected daily.

UNDERGROUND UTILITIES

Underground utility locations will be checked and determined and permits as necessary will be in place prior to initiating excavations. Local utility companies will be contacted at least two days in advance, advised of proposed work, and requested to locate underground installations. When excavations approach the estimated location of utilities, the exact location will be determined by careful probing or hand digging and when it is uncovered, proper supports will be provided.

OVERHEAD OBSTACLES

A minimum safe distance of 20 feet will be maintained when working around overhead high-voltage lines or the line will be de-energized following appropriate lock-out and tag-out procedures by qualified utility personnel.

ENTRY/EXIT ROUTES

Excavations five feet or more deep will require an adequate means of exit, such as a ladder, ramp, or steps and located so as to require no more than 25 feet of lateral travel. Under no circumstances will personnel be raised.

VEHICLE CONTROL/SAFETY

Personnel working around heavy equipment, or who may be exposed to public vehicular traffic will wear a traffic warning vest consisting of at least 400 square inches of red or orange material. At night, at least 400 square inches of florescent or other reflective material will be worn.

For excavation work on or adjacent to highways or streets, signs, signals, and barricades tat conform to the requirements of the current American National Standards Institute (ANSI) D6.1, Manual on Uniform Traffic Control Devices for Streets and Highways will be used to protect work areas. Signs, signals, and barricades will be adequately lighted at night. Flagmen will be provided when signs, signals and barricades do not provide adequate protection. Flagmen will use signals and procedures contained in the current issue of ANSI D6.1. At night, flagmen will be clearly illuminated so as to be easily seen by approaching traffic.

For mobile equipment operating next to or approaching the edge of an excavation, the operator will have a clear view of the edge of the excavation, or a warning system such as barricades, hand or mechanical signals, or stop logs will be used. If possible the surface grade will slope away from the excavation.

Personnel will be safely located in and around the trench and will not be permitted to work underneath loads handled by lifting or digging equipment. Personnel are required to stand away from vehicles being loaded and unloaded. Operators can remain in the cabs of vehicles being loaded or unloaded provided the vehicles are equipped to provide adequate protection to the operator.

HAZARDOUS ATMOSPHERES

Hazardous atmospheres, such as oxygen deficiency (atmospheres containing less than 19.5% oxygen), flammable gases or vapors (airborne concentrations greater than 20% of the lower explosive limit), and toxic gases or vapors (airborne concentrations above the OSHA Permissible Exposure Limit or other exposure limits) may occur in excavations, especially around landfills and hazardous waste sites.

In locations where oxygen deficiency or hazardous gaseous conditions are possible, the air in the excavation will be tested before personnel are permitted to enter an excavation deeper than 4 feet. When flammable gases are present, adequate ventilation will be provided and sources of ignition will be eliminated. Ventilation or respiratory protection will be provided to prevent personnel exposures to oxygen deficient or toxic atmospheres. Periodic retesting (at least each shift) of the excavation will be conducted to verify that the atmosphere is acceptable. A log or field book records will be maintained of all test results.

WATER ACCUMULATION HAZARDS

Personnel will not work in excavations that have accumulated water or where water is accumulating unless adequate precautions have been taken. These precautions can include special support or shield systems, water removal systems such as pumps, or safety harnesses and lifelines. Water removal systems will be operated and monitored by experienced personnel. Diversion ditches or dikes will be used to prevent surface water from entering the excavation and to provide adequate drainage of the area around the excavation.

Adequate precautions, as described above, will be taken for excavating subject to heavy rains.

STABILITY OF ADJACENT STRUCTURES

Support systems such as shoring, bracing, or underpinning will be provided to maintain the stability of adjoining buildings, walls, or other structures endangered by the excavation operations. Excavations below a foundation or retaining wall that could be reasonably expected to pose a hazard to personnel will not be permitted unless:

- a support system is provided;
- the excavation is in stable rock; or
- a Registered Professional Engineer has determined that the structure will not be effected by the excavation activity or that the excavation work will pose a hazard to employees. The Professional Engineer is required to demonstrate how the above determination was made on the basis of appropriate calculations.

Sidewalks will not be undermined unless shored to protect from possible collapse.

