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NAS CECIL FIELD, FL
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HEALTH AND SAFETY PLAN FOR OPERATION AND MAINTENANCE OF NUTRIENT INJECTION SYSTEMS AT BUILDINGS 9 AND 46 AND SPARGING SYSTEMS AT 103RD STREET AND A AVENUE AND DAY TANK 1 NAS CECIL FIELD FL

12/1/2002

TERRAINE INC ENVIRONMENTAL SERVICES

Health and Safety Plan

Operation and Maintenance
Building 9 Nutrient Injection System, Building 46 Nutrient Injection System, 103rd Street and "A" Avenue Air Sparge System, and Day Tank 1 Biosparge/SVE System

Revision: 01

Naval Air Station Cecil Field
Jacksonville, Florida

Contract No. N62467-02-G-0352
Contract Task Order No. 0001

Submitted to:
U.S. Naval Facilities
Engineering Command
Southern Division

Prepared by:
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Table of Contents

Attachments

Figures

Tables

Tables Continued

Acronyms

°F	degrees Fahrenheit
ALARA	as low as reasonably achievable
APR	air-purifying respirator
CNS	central nervous system
CPR	cardiopulmonary resuscitation
CTO	Contract Task Order
dBA	decibel A-rated
DOT	Department of Transportation
FA	first aid
FID	flame ionization detector
GFCI	ground fault circuit interrupter
HAZCOM	hazard communication
HR	heart rate
HSM	Health and Safety Manager
HSP	Health and Safety Plan
IDLH	immediately dangerous to life and health
IDW	investigation-derived waste
JAX	Jacksonville
lb	pound
LEL	lower explosive limit
mg/m^3	milligrams per cubic meter
MSDS	Material Safety Data Sheet
mW/cm^2	milliwatt per square centimeter
NAS	Naval Air Station
NDG	nuclear density gauge
NSC	National Safety Council
OSHA	Occupational Safety and Health Administration
PAPR	powered air-purifying respirator
PDF	personal flotation device
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
RMSF	Rocky Mountain Spotted Fever
SAR	supplied-air respirator
SCBA	self-contained breathing apparatus
SHSS	Site Health and Safety Specialist
SOP	standard of practice
STEL	short-term exposure limit
SZ	support zone
TBD	to be determined
TMCC	truck-mounted crash cushion
TSDF	treatment, storage, and disposal facility

This health and safety plan (HSP) will be kept on the site during field activities and will be reviewed and updated as necessary. The Site Health and Safety Specialist (SHSS) is to be familiar with the content of this plan. Site personnel must sign Attachment 1. In addition, this plan adopts procedures in the work plan for the project.

1.0 Project Information and Description

Client or Owner: Southern Division, NAVFACENGCOM

Project No: 04-41001

Terraine Project Manager: Mr. James L. Young

Office: Jacksonville, Florida

Site Name: NAS Cecil Field (Cecil Commercial Center)

Site Address: Jacksonville, Florida

Date Health and Safety Plan Prepared: December 2002

Date(s) of Initial Visit: October 2002

Date(s) of Site Work: October 2002 – October 2003

Site Access: Site access is through the main entrance off 103rd Street.

Site Size: The sites occupy less than 1,000 square feet outside Buildings 9 and 46. The site occupies over 30,000 acres including areas on both sides of 103rd Street.

Site Topography: Relatively flat

Prevailing Weather: Hot, humid summers with a chance of hurricanes

Site Description and History: The facility was released by the Navy under the Base Realignment Commission closing effective September 30, 1999. The base area was tuned over to the City of Jacksonville and is called the Cecil Commercial Center. The two sites contained storage tanks for diesel fuel and gasoline.

2.0 Project Organization and Tasks to be performed under this Plan

2.1 Project Organization

Client: Southern Division, Naval Facilities Engineering Command

Terraine:
Project Manager: Mr. James L. Young
Senior Project Engineer: Dr. Ronald Britto, EnSafe, Memphis
Field Staff: Refer to Section 4.0

Contractors and Subcontractors: Refer to Section 4.2.

2.2 Description of Tasks

Refer to project documents (i.e., work plan) for detailed task information. A health and safety risk analysis has been performed for each task and is incorporated in this HSP through task-specific hazard controls and requirements for monitoring and protection (Table 2-2). Tasks in addition to those listed below require an approved amendment to this plan before additional work begins. Refer to Section 10.2 for procedures related to tasks that do not involve hazardous waste operations and emergency response (HAZWOPER).

2.2.1 HAZWOPER-Regulated Tasks

HAZWOPER-regulated tasks include:

- Monthly inspections of Building 9 Nutrient Injection System and Building 46 Nutrient Injection System.
- Quarterly groundwater sampling Building 9 and building 46.
- Drilling one soil boring to water table at Building 9; drilling three soil borings to water table at Building 46.
- Weekly system checks, performance readings and disposal of produced water at 103rd Street and "A" Avenue Air Sparge System.
- Monthly data collection at 103rd Street and "A" Avenue Air Sparge System.
- Quarterly groundwater sampling (9 wells) at 103rd Street and "A" Avenue Air Sparge System.
- Annual groundwater sampling (13 wells) at 103rd Street and "A" Avenue Air Sparge System.
- Weekly system checks, performance readings at Day Tank 1 Biosparge / SVE System.
- Monthly data collection at Day Tank 1 Biosparge / SVE System.
- Quarterly groundwater sampling (5 monitoring wells and 7 vapor extraction wells) at Day Tank 1 Biosparge / SVE System.

2.2.2 Non-HAZWOPER-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state HAZWOPER regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-HAZWOPER-trained

personnel. **Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.**

TASKS	CONTROLS
• Waste removal / hauling	• Brief on hazards, limits of access, and emergency procedures • Post contamination areas as appropriate (refer to Section 8.2 for details) • Sample and monitor as appropriate (refer to Section 5.0)

TABLE 2-1

Task Hazard Analysis

Potential Hazards	Tasks	
	Drilling, Soil Borings	Groundwater Monitoring
Benzene	X	X
Buried Utilities, Drums, Tanks	X	
Drilling	X	
Electrical	X	X
Fire Protection	X	X
Hand and Power Tools	X	X
Heavy Equipment	X	
Lockout / Tagout	X	X
Manual Lifting	X	X
Noise >85dBa	X	X
Traffic Control	X	X
Visible Lighting	X	X

2.2.3 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. Table 2-2 lists safe work practices and control measures used to reduce or eliminate potential hazards for the activities associated with this project. Inspection and training requirements for equipment are listed in Table 2-3. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. Terraine employees and subcontractors must remain aware of the hazards affecting them regardless of the party responsible for controlling the hazards. Terraine employees and subcontractors who do not understand any of these provisions should contact the SHSS for clarification.

In addition to controls specified in this section, an activity Self-Assessment Checklist is provided in Attachment 5. This checklist is to be used to assess the adequacy of Terraine and its subcontractor's site-specific safety requirements. Objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing gaps. A Self-Assessment Checklist will be completed weekly and returned to the Senior Project Manager, with a copy to HSM.

TABLE 2-2
Activity Hazard Analysis: Well Drilling and System Installation

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
General Hazards	Reduce general safety hazards found at most sites.	• Site work will be performed during daylight hours whenever possible. Work conducted during hours of darkness will require enough illumination intensity to read a newspaper without difficulty. • Hearing protection worn in areas where you need to shout to hear someone within 3 feet. • Good housekeeping must be maintained at all times in project work areas. • Common paths of travel established and kept free from accumulation of materials. • Provide slip-resistant surfaces, ropes, and /or other devices to be used. • Specific areas should be designated for the proper storage of materials. • Tools, equipment, materials, and supplies will be stored in an orderly manner. • As work progresses, scrap and unessential materials must be neatly stored or removed from the work area. • Containers should be provided for collecting trash and other debris and will be removed at regular intervals. • Spills will be cleaned up. Oil and grease will be cleaned from walking/working surfaces.

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Hazard Communication	Comply with the Hazard Communication Standard informing workers about the chemicals to which they may be exposed; reference 29 CFR 1926	• Complete an inventory of chemicals brought on site by Terraine using the Project-Specific Chemical Hazard Communication Form provided in Attachment 2. • Confirm inventory of chemicals brought on site by Terraine subcontractors is available. • Confirm locations of Material Safety Data Sheets (MSDSs) from client, contractors, and subcontractors for chemicals to which Terraine employees potentially are exposed. • Before or as the chemicals arrive onsite, obtain an MSDS for each hazardous chemical. • Label chemical containers with the identity of the chemical and with hazard warnings, and store properly. • Give employees required chemical-specific HAZCOM training using the Chemical-Specific Tracking Form provided in Attachment 3.
Benzene, Building 46	Exposure to Benzene above the PEL as listed in 29 CFR 1926.1128; reference standard 29 CFER 1910.1028	• Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met. • Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas. • Skin absorption is a potential route of benzene exposure. • Benzene is considered a "Confirmed Human Carcinogen." • A short term exposure limit (STEL) of 15 minutes exists for this material. • Benzene has an aromatic odor. • Respiratory protection and other exposure controls selection will be based on the most recent exposure monitoring results obtained from the competent person.
Buried utilities, drums, tanks	Reduce risk of contacting buried utilities, drums, or tanks during excavations	• Contact local utility locator service or Base utilities service before excavations. • Perform testing to locate buried tanks, drums or pipelines such as magnetometer or ground penetrating radar survey before excavation.