PROTECTION FROM LOOSE ROCK, MATERIALS OR SPOILS

In excavations and trenches that personnel may be required to enter, loose rock, excavated or other material, and spoils will be effectively stored and retained at least two feet or more from the edge of the excavation.

As an alternative to the clearance prescribed above, barriers or other effective retaining devices may be used in order to prevent spoils or other materials from falling into the excavation.

Walkways, runways, and sidewalks will be kept clear of excavated material from other obstructions.

Scaling operations may be used to remove loose material and will be performed only by experienced crews under the direct supervision of a competent supervisor. The scalers will be provided with scaler?s lifelines, safety belts, boatswain chair, and other safety equipment necessary for their protection.

FALL PROTECTION

Walkways or bridges with standard guardrails that meet OSHA specifications will be provided where employees, the public, or equipment are required to cross over excavations.

Adequate barrier physical protection will be provided at all remotely located excavations. All excavations will be barricaded or covered.

EMERGENCY RESCUE

In the event of a cave-in, the Emergency Rescue Squad will be immediately notified. The caller should provide his name, location, nature of the accident (an excavation collapse), the dimensions of the excavation, and number of people trapped in the excavation. Personnel are not to enter a collapsed trench to attempt rescue. This may cause a further collapse of the trench. Under no circumstance is heavy equipment to be used to attempt rescue of personnel in a collapsed excavation; injury or decapitation could be the result. All

heavy equipment and traffic in the area is to be shut down and stopped to reduce vibration. Pumps should be started if water ensues.

INSPECTION PROGRAM

Safety personnel will conduct daily inspections of the excavation, the adjacent areas, and protective systems. Inspections will be conducted prior to the start of work and as needed throughout the work shift. Inspections will also be made after every rainstorm or other occurrence that increases the hazard of collapse (i.e., vibration from heavy equipment, freezing and thawing, etc.).

The excavation inspection will include a check for the following:

- Evidence if situations that could result in possible cave-in (i.e. soil crumbling or sloughing, water saturated soils, freezing and thawing, unusual vibrations such as from heavy equipment, heavy rains, surface run off entering trench, etc.);
- Indications of failure of protective systems;
- Hazardous atmosphere (oxygen deficiency, flammable and toxic gases and vapors);
- Condition and support of exposed underground installations;
- Adequate means of egress;
- Signs, signals, and barricades for work area protection;
- Precautionary measures to control water accumulation;
- Stability and support of adjacent structures; and
- Adequate protection from loose rock and soil.

PROTECTIVE SYSTEMS

Personnel working in excavations will be protected from cave-ins by sloping and/or benching of excavation walls, a shoring system or some other equivalent means except when:

- The excavation is made entirely in stable rock; or
- Excavations are less than five feet deep and safety personnel have determined that there is no indication of potential cave-in. Depending on site and soil conditions protective measures may be taken for the excavations less than five feet in depth.

The most important factor influencing the choice of protective systems is the soil type classification. Once the soil type has been classified, selection of the protective system, the determination of the angle of repose for sloping and benching, and the design of shoring systems will be made. Decisions will be based on careful evaluation of pertinent factors such as depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed structures equipment, overlying material, or stored material; and vibration from equipment, blasting traffic or other sources.

Soil Classification

Appendix A of the OSHA Excavation Standard describes a methjod to classify soils into four types:

1. Stable Rock - Solid mineral matter that can be excavated with vertical sides.

2. Type A - cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) or greater. Examples include: clay; silty clay; sandy clay; clayey loam; and cemented soils such as caliche and hardpan. No soil is considered to be Type A if it is fissured, subject to vibration, previously disturbed, or part of a sloped, layered system.

3. Type B - cohesive soils with an unconfined compressive strength of greater than 0.5 tsf but less than 1.5 tsf. Examples include: angular gravel similar to crushed rock; silt; silty loam; and sandy loam; Type B soils also include : previously disturbed soils that are not type C; Type A soils that are fissured or subject to vibration; and dry rock that is not stable.

4. Type C - cohesive soils with an unconfined compressive strength of 0.5 tsf or less. Examples include: gravel; sand; loamy sand; submerged soil or soil from which water is seeping; submerged rock that is not stable.