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Compressed gasses	Reduce the hazards when working with compressed gasses	• Valve caps must be in place when cylinders are transported, moved, or stored. • Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved. • Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved. • Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or exposed to extreme heat sources. • Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.
Drilling	Reduce the hazards from drilling operations	• Only authorized personnel are permitted to operate drill rigs. • Stay clear of areas surrounding drill rigs during every startup. • Stay clear of the rotating augers and other rotating components of drill rigs. • Stay clear of hoisting operations. Loads will not be hoisted overhead of personnel. • Do not wear loose-fitting clothing or items such as rings or watches that could get caught in moving parts. Long hair should be restrained. • If equipment becomes electrically energized, personnel will be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party will be contacted to have line de-energized prior to approaching the equipment. • Smoking around drilling operations is prohibited.

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Energized Electrical	Reduce the hazards when dealing with energized electrical circuits; reference in 29 CFR 1926.400	• Only qualified personnel permitted to work on unprotected energized electrical systems. • Electrical wiring and equipment will be de-energized prior to conducting work unless it can be demonstrated that de-energizing introduces additional or increased hazards or is unfeasible due to equipment design or operational limitations. • Electrical systems will be considered energized until lockout/tagout procedures are implemented. • The Energized Electrical Work permit provided in Attachment 4 of this plan must be completed prior to working on unprotected energized electrical systems. • Follow control measures &procedures identified on Energized Electrical Work permit.
Fire Protection	To reduce the incidents of fires and provide resources to fight fires; reference in 29 CFR 1926.150	• Fire extinguishers will be provided so travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must: 1) be maintained in a fully charged and operable condition, 2) be visually inspected each month, and 3) undergo a maintenance check each year. • The area in front of extinguishers must be kept clear. • Post "Exit" signs over exiting doors, and post "Fire Extinguisher" signs over extinguisher locations. • Combustible materials stored outside should be at least 10 feet from any building. • Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site. • Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Lockout/Tagout	Reduce the hazards of machine startups while out of service as referenced in 29 CFR 1910.147, 29 CFR 1926. 417	• Do not work on equipment when the unexpected operation could result in injury, unless lockout/tagout procedures are implemented. • Staff working under a lockout/tagout procedure must complete the TERRAINE Lockout/Tagout training course. Project-specific training may also be required on site-specific lockout/tagout procedures. • Standard lockout/tagout procedures include the following six steps: • Notify all personnel in the affected area of the lockout/tagout, • Shut down the equipment using normal operating controls, • Isolate all energy sources, • Apply individual lock and tag to each energy isolating device, • Relieve or restrain all potentially hazardous stored or residual energy, and • Verify that isolation and de-energization of the equipment has been accomplished. Once verified that the equipment is at the zero energy state, work may begin. • All safe guards must be put back in place, all affected personnel notified that lockout/tagout has been removed, and controls positioned in the safe mode prior to lockout/tagout removal. • Do not remove another person's lock or tag.
Manual Lifting	Reduce hazards encountered when lifting loads	• Proper lifting techniques must be used when lifting any object. • Plan storage and staging to minimize lifting or carrying distances. • Split heavy loads into smaller loads. • Use mechanical lifting aids whenever possible. • Have someone assist with the lift especially for heavy or awkward loads. • Ensure that the path of travel is clear prior to the lift.

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Noise	Reduce the exposure to noise as referenced by 29 CFR 1926.101 and 29CFR 1910.95	• Noise areas will be evaluated at the start of the project and at any time new machinery is added to the process. • Hearing protection will be worn whenever levels in excess of 85 dBA are exceeded as in areas where you must raise your voice to communicate at a distance of 3 feet or less. • Personnel will be trained in the proper installation techniques for ear protection that fits in the ear canal. • Hearing protective devices will be kept clean and sanitary be between uses. • Noise measurements may be required by the SSHS to determine protection areas. These areas need to be posted with appropriate warning signs.
Traffic Control	Reduce hazards related to control of traffic and impacts	• Exercise caution when exiting traveled way or parking along street; avoid sudden stops, use flashers, etc. • Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier. • All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests. • Eye protection should be worn to protect from flying debris. • Remain aware of factors that influence traffic related hazards and required controls – sun glare, rain, wind, flash flooding, limited sight-distance, hills, curves, guardrails, width of shoulder (i.e., breakdown lane), etc. • Always remain aware of an escape route – behind an established barrier, parked vehicle, guardrail, etc. • Always pay attention to moving traffic – never assume drivers are looking out for you • Work as far from traveled way as possible to avoid creating confusion for drivers. • When workers must face away from traffic, a "buddy system" should be used, where one worker is looking towards traffic. • When working on highway projects, obtain copy of the contractor's traffic control plan. • Work area should be protected by a physical barrier such as a K-rail or Jersey barrier.

3.0 Hazard Evaluation and Control

3.1 Heat and Cold Stress

3.1.1 Preventing Heat Stress

The following guidelines relate to heat stress prevention:

- Drink 16 ounces of water before beginning work, such as in the morning or after lunch. Disposable (e.g., 4-ounce) cups and water maintained at 50 to 60 degrees Fahrenheit (°F) should be available. Under severe conditions, drink one to two cups every 20 minutes, for a total of 1 to 2 gallons per day. Take regular breaks in a cool, preferably air-conditioned, area. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours. Monitor for signs of heat stress.
- Acclimate to site work conditions by slowly increasing workloads; e.g., do not begin site work with extremely demanding activities.
- Use cooling devices, such as cooling vests, to aid natural body ventilation. The devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- During hot weather, conduct field activities in the early morning or evening if possible.
- Provide adequate shelter to protect personnel against radiant heat (sun, flames, hot metal), which can decrease physical efficiency and increase the probability of heat stress.
- In hot weather, rotate shifts of workers.
- Maintain good hygiene standards by frequently changing clothing and by showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should consult medical personnel.

3.1.2 Symptoms and Treatment of Heat Stress

The symptoms of heat stress are listed in Table 3-1.

TABLE 3-1
Symptoms and Treatment of Heat Stress

	Heat Syncope	Heat Rash (*miliaria rubra*, "prickly heat")	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature.
Treatment	Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool–but not cold–water. Call ambulance, and get medical attention immediately!

3.1.3 Heat-Stress Monitoring

For field activities part of ongoing site work activities in hot weather, the following procedures should be used to monitor the body's physiological response to heat and to estimate the work-cycle/rest-cycle when workers are performing moderate levels of work. These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high (greater than 50 percent), or when the workers exhibit symptoms of heat stress.

The heart rate (HR) should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute or 20 beats per minute above resting pulse. 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 per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 110 beats per minute or 20 beats per minute above resting pulse.

3.1.4 Preventing Cold Stress

Working in cold environments can be dangerous. Prolonged exposure to freezing or cold temperatures can result in health problems such as trench foot, frost bite and hypothermia. When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death can occur. To help protect workers in cold environments:

- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help workers.
- Train workers about cold-induced injuries and illnesses.
- Encourage workers to wear proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene).
- Be sure that workers take frequent short breaks in warm dry shelters to allow the body to warm up.
- Try to schedule work for the warmest part of the day.
- Drink warm, sweet beverages (sugar water, sports drinks) and avoid drinks with caffeine (coffee, tea, sodas, or hot chocolate) or alcohol.
- Eat warm, high-calorie foods such as hot pasta dishes.

3.1.5 Symptoms and Treatment of Cold Stress

The symptoms and treatment of cold stress are listed in Table 3-2.

TABLE 3-2
Symptoms and Treatment of Cold Stress

	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Pale, waxy-white skin color; skin becomes hard and numb; usually affects the fingers, hands, toes, feet, ears, and nose.	Normal body temperature drops below 95°F; fatigue or drowsiness; uncontrolled shivering; cool bluish skin; slurred speech; clumsy movements; irritable; irrational or confused behavior.
Treatment	Seek medical treatment immediately.	Move person to a warm dry area; remove wet or tight clothing; do not rub the affected area; gently place the affected area in a warm water bath and monitor the water temperature to slowly warm the tissue; when normal feeling, movement, and skin color have returned, dry and wrap the affected area; seek medical attention as soon as possible.	Call for emergency help; move person to a warm dry area; remove any wet clothing and replace with warm, dry clothing or wrap person in blankets; have person drink warm, sweet drinks; avoid caffeine; have person move their arms and legs.

3.2 Locating Buried Utilities

3.2.1 Local Utility Mark-Out Service

The Utilities Locator Service on Base will be responsible for marking utilities.

3.2.2 Procedures for Locating Buried Utilities

Procedures for locating buried utilities are listed as follows:

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural-gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary, clear locations with a utility-locating instrument (e.g., metal detector).
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually. Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SHSS should confirm that arrangement.

3.3 Biological Hazards and Controls

Biological hazards and controls are listed in Table 3-3.

TABLE 3-3
Biological Hazards and Controls

Hazard and Location	Control Measures
Snakes typically are found in underbrush and tall grassy areas.	If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound, or apply a tourniquet. Carry the victim or have him/her walk slowly if the victim must be moved. Try to identify the type of snake: note color, size, patterns, and markings.
Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas.	Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.
Exposure to **bloodborne pathogens** may occur when rendering first aid or CPR, or when coming into contact with medical or other potentially infectious material, or when coming into contact with landfill waste or waste streams containing such infectious material.	Training is required before a task involving potential exposure is performed. Exposure controls and personal protective equipment (PPE) are required as specified in TERRAINE SOP HS-36, *Bloodborne Pathogens*. Hepatitis B vaTerrainenation must be offered before the person participates in a task where exposure is a possibility.

TABLE 3-3
Biological Hazards and Controls

Bees and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic.	Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SHSS and/or the buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.
Other potential biological hazards	None anticipated.

3.4 Tick Bites

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size.

Prevention against tick bites includes avoiding tick areas; wearing tightly woven light-colored clothing with long sleeves and wearing pant legs tucked into boots or socks; spraying only outside of clothing with insect repellent containing permethrin or permanone, and spraying skin with DEET; and checking yourself frequently for ticks and showering as soon as possible. To prevent chemical repellents from interfering with sample analyses, exercise care while using repellents during the collection and handling of environmental samples.

If bitten by a tick, carefully remove the tick with tweezers, grasping the tick as close as possible to the point of attachment while being careful not to crush the tick. After removing the tick, wash your hands and disinfect and press the bite area. The removed tick should be saved. Report the bite to human resources personnel.

Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF): Lyme - a rash that looks like a bullseye with a small welt in the center; RMSF - a rash of red spots under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, headache, fatigue, stiff neck, bone pain may develop. If symptoms appear, seek medical attention.

3.5 Hazards Posed by Chemicals Brought on the Site

3.5.1 Hazard Communication

The project manager is to request MSDSs from the client or from the contractors and the subcontractors for chemicals to which Terraine employees potentially are exposed. The SHSS is to do the following:

- Give employees required site-specific hazard communication (HAZCOM) training.
- Confirm that inventory of chemicals brought on the site by subcontractors is available.
- Before or as chemicals arrive on the site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with identity of chemical and with hazard warnings, if any.

The chemical products listed in Table 3-4 will be used on the site. Refer to Attachment 2 for MSDSs.

TABLE 3-4
Chemical Hazards

Chemical	Quantity	Location
Isobutylene (calibration gas)	1 liter, compressed gas	Support Zone
Methanol (decontamination)	4 liters, flammable	Support/Decontamination Zone
Hexane (decontamination)	4 liters, flammable	Support/Decontamination Zone
MSA Cleaner/Sanitizer (respirators)	Powder packets	Support/Decontamination Zone
Alconox/Liquinox (detergent)	< 1 liter, powder/liquid	Support/Decontamination Zone

3.5.2 Shipping and Transportation of Chemical Products

Nearly all chemicals brought to the site are considered hazardous materials by the DOT. All staff who ship the materials or transport them by road must receive the Terraine training in shipping dangerous goods. Hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

3.6 Contaminants of Concern

Contaminants of concern are listed in Table 3-5.

3.7 Potential Routes of Exposure

Potential routes of exposure include:

- **Dermal:** Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 5.0.
- **Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 5.0 and 6.0, respectively.
- **Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before eating, drinking, or smoking).

TABLE 3-5
Contaminants of Concern

Contaminant	Location and Maximum[a] Concentration	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Building 9					NA
Ethyl Benzene	GW: 360 ug/L SB: 140 mg/kg	100 ppm	800 ppm	Eye, skin, and mucous membrane irritation; headache; dermatitis; narcotic; coma	8.76
Naphthalene	GW: 38 ug/L SB: 34 mg/kg	10 ppm	250 ppm	Eye irritation, headache, confusion, excitement, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, dermatitis, corneal damage, optical neuritis	8.12
Toluene	GW: 97 ug/L SB: 44 mg/kg	50 ppm	500 ppm	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
Xylenes	GW: 1,000 ug/L SB: 1,100 mg/kg	100 ppm	900 ppm	Irritated eyes, skin, nose, and throat; dizziness; excitement; drowsiness; incoherence; staggering gait; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	8.56
Building 46					
Benzene	GW: 13,000 ug/L SB: 0.42 mg/kg	1 ppm	500 Ca	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression	9.24
Ethyl Benzene	GW: 3,200 ug/L SB: 52 mg/kg	100 ppm	800 ppm	Eye, skin, and mucous membrane irritation; headache; dermatitis; narcotic; coma	8.76
Naphthalene	GW: 660 ug/L SB: 1.3 mg/kg	10 ppm	250 ppm	Eye irritation, headache, confusion, excitement, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, dermatitis, corneal damage, optical neuritis	8.12
Toluene	GW: 44,000 ug/L SB: 94 mg/kg	50 ppm	500 ppm	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
Xylenes	GW: 18,000 ug/L SB: 280 mg/kg	100 ppm	900 ppm	Irritated eyes, skin, nose, and throat; dizziness; excitement; drowsiness; incoherence; staggering gait; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	8.56

TABLE 3-5
Contaminants of Concern

Contaminant	Location and Maximum[a] Concentration	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)

Footnotes:
[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).
[b] Appropriate value of PEL, REL, or TLV listed.
[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.
[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.
ppm = parts per million
mg/m^3 = milligram per cubic meter
eV – electron volt

4.0 Personnel

4.1 Terraine Employee Medical Surveillance and Training

The employees listed in Table 4-1 are enrolled in the Terraine Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SHSS" have received 8 hours of supervisor and instrument training and can serve as SHSS for the level of protection indicated. An SHSS with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and cardiopulmonary resuscitation (CPR). At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones that involve the potential for exposure to health and safety hazards. The employees listed below are currently active in a medical surveillance program that meet state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

TABLE 4-1
Project Personnel Safety Certifications

Employee Name	Office	Responsibility	SHSS/FA-CPR
James L. Young	JAX	Project Manager; Site Superintendent	
Heather Rasmussen/EnSafe	Dallas	SHSS; H&S Manager	Level B SHSS; FA-CPR

4.2 Field Team Chain of Command and Communication Procedures

4.2.1 Client

Contact Name: Wayne Hansel, Naval Facilities Engineering Command, North Charleston, South Carolina

4.2.2 Terraine

Project Manager: James L. Young

Health and Safety Manager: Heather Rasmussen, EnSafe

Site Superintendent: James L. Young

Site Health and Safety Specialist: Heather Rasmussen, EnSafe

The SHSS is responsible for contacting the site superintendent and the project manager. In general, the project manager either will contact or will identify the client contact. The HSM should be contacted as appropriate. The SHSS or the project manager must notify the client and the HSM when a serious injury or a death occurs or when health and safety inspections by OSHA or other agencies are conducted. Refer to Sections 10 through 12 for emergency procedures and phone numbers.

4.2.3 Subcontractors

When specified in the project documents (e.g., contract), this plan may cover Terraine subcontractors. However, this plan does not address hazards associated with tasks and equipment that the subcontractor has expertise in (e.g., operation of drill rig). Specialty subcontractors are responsible for health and safety procedures and plans specific to their work. Specialty subcontractors are to submit plans to Terraine for review and approval before the start of fieldwork. Subcontractors must comply with the established health and safety plan(s). Terraine must monitor and enforce compliance with the established plan(s).

General health and safety communication with subcontractors contracted with Terraine and covered by this plan is to be conducted as follows:

- Request that the subcontractor, if a specialty subcontractor, submit a safety or health plan applicable to their expertise (e.g., drill-rig safety plan or nuclear density gauge [NDG] health plan); attach the reviewed plan.
- Supply subcontractors with a copy of this plan, and brief them on its provisions.
- Direct health and safety communication to the subcontractor-designated safety representative.
- Notify the subcontractor-designated representative if a violation of the plan(s) is observed. Specialty subcontractors are responsible for mitigating hazards in which they have expertise.
- If a hazard condition persists, inform the subcontractor. If the hazard is not mitigated, stop affected work as a last resort and notify the project manager.
- When an apparent imminent danger exists, promptly remove all affected personnel. Notify the project manager.
- Make clear that consistent violations of the health and safety plan by a subcontractor may result in termination of the subcontract.

5.0 Personal Protective Equipment

5.1 PPE Specifications

PPE specifications are listed in Table 5-1.

TABLE 5-1
PPE Specifications[a]

Task	Level	Body	Head	Respirator[b]
General Work Uniform when no Chemical Exposure is anticipated	D	Work clothes; steel-toe, steel-shank leather work boots; work gloves	Hardhat[c] Safety glasses Ear protection[d]	None required
Soil Borings; Soil Sample Collection	Modified D	**COVERALLS:** Uncoated Tyvek® **BOOTS:** Steel-toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots with outer rubber boot covers **GLOVES:** Inner surgical-style nitrile glove AND outer chemical-resistant leather or arimid-fiber glove.	Hardhat[c] Splash shield[c] Safety glasses Ear protection[d]	None required
Groundwater Sample Collection	Modified D	**COVERALLS:** Polycoated Tyvek® **BOOTS:** Steel-toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots with outer rubber boot covers **GLOVES:** Inner surgical-style nitrile glove AND outer chemical-resistant nitrile glove.	Hardhat[c] Splash shield[c] Ear protection[d] Spectacle inserts	APR, full face, MSA Ultratwin or equivalent;
Not Approved for This Activity	B	**COVERALLS:** Polycoated Tyvek® **BOOTS:** Steel toe, steel-shank chemical-resistant boots OR steel-toe, steel-shank leather work boots with outer rubber boot covers **GLOVES:** Inner surgical-style nitrile glove AND outer chemical-resistant nitrile glove.	Hardhat[c] Splash shield[c] Ear protection[d] Spectacle inserts	Positive-pressure demand self-contained breathing apparatus (SCBA): MSA Ultralite, or equivalent

[a] Modifications are as indicated. Terraine will provide PPE to only Terraine employees.
[b] No facial hair that would interfere with respirator fit is permitted.
[c] Hardhat and splash-shield areas are to determined by the SHSS.
[d] Ear protection should be worn while working around drill rigs or other noise-producing equipment or when conversations cannot be held at distances of 3 feet or less without shouting. Refer to Section 6 for other requirements.