The engineer, geologist, or safety personnel will conduct at least one visual and at least one manual test as described in the OSHA excavation standard in order to classify soils. Visual tests include looking for : particle size and soil cohesiveness (clumping); cracking in the excavation sides which suggests fissured material; underground installations ans previously disturbed soils; layered soil systems that slope toward the excavation; evidence of surface water and water seeping from the sides of the excavation; and sources of vibration that may affect the excavation stability. Manual tests include: plascticity; dry strength; tumb penetration; drying test; and strength tests using a pocket penetrometer or hand-operated shearvane.

Sloping and Benching

One of the following options for sloping and benching systems described in section 1926.652(b) of the OSHA Excavation Standard will be used in excavations of .5 foot or deeper or at the discretion of the safety personnel:

- The walls of excavation will be sloped at an angle not steeper than One-and one-half horizontal to one vertical. Sloping configurations will follow the slopes shown for Type C soils in Appendix B of the OSHA Excavation Standard.

- Maximum allowable slopes and sloping and benching configurations will be determined according to soil type as described in Appendices A and B of the OSHA Excavation Standard.

- Use of other written tabulated data and designs, such as tables and charts, to design sloping and benching systems. A copy of the tabulated data must be approved by a registered Professional Engineer. A copy of the tabulated data must be kept at the job site.

Personnel are not allowed to work on the faces of sloped or benched excavations above other workers unless the workers at the lower levels are protected from falling material or equipment. Similar protection will be provided for personnel working in excavations below other workers.

Support Systems, Shield Systems, and Other Protective Devices

One of the following options described in OSHA (1926.652 (c)) will be followed.

- Timber shoring, designed according to the conditions and requirements of Appendix C of the OSHA Excavation Standard or aluminum hydraulic shoring designed according to manufacturers tabulated

data or Appendix D of the OSHA Excavation Standard. In order to use the information in Appendices C or D, the soil type must first be determined using the classification system in Appendix A. For each soil type the size and spacing of the cross braces, uprights, and walls that comprise the shoring system are then selected based on the depth and width of the trench.

- Use of the manufacturer?s written tabulated to design support systems, shielded systems, and other protective devices. Any deviation from this tabulated data must be approved by the manufacturer. A copy of the tabulated data as well as any approvals to deviate from the tabulated data must be kept at the job site.

- Use of other written tabulated data to design support systems, shield systems, and other protective devices. The tabulated data must be approved by a Registered Professional Engineer. A copy of the tabulated data must be kept at the job site.

- Use of a written support system, shield system, and other protective device design that has been approved by a Registered Professional Engineer. A copy of the written design must be kept at the job site.

Installation and Removal of Support

Cross braces or trench jacks, uprights, and walls will be secured together to prevent sliding, falling or kickouts.

Additional precautions by way of shoring and bracing will be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.

If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above or near any excavation, the side of the excavation will be sheetpiled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

Backfilling and removal of trench supports will progress together from the bottom of the trench. Jacks or braces will be released slowly and , in unstable soil, ropes will be used to pull out the jacks or braces from above after employees have cleared the trench.

Shield Systems

Portable trench boxes or sliding trench shields may be used for protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they will be designed, constructed and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench. Shields will be installed so as to restrict lateral or other hazardous movement. Personnel are not allowed inside shields when shields are being moved.

EXCAVATION SAFETY LIST

To be completed prior to each work shift, or prior to personnel entering a new trench for the first time, by the Site Safety Officer/Competent Person:

Project_____Location_____

Job Number_____

Competent Person(CP)*_____Date_____

		Yes	No	N/A
1.	Has the site been cleared for utilities and other underground obstructions?	____	____	____
2.	If on public property, has the regional utility locating service been notified?	____	____	____
3.	Has the excavation equipment been safety checked by the operator?	____	____	____
4.	Are copies of relevant OSHA excavation regulations available on site?	____	____	____
5.	Will the excavation be 5 feet or more in depth?	____	____	____
6.	If 4 is yes, will personnel enter the excavation at any time?	____	____	____
7.	If 4a is yes, have provisions been made for shoring, sloping, or benching the excavation? Describe:	____	____	____
8.	Has an inspection of the site and excavation been conducted by the SSO?	____	____	____
9.	Has the Competent Person conducted visual and manual tests to classify the soil?	____	____	____

* According to Federal OSHA, A Competent Person is a person 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.