5.2 Upgrading or Downgrading Level of Protection

The reasons for upgrading or downgrading the PPE level are as follows:

- Upgrade
  - Request from individual performing task
  - Change in work task that will increase contact or potential contact with hazardous materials
  - Occurrence or likely occurrence of gas or vapor emission
  - Known or suspected presence of dermal hazards
  - Instrument action levels (Section 6) exceeded
- Downgrade
  - New information indicating that situation is less hazardous than originally thought
  - Change in site conditions that decreases the hazard
  - Change in work task that will reduce contact with hazardous materials

Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been specified in Section 5.0 and an SHSS who meets the requirements specified in Section 4.1 is present.

6.0 Air Monitoring Specifications

Table 6-1, Air Monitoring Specifications

Instrument	Action Levels[a]	Frequency[b]	Calibration
Building 9; PID MiniRAE with 10.6eV lamp or equivalent	0 – 5 ppm – Level D >5 - 50 ppm – Level C >50 ppm – Stop Work	Initially and periodically during task	Daily
Building 46; PID MiniRAE with 10.6eV lamp or equivalent	0 – 1 ppm – Level D >1 - 10 ppm – Level C > 10 ppm – Stop Work		Daily
Building 46; Detector Tube: Benzene specific 0.5/c (0.5 to 10 ppm range) with pre-tube or equivalent	<1 ppm – Level D 1.0 - 10 ppm – Level C >10 ppm – Level B	Initially and periodically when PID/FID >1 ppm	

[a] Action levels apply to sustained breathing-zone measurements above background.
[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SHSS; generally, every 5 to 15 minutes is acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time and measurement result, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3,").
ppm = parts per million
Action Levels will be established in Site Specific HSP, when concentrations for Contaminants of Concern are evaluated.

6.1 Calibration Specifications

Calibration specifications are listed in Table 6-2. Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures.

Table 6-2, Calibration Specifications

Instrument	Calibration Gas	Span	Reading	Method
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF=53	53 ppm ±5 ppm	1.5 lpm REG T-Tubing

ppm = parts per million

6.2 Air Sampling

Sampling may be required by other OSHA regulations where exposure to certain contaminants may exist. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Contact the HSM immediately if these contaminants are encountered.

6.2.1 Method Description

Real time air monitoring will be performed. Contact HSM if assistance is required.

6.2.2 Personnel and Areas

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel. Results reported to HSM: Heather Rasmussen, EnSafe.

7.0 Decontamination

The SHSS must monitor the effectiveness of the decontamination procedures. Decontamination procedures found to be ineffective will be modified by the SHSS.

7.1 Decontamination Specifications

Decontamination specifications are listed in Table 7-1.

TABLE 7-1
Decontamination Specifications

Personnel	Sample Equipment	Heavy Equipment
Boot wash/rinse	Wash/rinse equipment	Power wash
Glove wash/rinse	Solvent-rinse equipment	Steam clean
Body-suit removal	**Solvent-disposal method**	**Water-disposal method**
Respirator removal	Dispose in drums	Dispose in drums
Hand wash/rinse		
Face wash/rinse		
Shower ASAP		
PPE-disposal method Dispose in drums		
Water-disposal method Dispose in drums		

7.2 Diagram of Personnel-Decontamination Line

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SHSS should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure 7-1 illustrates a typical establishment of work zones, including the decontamination line. Work zones are to be modified by the SHSS to accommodate task-specific requirements.

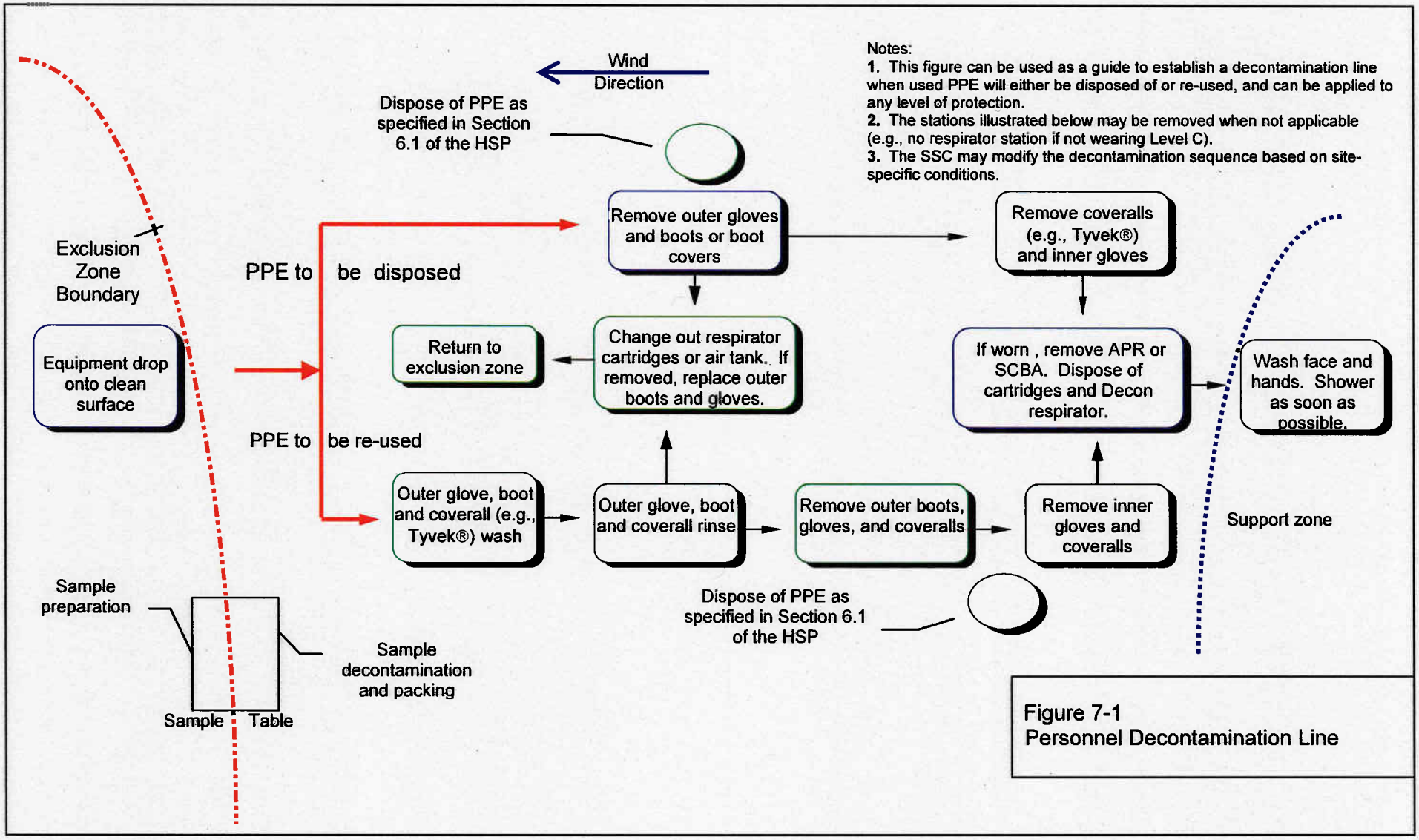


Figure 7-1
Personnel Decontamination Line

8.0 Spill Prevention and Control Plan

This Spill Prevention and Control Plan establishes minimum site requirements. Subcontractors are responsible for spill prevention and control related to their operations. Subcontractors written spill prevention and control procedures must be consistent with this plan. Spills must be reported to your supervisor, the site manager, and the Contract Manager.

8.1 Spill Prevention

Fuel and chemical storage areas will be properly protected from onsite and offsite vehicle traffic. Fuel storage tanks must be equipped with secondary containment. Fuel tanks must be inspected daily for signs of leaks. Accumulated water must be inspected for signs of product before discharge.

Incidental chemical products must be properly stored, transferred, and used in a safe manner. Should chemical product use occur outside areas equipped with spill control materials, adequate spill control materials must be maintained.

8.2 Spill Containment and Control

Spill control materials will be maintained in the support zone and at fuel storage and dispensing locations. Incidental spills will be contained with sorbent and disposed of properly. Spilled materials must be immediately contained and controlled. Spill response procedures include:

- Immediately warn any nearby personnel and notify the work supervisor.
- Assess the spill area to ensure that it is safe to approach.
- Activate site evacuation signal if spill presents an emergency.
- Ensure any nearby ignition sources are immediately eliminated.
- If it can be done safely, stop the source of the spill.
- Establish site control for the spill area.
- Use proper PPE in responding to the spill.
- Contain and control spilled material through the use of sorbent booms, pads, or other materials.

8.3 Spill Cleanup and Removal

Spilled material, contaminated sorbent, and contaminated media will be cleaned up and removed as soon as possible. Contaminated spill material will be drummed, labeled, and properly stored until material is disposed of. Contaminated material will be disposed of according to applicable federal, state, and local requirements. Contact the regulatory compliance person for the project or the program for assistance.

9.0 Confined-Space Entry

Confined-space entry requires health and safety procedures, training, and a permit.

When planned activities include confined-space entry, permit-required confined spaces accessible to Terraine personnel are to be identified before the task begins. The SHSS will confirm that permit spaces are properly posted or that employees are informed of their locations and informed of their hazards.

10.0 Site Control Plan

10.1 Site Control Procedures

The following site control procedures will be implemented for this CTO:

- SHSS will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of health and safety plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- SHSS records attendance at safety briefings in logbook and documents topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location at sites where project field offices, trailers, or equipment storage boxes are established. Posters can be obtained by calling either 800/548-4776 or 800/999-9111.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Determine wind direction.
- Establish work zones: support, decontamination, and exclusion zones. Delineate work zones with flags or cones as appropriate. The support zone (SZ) should be upwind of the site.
- Establish decontamination procedures, including respirator-decontamination procedures, and test the procedures.
- Use access control at the entry and exit from each work zone.
- Store chemicals in appropriate containers.
- Make MSDSs available for onsite chemicals to which employees are exposed.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Establish procedures for disposing of material generated on the site.
- Initial air monitoring is conducted by the SHSS in appropriate level of protection.
- SHSS is to conduct periodic inspections of work practices to determine the effectiveness of this plan

10.2 HAZWOPER Compliance Plan

The following procedures are to be followed when certain activities do not require 24- or 40-hour training. Note that prior approval from the HSM is required before these tasks are conducted on regulated hazardous waste sites.

- Certain parts of the site work may be covered by state or federal HAZWOPER standards and therefore require training and medical monitoring. Anticipated tasks must be included in Section 2.2.1.
- Air sampling must confirm that there is no exposure to gases or vapors before non-HAZWOPER-trained personnel are allowed on the site. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to Sections 3.8 and 6.2 for contaminant data and air sampling requirements, respectively.
- Non-HAZWOPER-trained personnel must be informed of the nature of the existing contamination and its locations, the limits of their access, and the emergency action plan for the site. Non-HAZWOPER-trained personnel also must be trained in accordance with other state and federal OSHA requirements, including 29 CFR 1910.1200 (HAZCOM). Refer to Section 3.7.1 for hazard communication requirements.
- Air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-HAZWOPER-trained personnel (e.g., in an adjacent area) are not exposed to volatile contaminants. Non-HAZWOPER-trained personnel should be monitored whenever the belief is that there may be a possibility of exposure (e.g., change in site conditions), or at some reasonable frequency to confirm that there is no exposure. Refer to Section 6.1 for air monitoring requirements.
- Treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the HAZWOPER standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only HAZWOPER-trained personnel (minimum of 24 hours of training) will be permitted to enter the site. All non-HAZWOPER-trained personnel must leave the site.

If HAZWOPER-regulated tasks are conducted concurrently with nonregulated tasks, non-HAZWOPER-trained subcontractors must be removed from areas of exposure. If non-HAZWOPER-trained personnel remain on the site while a HAZWOPER-regulated task is conducted, the contaminant/exposure area (exclusion zone) must be posted, non-HAZWOPER-trained personnel must be reminded of the locations of restricted areas and the limits of their access, and real-time monitoring must be conducted. Non-HAZWOPER-trained personnel at risk of exposure must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.

11.0 Emergency Response Plan

11.1 Pre-Emergency Planning

SHSS performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with the facility and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Locate the nearest telephone; determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Identify and communicate chemical, safety, radiological, and biological hazards.
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Post site map marked with locations of emergency equipment and supplies, and post OSHA job-site poster. The OSHA job-site poster is required at sites where project field offices, trailers, or equipment-storage boxes are established. Posters can be obtained by calling either 800/548-4776 or 800/999-9111.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Evaluate capabilities of local response teams where applicable.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, chemical and vapor releases.
- Review notification procedures for contacting Terraine's medical consultant and team member's occupational physician.
- Rehearse the emergency response plan once before site activities begin, including driving the route to the hospital.
- Brief new workers on the emergency response plan.
- The SHSS will evaluate emergency response actions and initiate appropriate follow-up actions.

11.2 Emergency Equipment and Supplies

The SHSS should mark the locations of emergency equipment on the site map and should post the map. Emergency equipment and its location are listed in Table 11-1.

TABLE 11-1
Emergency Equipment

Emergency Equipment and Supplies	Location
20 lb (or two 10-lb) fire extinguisher (A, B, and C classes)	In Field Vehicle
First aid kit	In Field Vehicle
Eye wash	In Field Vehicle
Potable water	In Field Vehicle
Bloodborne-pathogen kit	In Field Vehicle
Additional equipment (specify)	

11.3 Emergency Medical Treatment

Emergency medical treatment procedures are as follows:

- Notify appropriate emergency response authorities listed in Sections 11.9 and 11.11 (e.g., 911).
- During a time of no emergency, contact Terraine's medical consultant for advice and guidance on medical treatment.
- The SHSS will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Notify the field team leader and the project manager of the injury.
- Make certain that the injured person is accompanied to the emergency room.
- Notify the health and safety manager.
- Notify the injured person's human resources department within 24 hours.
- Prepare an incident report. Submit the report to the corporate director of health and safety and the corporate human resources department within 48 hours.
- When contacting the medical consultant, state that you are calling about a Terraine matter, and give your name, your telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.

11.4 Non-emergency Procedures

The procedures listed above may be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the Terraine medical consultant.

When contacting the medical consultant, state that the situation is a Terraine matter, and give your name, your telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken. Follow these procedures as appropriate.

11.5 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down Terraine operations and evacuate the immediate work area.
- Account for personnel at the designated assembly area(s).
- Notify appropriate response personnel.
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

11.6 Evacuation

Evacuation procedures are as follows:

- Evacuation routes will be designated by the SHSS before work begins.
- Onsite and offsite assembly points will be designated before work begins.
- Personnel will leave the exclusion zone and assemble at the onsite assembly point upon hearing the emergency signal for evacuation.
- Personnel will assemble at the offsite point upon hearing the emergency signal for a site evacuation.
- SHSS and a "buddy" will remain on the site after the site has been evacuated (if possible) to assist local responders and advise them of the nature and location of the incident.
- SHSS accounts for all personnel in the onsite assembly zone.
- A person designated by the SHSS before work begins will account for personnel at the offsite assembly area.
- The SHSS will write up the incident as soon as possible after it occurs and will submit a report to the corporate director of health and safety.

11.7 Evacuation Routes and Assembly Points

Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map posted at the site.

11.8 Evacuation Signals

Evacuation signals are listed in Table 11-2.

Table 11-2
Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency–help me
Thumbs up	OK; understood
Grasping buddy's wrist	Leave area now
Continuous sounding of horn	Emergency; leave site now

11.9 Emergency Response Telephone Numbers

Emergency response telephone numbers are listed in Table 11-3.

TABLE 11-3
Emergency Response Telephone Numbers

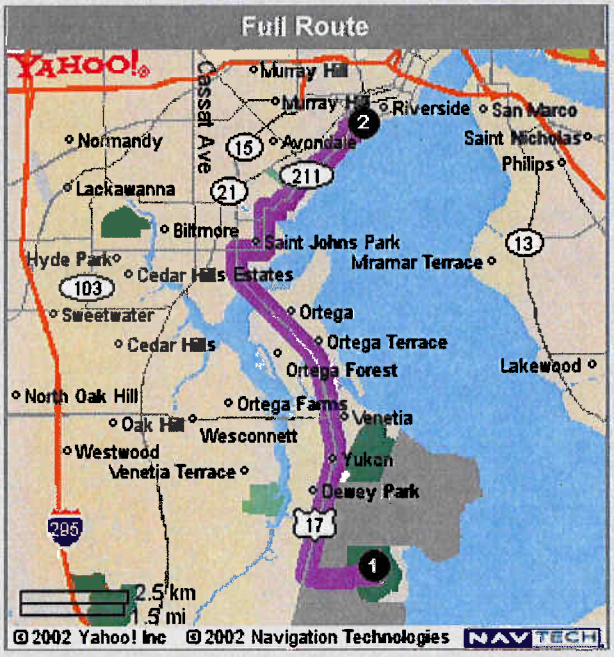
Police: Jacksonville Police	**Phone:** 911
Fire: Jacksonville Fire Department	**Phone:** 911
Ambulance: JacksonvilleFire Department	**Phone:** 911
Hospital: St Vincent's Hospital	**Phone:** 904/387-7300
1800 Barrs St. Jacksonville, FL	

*When using a cellular phone outside the telephone's normal calling area, exercise caution in relying on the cellular phone to activate 911. When the caller is outside the normal calling area, the cellular service carrier should connect the caller with emergency services in the area where the call originated, but this may not occur. Telephone numbers of backup emergency services should be provided if a cellular phone is relied on to activate 911.

Route to Hospital: From Cecil Field: Take SR 134 (Jacksonville Heights) approximately 10 miles to US 17. Turn left and go north approximately 2.5 miles to SR 128 (San Juan Ave.). Turn right and go approximately 1and 1/4 miles to Hershell. Turn left on Hershell. Hershell will turn into St. Johns Ave. St. Johns Ave will turn into Riverside Ave. Go one mile and turn right. Hospital is on the corner of King and Barrs streets.

The hospital location map is provided in Figure 11-1.

Figure 11-1: Hospital Map



11.10 Government Agencies Involved in Project

Federal Agency and Contact Name: Naval Facilities Engineering Command

Contact the project manager. Generally, the project manager will contact relevant government agencies.