10. Visual Test_____(type)
    Manual Test_____(type)

Soil Classification_____(type)

11.	Are there any conditions that might expose employees to injury from possible moving ground?	____	____	____
12.	Is excavated material being placed at least 2 feet from the edge of the excavation?	____	____	____
13.	Is work in the excavation at all times under the immediate supervision of the SSO or other competent person?	____	____	____
14.	Is there a stairway, ladder, or ramp securely fastened in place to provide ingress and egress from the excavation?	____	____	____
15.	If the excavation is 4 feet or more in depth, are safe means of access (see 8) provided so as to require no more than 25 feet of lateral travel to reach them?	____	____	____
16.	If structural ramps are installed that are used for access/egress: were they designed by a qualified engineer?	____	____	____
17.	Do the structural ramps have appropriate means to prevent slipping and are the ramps uniform in thickness?	____	____	____
18.	Are walkways or bridges provided across the excavation to safe crossing?	____	____	____
19.	If excavations are 71/2 or more feet in depth, do the walkways have guardrails and toeboards?	____	____	____
20.	Are undermined structures adequately supported to safely carry all anticipated loads and protect workers?	____	____	____
21.	Are there adequate means provided to prevent mobile equipment from inadvertently entering the excavation?	____	____	____
22.	Is the excavation well marked and barricaded to prevent personnel from falling IN?	____	____	____

23.	Are means available to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the trench?	____	____	____
24.	Where it is reasonable to expect hazardous atmospheres, including oxygen deficiency, to exist in the excavation, is appropriate atmosphere testing equipment available.	____	____	____
25.	Has the testing equipment been calibrated, and the calibrations recorded, today?	____	____	____
26.	Are employees trained in proper use of this equipment?	____	____	____
27.	Has a harness and lifeline been provided whenever an employee is required to enter a confined footing excavation?	____	____	____
28.	Is appropriate personal protective equipment (hardhat, safety boots, eye protection, etc.) available and in use?	____	____	____

Notes:

Name (Print) Signature

SITE SAFETY BRIEFING FORM

ON-SITE SAFETY MEETING

Project _____
Date _____ Time _____ Job No. _____
Address _____
Specific Location _____
Type of Work _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

Chemical Hazards _____

Emergency Procedures _____

Hospital/Clinic _____ Phone _____
Hospital Address _____
Special Equipment _____

Other _____

ATTENDEES

Name Printed	Signature

Meeting Conducted by: _____ _____
Name Printed Signature

Site Safety Officer _____ Team Leader _____

ACCIDENT/EXPOSURE FORM

Employee Name _____ Date of Birth _____

Home Address _____ Phone No. _____

Sex: Male ___ Female ___ Job Title _____ Social Security No. _____

Office No. ___ Office Location _____ Date of Hire _____

Hours Usually Worked: Hours per day _____ Hours per Week _____ Total Hours Weekly _____

Where did accident or exposure occur? (include address) _____

_____

County _____ On employer's premises? Yes ___ No ___

What was employee doing when injured? (be specific) _____

_____

How did the accident or exposure occur? (describe fully) _____

_____

_____

_____

What steps could be taken to prevent such an occurrence? _____

_____

_____

Object or substance that directly injured employee _____

_____

Describe the injury or illness _____ Part of body injured _____

Name and address of physician _____

If hospitalized, name and address of hospital _____

Date of injury/illness _____ Time of day _____ Loss of one or more day of work? Yes/No ___

If yes, date last worked _____

Has employee returned to work? ___ If yes, date returned _____

Did employee die? ___ If yes, date _____

Completed by (print) _____ Signature _____

Title _____ Date _____

An Accident/Exposure Report must be completed by the Supervisor or Site Safety Officer immediately upon learning of the incident. The completed report must be immediately transmitted to the Office Administrative Manager.