11.11 Emergency Contacts

If an injury occurs, notify the injured person's personnel office as soon as possible after obtaining medical attention for the injured person. Notification **MUST** be made within 24 hours of the injury, including the Southern Division NAVFAC HQ Safety Office. Emergency contacts are listed in Table 11-4.

TABLE 11-4
Emergency Contacts

Navy RAC Health and Safety Manager (HSM) Robert Nash/ATL 770/604-9095	**Southern Division NAVFAC HQ Safety Office** Fletcher Ballzigler 843/820-5666
Project Manager James L. Young 305/490-7702 Cell Phone	**Site Safety and Health Specialist (SHSS)** Heather Rasmussen, EnSafe Inc. 972/791-3222
Client Wayne Hansel - Southern Division Naval Facilities Engineering Command 843-820-5624	

12.0 Approval

This site-specific health and safety plan has been written for use by Terraine only. Terraine claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

12.1 Original Plan

Written by: CH2M Hill Date: October 2000

Approved by: Robert Nash Date: October 2000

12.2 Revisions

Revisions Made by: Heather Rasmussen/EnSafe, Inc. Date: December 2002

Signature: Validity unknown Heather A. Rasmussen Digitally signed by Heather A. Rasmussen DN: cn=Heather A. Rasmussen, c=US Date: 2002.12.06 16:01:01 -06'00' Date: December 6, 2002

Revisions Approved by: Date:

Validity unknown James L. Young Digitally signed by James L. Young DN: cn=James L. Young, o=Terraine, Inc., c=US Date: 2002.12.06 17:49:08 -05'00' Reason: I am approving this document

13.0 Distribution

Distribution for this plan is listed in Table 13-1.

TABLE 13-1
Distribution List

Name	Office	Responsibility	Number of Copies
Heather Rasmussen	Dallas	Health and Safety Manager; Site Safety and Health Specialist/Approver	1
James L. Young	JAX	Project Manager; Site Superintendent	1
Wayne Hansel	NA	Client Project Manager	1

Attachment 1

Employee Signoff

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

The Terraine project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

Project Name: Cecil Field **Project Number:**

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

Attachment 2

Project Specific Chemical Product Hazard Communication Form

Project-Specific Chemical Product Hazard Communication Form

This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SSC will verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to Terraine and subcontractor personnel. Labeling and MSDS systems will also be explained.

Project Name: Cecil Field **Project Number:**

MSDSs will be maintained at the following location(s):

Hazardous Chemical Products Inventory

Chemical	Quantity	Location	MSDS Available	Container Labels	
				Identity	Hazard
Alconox/Liquinox	< 1liter	Support/Decon Zones			

Attachment 3

Chemical-Specific Training Form

TERRAINE CHEMICAL-SPECIFIC TRAINING FORM

Location:	Cecil Field	Project # :	
SSHS:		Trainer:	

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The HCC will use the product MSDS to provide the following information concerning each of the products listed above.

☐ Physical and health hazards

☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)

☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants will have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and Terraine's written hazard communication program will be made available for employee review in the facility/project hazard communication file.

Attachment 4
Material Safety Data Sheets

Alconox ®

MATERIAL SAFETY DATA SHEET

Alconox, Inc.
9 East 40th Street, Suite 200
New York, NY 10016

I. IDENTIFICATION

Product Name (as appears on label)	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 1998
Chemical Family:	Anionic Powdered Detergent

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in ALCONOX as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	Not Applicable
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (AIR=1):	Not Applicable
Specific Gravity (Water=1):	Not Applicable
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Solubility in Water:	Appreciable-Soluble to 10% at ambient conditions
Appearance:	White powder interspersed with cream colored flakes.

IV. FIRE AND EXPLOSION DATA

Flash Point (Method Used):	None
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO_2, foam
Special Firefighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

V. REACTIVITY DATA

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition or Byproducts:	May release CO_2 on burning

VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs readminister fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

Attachment 5
Self Assessment Checklist

JOBSITE SAFETY INSPECTION CHECKLIST

Revision.: 04

Date: 12/6/02

Note: The following jobsite safety inspection checklist is to be used only at locations where Terraine controls the work. It is not to be used at locations where others control the work.

Project Name: Cecil Field Buildings 9 & 46, 103rd Street and Day Tank 1 Operation and Maintenance

Project No.: _____

Location: Cecil Field Florida

Project Manager: James L. Young

Inspector: _____

Date: _____

This checklist has been divided into two sections. The first section (I through XXVI) are applicable to all projects. The second section (XXVII through XXIX) addresses specific situations such as hazardous waste, construction activities, and office trailers. There may be some duplication between the first and second sections.

If an item is not applicable, the column titled "N/A" should be checked. If an item is applicable but the auditor does not observe it during the inspection, the "N/O" column should be checked. For each deficiency noted, a Health and Safety Audit Finding Form must be completed. The Corporate Health and Safety Director must be copied on the results of all audits.

Check "Yes" for Items Completed	Yes	No	N/A	N/O
I. JOBSITE OFFICE				
1. Posters and safety signs in place:				
a. OSHA safety poster	☐	☐	☐	☐
b. Emergency Telephone Number Form	☐	☐	☐	☐
c. Workers Compensation Form	☐	☐	☐	☐
2. First aid kit:				
a. Fully stocked/sufficient supply	☐	☐	☐	☐
b. First-aid administered by a person with a valid certificate	☐	☐	☐	☐
3. Bloodborne-pathogen kit	☐	☐	☐	☐
4. Accident/injury reporting:				
a. Employees briefed	☐	☐	☐	☐
b. Forms available	☐	☐	☐	☐
c. Injuries and illnesses reported and logged	☐	☐	☐	☐
d. Accidents investigated and properly followed up to prevent	☐	☐	☐	☐
e. Accident reports and logs submitted promptly as required	☐	☐	☐	☐

5.	Job safety rules and regulations available/posted	☐	☐	☐	☐
II. HAZARD COMMUNICATION					
1.	Employee training:				
	a. Employees' signed training certificates on file	☐	☐	☐	☐
2.	Material safety data sheets (MSDSs):				
	a. MSDSs on file	☐	☐	☐	☐
	b. Log assigned to competent person	☐	☐	☐	☐
	c. Log complete and up to date	☐	☐	☐	☐
3.	Written program on file	☐	☐	☐	☐
III. EMPLOYEE TRAINING					
1.	Safety indoctrination held for new employees	☐	☐	☐	☐
2.	Sufficient instruction given in recognition and avoidance of job hazards; unsafe conditions; and job rules, regulations, and procedures	☐	☐	☐	☐
3.	Sufficient instruction in proper use and maintenance of tools, equipment, and personal protective equipment	☐	☐	☐	☐
4.	Employees instructed to report unsafe or hazardous conditions to proper job supervisor	☐	☐	☐	☐
5.	Employees instructed to promptly report injury, illness, and involving damage to equipment and materials	☐	☐	☐	☐
6.	All site personnel have read the job safety rules and regulations and have signed the "Employee Signoff Sheet"	☐	☐	☐	☐
IV. JOBSITE LOGISTICS AND LAYOUT					
1.	Traffic routes around construction areas:				
	a. Warning signs, flagging in place	☐	☐	☐	☐
2.	Utility ditches:				
	a. Flagged or barricaded	☐	☐	☐	☐
3.	Trucks and heavy equipment:				
	a. Good mechanical conditions	☐	☐	☐	☐
	b. Backup signals working	☐	☐	☐	☐
	c. Seat belts installed and used	☐	☐	☐	☐
V. PUBLIC PROTECTION					
1.	Warning signs in place around site	☐	☐	☐	☐
2.	After-hours hazards:				
	a. Open ditches protected	☐	☐	☐	☐
3.	Hazard lights	☐	☐	☐	☐
VI. HOUSEKEEPING					
1.	Material storage yard:				
	a. Stacked neatly and properly	☐	☐	☐	☐

b.	Aisles, walkways, roads clear	☐	☐	☐	☐
2.	Check work areas for:				
a.	Loose and waste materials	☐	☐	☐	☐
b.	Vicinity of ladders, stairs, ramps, and machinery	☐	☐	☐	☐
c.	Empty bottles, containers, papers, trash, bands, brick-bats, etc.	☐	☐	☐	☐
d.	Trash cans, dumpsters available and emptied regularly	☐	☐	☐	☐

VII. PERSONAL PROTECTIVE EQUIPMENT (PPE)

1.	Hard hats	☐	☐	☐	☐
2.	Safety shoes/boots	☐	☐	☐	☐
3.	Eye/face protection	☐	☐	☐	☐
4.	Safety belts/lanyards	☐	☐	☐	☐
5.	Ear protection:				
a.	Noise level areas of 90 dBA and above identified	☐	☐	☐	☐
b.	Signs notifying personnel of "Hearing Protection Required" posted as	☐	☐	☐	☐
6.	Specialized equipment:				
a.	Gloves	☐	☐	☐	☐
b.	Chemical-Respirators (respirator use requires medical protocol, monitoring and training)	☐	☐	☐	☐
c.	Chemical-resistant clothing	☐	☐	☐	☐
7.	Tools:				
a.	Handles in good shape	☐	☐	☐	☐
b	Tool guards in place	☐	☐	☐	☐
c.	Proper tools used for the job	☐	☐	☐	☐
d.	Tools maintained in functional condition (hammer heads not mushroomed)	☐	☐	☐	☐

VIII. SANITATION

1.	Temporary toilets:				
a.	Serviced regularly	☐	☐	☐	☐
b.	Sufficient Quantity (20 or fewer employees - 1 required; 20 or more employees - 1 toilet and 1 urinal per 40 workers	☐	☐	☐	☐
2.	Potable Water:				
a.	Tightly closed containers	☐	☐	☐	☐

b.	Equipped with tap	☐	☐	☐	☐
c.	Paper cups available	☐	☐	☐	☐
d.	Containers labeled "Drinking Water"	☐	☐	☐	☐
IX. FLOOR AND WALL OPENINGS GUARDS					
XI. SCAFFOLDING					
XII. ELECTRICAL					
1.	Cords/devices have current inspection color code tape installed	☐	☐	☐	☐
2.	Frayed cords, broken plugs fixed	☐	☐	☐	☐
3.	Temporary wiring:				
a.	Panels secured and GFCIs working	☐	☐	☐	☐
b.	Away from vehicle pathways	☐	☐	☐	☐
c.	Out of water/moisture	☐	☐	☐	☐
d.	No broken receptacles found	☐	☐	☐	☐
e.	Sufficient outlets for all crafts	☐	☐	☐	☐
4.	Temporary lighting with cages	☐	☐	☐	☐
5.	Assured equipment grounding conductor program in place, if not using GFCIs	☐	☐	☐	☐
6.	Lock-out or tag-out system used when necessary	☐	☐	☐	☐
7.	Electrical dangers posted and guarded	☐	☐	☐	☐
8.	Fire hazards checked, proper extinguishers available	☐	☐	☐	☐
9.	Only qualified electricians work on electrical circuits and equipment	☐	☐	☐	☐
10.	Cords passing through work areas must be covered or elevated to protect them from damage	☐	☐	☐	☐
11.	Extension cords must be hard or extra-hard usage	☐	☐	☐	☐
XIII. TEMPORARY HEATERS					
XIV. FIRE PROTECTION					
1.	Office fire extinguisher in working order and inspected regularly	☐	☐	☐	☐
2.	One extinguisher, 2A rating, for each 3,000 square feet of protected area	☐	☐	☐	☐
3.	One extinguisher, 2A rating, on each floor adjacent to each stairway	☐	☐	☐	☐

4.	Trash, paper, other combustibles picked up	☐	☐	☐	☐
5.	Welders/roofers have extinguishers nearby and a fire watch is available if needed	☐	☐	☐	☐
6.	Fire alarm available/fire evacuation plan	☐	☐	☐	☐
7.	"No Smoking" signs posted and enforced where necessary	☐	☐	☐	☐
8.	Supervisors and employees trained in proper use of extinguishers	☐	☐	☐	☐

XV. MATERIAL STORAGE AND HANDLING

1.	Neat storage area, clear passageways	☐	☐	☐	☐
2.	Materials spotted to minimize rehandling and reduce transport distances	☐	☐	☐	☐
3.	Power equipment used to handle heavy/awkward loads	☐	☐	☐	☐
4.	Stacks on firm footing and all tier stacked materials secured against sudden movement	☐	☐	☐	☐
5.	Storage platforms, skids, bins, shelves, etc. in good repair	☐	☐	☐	☐

XVI. DEMOLITION WORK

XVII. STEEL ERECTION

1.	Safety nets used, if required	☐	☐	☐	☐
2.	Hard hats, eye protection, safety belts, serviceable shoes, gloves, and full clothing used	☐	☐	☐	☐
3.	Tag lines used for hoisting tools and material	☐	☐	☐	☐
4.	Fire hazards checked at rivet force and welding operations	☐	☐	☐	☐
5.	Ladders, stairs, or other safe access provided	☐	☐	☐	☐
6.	Hoisting apparatus checked	☐	☐	☐	☐
7.	Good housekeeping, welding, and rigging practices observed	☐	☐	☐	☐

XX. FLAMMABLE AND COMBUSTIBLE LIQUIDS

1.	All containers clearly marked to show contents (gas cylinders, cans, drums, fuel tanks, etc.)	☐	☐	☐	☐
2.	Proper storage practices observed:				
	a. Storage areas enclosed or protected from heat and mobile equipment exposure	☐	☐	☐	☐
	b. Fire hazards checked	☐	☐	☐	☐
	c. Sufficient fire extinguishers	☐	☐	☐	☐

d.	UL approved safety cans for 1 to 5 gallons of flammable liquids	☐	☐	☐	☐
e.	Approved cabinet for indoor storage of liquids in excess of 25-gallons, but not more than 120-gallon storage	☐	☐	☐	☐
f.	Sign labeled "Flammable - Keep Fire Away" posted on cabinet	☐	☐	☐	☐

XXI. FLAMMABLE GAS (Oxygen/Acetylene)

1.	Cylinders:				
a.	Away from heat	☐	☐	☐	☐
b.	Stored upright (secured)	☐	☐	☐	☐
c.	Valves closed on empty cylinders	☐	☐	☐	☐
d.	Valve protection caps in place if cylinder not in use	☐	☐	☐	☐
e.	Valve key wrench available	☐	☐	☐	☐
f.	Portable rack with bottles secured	☐	☐	☐	☐
g.	Instruct project staff to never drag or slide bottles	☐	☐	☐	☐
h.	Designated storage area	☐	☐	☐	☐
i.	"No Smoking" signs posted	☐	☐	☐	☐
j.	Oxygen bottles stored 20' from acetylene bottles or 1/2-hour fire barrier installed between them	☐	☐	☐	☐
2.	Gauges/valves/hoses:	☐	☐	☐	☐
a.	Good condition	☐	☐	☐	☐
b.	Fire arresters installed (both hoses)	☐	☐	☐	☐
3.	Eye protection available	☐	☐	☐	☐
4.	Ventilation adequate	☐	☐	☐	☐
5.	When in use, gas lines properly located to prevent tripping and falling	☐	☐	☐	☐
6.	All burning torches bled and free of oxygen and acetylene and/or other gases during lunch breaks and other extended periods of time	☐	☐	☐	☐

XXII. WELDING OPERATIONS

1.	Performed by qualified personnel	☐	☐	☐	☐
2.	Screens, shields, or eye protection provided and used to protect employees from welding operation	☐	☐	☐	☐
3.	Employees wear sufficient clothing and PPE	☐	☐	☐	☐

4.	Equipment checked before use and in operative conditions	☐	☐	☐	☐
5.	Electrical equipment grounded	☐	☐	☐	☐
6.	Power cables protected and in good repair	☐	☐	☐	☐
7.	Power cables properly located to prevent tripping and falling hazards	☐	☐	☐	☐
8.	Dry chemical fire extinguisher within 30 feet	☐	☐	☐	☐
9.	Exposed combustible materials removed to safe location or properly protected from sparks and slag	☐	☐	☐	☐
10.	Valid hot work permit required or provided	☐	☐	☐	☐
11.	Overhead protection provided where required	☐	☐	☐	☐
12.	"Danger - No Smoking, Matches or Open Lights" signs posted when required	☐	☐	☐	☐
13.	Adequate lighting and ventilation provided	☐	☐	☐	☐
14.	Machines turned off at end of shift or when not in use for extended periods	☐	☐	☐	☐

XXIII. HOISTS

1.	Material hoists:				
a.	Designed by licensed professional engineer	☐	☐	☐	☐
b.	With tower enclosed for full height on all sides with 1/2-inch by 18--inch Gauge screen mesh, except for landing for landing access	☐	☐	☐	☐
c.	With tower not enclosed, hoist platform or car will be totally enclosed on all sides for the full height between floor and overhead covering with 1/2-inch x 14-inch gauge mesh	☐	☐	☐	☐
d.	Operation rules poster "No Riders Allowed" posted	☐	☐	☐	☐
e.	Hoisting entrances guarded by substantial gate or bars	☐	☐	☐	☐
f.	Vertical gates of sufficient height to prevent anyone from looking over them into shaft	☐	☐	☐	☐
g.	Competent person assigned to inspect daily	☐	☐	☐	☐
h.	Weekly inspections logged	☐	☐	☐	☐
I.	Annual inspection available	☐	☐	☐	☐
j.	Fire extinguisher in place and inspected	☐	☐	☐	☐
k.	Load chart posted	☐	☐	☐	☐

XXIV. BLASTING

XXV. HAZARDOUS WASTE

Certification and Training of TERRAINE Personnel

1.	Medical exam within last 12 months	☐	☐	☐	☐
2.	40-hour initial training, 3 days supervised field activities, 8-hour annual Refresher	☐	☐	☐	☐
3.	First aid and CPR certification	☐	☐	☐	☐
4.	Quantitatively fit tested (preferred method per NIOSH Publication 87-116, 87-116, Appendix B.3)	☐	☐	☐	☐
5.	Attend pre-entry safety meeting	☐	☐	☐	☐
6.	Site Safety Coordinator with appropriate training	☐	☐	☐	☐

Certification and Training of Subcontractor Personnel

1.	Medical exam within last 12 months	☐	☐	☐	☐
2.	40-hour initial training, 3 days supervised field activities, 8-hour Annual refresher	☐	☐	☐	☐
3.	First aid and CPR certification	☐	☐	☐	☐
4.	Quantitatively fit tested (preferred method per NIOSH Publication 87-116, (Appendix B.3)	☐	☐	☐	☐
5.	Attend pre-entry safety meeting	☐	☐	☐	☐

Site Safety Documentation

1.	Site health and safety plan (HSP) prepared and approved	☐	☐	☐	☐
2.	HSP onsite	☐	☐	☐	☐
3.	All personnel onsite identified in HSP	☐	☐	☐	☐
4.	Documentation of safety briefing	☐	☐	☐	☐
5.	Hospital map posted	☐	☐	☐	☐
6.	Phone numbers posted	☐	☐	☐	☐
7.	Emergency vehicle identified	☐	☐	☐	☐
8.	Material Safety Data Sheets (MSDSs) onsite	☐	☐	☐	☐
9.	Work zones delineated (How? _____)	☐	☐	☐	☐
10.	Wind direction flags in use	☐	☐	☐	☐
11.	Documentation of calibration of monitoring equipment in	☐	☐	☐	☐

	Clean environment				
12.	Monitoring conducted and recorded as specified in HSP (Frequency? _____)	☐	☐	☐	☐
13.	Monitoring for heat/cold stress	☐	☐	☐	☐
14.	Buddy system in use	☐	☐	☐	☐
15.	Decontamination procedures established as specified in HSP	☐	☐	☐	☐
16.	No eating, drinking, or smoking in exclusion and contamination Reduction zones	☐	☐	☐	☐
17.	Toilet facilities provided	☐	☐	☐	☐
18.	No contact lenses	☐	☐	☐	☐
19.	Work conducted during daylight hours only	☐	☐	☐	☐
Safety Briefing					
1.	All personnel attended (including new personnel)	☐	☐	☐	☐
2.	Documentation of meetings	☐	☐	☐	☐
3.	Chemical hazards and toxicology reviewed	☐	☐	☐	☐
4.	Physical hazards reviewed	☐	☐	☐	☐
5.	Biological hazards reviewed	☐	☐	☐	☐
6.	Heat/cold stress information reviewed	☐	☐	☐	☐
7.	Air monitoring requirements	☐	☐	☐	☐
8.	Levels of protection reviewed	☐	☐	☐	☐
9.	Work zones reviewed	☐	☐	☐	☐
10.	Decontamination procedures reviewed	☐	☐	☐	☐
11.	Emergency response procedures reviewed	☐	☐	☐	☐
12.	Site communications	☐	☐	☐	☐
Personal Protective Equipment (PPE)					
1.	Levels of protection being worn as specified in HSP	☐	☐	☐	☐
2.	All appropriate PPE available onsite	☐	☐	☐	☐
3.	Hard hats being worn	☐	☐	☐	☐

4. Appropriate hand protection being used ☐ ☐ ☐ ☐
(What? _____)

5. Appropriate body protection being used ☐ ☐ ☐ ☐
(What? _____)

6. Appropriate eye protection being used ☐ ☐ ☐ ☐
(What? _____)

7. Appropriate ear protection being used ☐ ☐ ☐ ☐

8. Appropriate respirator protection being used ☐ ☐ ☐ ☐

9. Respirators donned correctly ☐ ☐ ☐ ☐

10. TLD badges being used ☐ ☐ ☐ ☐

11. If air purifying respirators (APRs) are being used, correct cartridges ☐ ☐ ☐ ☐
(Type? _____)

12. If self contained breathing apparatuses (SCBAs) are being used, is grade D air being used ☐ ☐ ☐ ☐

13. If SCBAs are being used, are cylinders stored correctly ☐ ☐ ☐ ☐

14. If PPE is not onsite, prepared to halt work ☐ ☐ ☐ ☐

15. Disposal methods in place for disposable PPE ☐ ☐ ☐ ☐

Decontamination Procedures

1. Decontamination procedure established as specified in the HSP ☐ ☐ ☐ ☐

2. Decontamination zone clearly defined ☐ ☐ ☐ ☐

3. PPE properly decontaminated ☐ ☐ ☐ ☐
(How? _____)

4. Sampling equipment properly decontaminated ☐ ☐ ☐ ☐
(How? _____)

5. Monitoring equipment properly decontaminated ☐ ☐ ☐ ☐
(How? _____)

6. Heavy equipment properly decontaminated ☐ ☐ ☐ ☐
(How? _____)

7. Samples properly decontaminated ☐ ☐ ☐ ☐
(How? _____)

8. Decontamination fluids appropriately disposed of ☐ ☐ ☐ ☐

XXVI. CONSTRUCTION INSPECTIONS
XXVII. OFFICE TRAILERS/BUILDINGS
XXIII. CONFINED SPACE ENTRY
XXIX. STAIRWAYS AND LADDERS
XXX. FALL PROTECTION
XXXI. EXCAVATIONS
XXXII. DRILLING

Personnel Safe Work Practices. (3.1)

1. Only authorized personnel operating drill rig. ☐ ☐ ☐ ☐
2. Personnel cleared during rig startup. ☐ ☐ ☐ ☐
3. Personnel clear of rotating parts. ☐ ☐ ☐ ☐
4. Personnel not positioned under hoisted loads. ☐ ☐ ☐ ☐
5. Loose clothing and jewelry removed. ☐ ☐ ☐ ☐
6. Personnel instructed not to approach equipment that has become electrically energized. ☐ ☐ ☐ ☐
7. Smoking is prohibited around drilling operation. ☐ ☐ ☐ ☐
8. Personnel wearing appropriate PPE, per HSP. ☐ ☐ ☐ ☐

General (3.2.1)

9. Daily safety briefing/meeting conducted with crew. ☐ ☐ ☐ ☐
10. Daily inspection of drill rig and equipment conducted before use. ☐ ☐ ☐ ☐

Drill Rig Placement (3.2.2)

11. Location of underground utilities identified. ☐ ☐ ☐ ☐
12. Safe clearance distance maintained from overhead powerlines. ☐ ☐ ☐ ☐
13. Drilling pad established, when necessary. ☐ ☐ ☐ ☐
14. Drill rig leveled and stabilized. ☐ ☐ ☐ ☐

Drill Rig Travel (3.2.3)

15. Rig shut down and mast lowered and secured prior to rig movement. ☐ ☐ ☐ ☐
16. Tools and equipment secured prior to rig movement. ☐ ☐ ☐ ☐
17. Only personnel seated in cab are riding on rig during movement. ☐ ☐ ☐ ☐
18. Safe clearance distance maintained while traveling under overhead powerlines. ☐ ☐ ☐ ☐
19. Backup alarm or spotter used when backing rig. ☐ ☐ ☐ ☐

Drill Rig Operation (3.2.4)

20. Kill switch clearly identified and operational. ☐ ☐ ☐ ☐
21. All machine guards are in place. ☐ ☐ ☐ ☐
22. Rig ropes not wrapped around body parts. ☐ ☐ ☐ ☐
23. Pressurized lines and hoses secured from whipping hazards. ☐ ☐ ☐ ☐
24. Drill operation stopped during inclement weather. ☐ ☐ ☐ ☐
25. Air monitoring conducted per HSP for hazardous atmospheres. ☐ ☐ ☐ ☐
26. Rig placed in neutral when operator not at controls. ☐ ☐ ☐ ☐

Drill Rig Maintenance (3.2.5)

27. Defective components repaired immediately. ☐ ☐ ☐ ☐
28. Lockout/tagout procedures used prior to maintenance. ☐ ☐ ☐ ☐
29. Cathead in clean, sound condition. ☐ ☐ ☐ ☐
30. Drill rig ropes and wire lines in clean, sound condition ☐ ☐ ☐ ☐
31. Fall protection used for exposures > 6'. ☐ ☐ ☐ ☐
32. Rig in neutral and augers stopped rotating before cleaning. ☐ ☐ ☐ ☐
33. Good housekeeping maintained on and around rig. ☐ ☐ ☐ ☐

Drilling at Hazardous Waste Sites (3.2.6)

34. Waste disposal according to HSP and Environmental Protection Plan. ☐ ☐ ☐ ☐
35. Appropriate decontamination procedures followed, per HSP> ☐ ☐ ☐ ☐

XXXIII. EARTHMOVING EQUIPMENT
XXXIV. DEMOLITION
XXXVI. HAND AND POWER TOOLS

SAFE WORK PRACTICES (3.1)

1. All tools operated according to manufacture's instructions. ☐ ☐ ☐ ☐
2. All hand and power tools maintained in a safe condition and inspected before each use. ☐ ☐ ☐ ☐
3. Defective tools are tagged and removed from service until repaired. ☐ ☐ ☐ ☐
4. PPE is selected and used according to tool-specific hazards. ☐ ☐ ☐ ☐
5. Power tools are not carried or lowered by cord or hose. ☐ ☐ ☐ ☐

6. Tools are disconnected from energy sources when not in use.	☐	☐	☐	☐
7. Safety guards remain installed or are promptly replaced after repair.	☐	☐	☐	☐
8. Tools are stored properly.	☐	☐	☐	☐
9. Cordless tools and recharging units conform to electrical standards.	☐	☐	☐	☐
10. Tools used in explosive environments are rated for such use.	☐	☐	☐	☐
11. Knife or blade hand tools are used with the proper precautions.	☐	☐	☐	☐
12. Consider controls to avoid muscular skeletal, repetitive motion, and cumulative trauma stresses.	☐	☐	☐	☐
General (3.2.1)				
13. PPE is selected and used according to tool-specific hazards anticipated.	☐	☐	☐	☐
14. Tools are tested daily to assure safety devices are operating properly.	☐	☐	☐	☐
15. Damaged tools are removed from service until repaired.	☐	☐	☐	☐
16. Power operated tools designed to accommodate guards and used.	☐	☐	☐	☐
17. Rotating or moving parts on tools are properly guarded.	☐	☐	☐	☐
18. Machines designed for fixed locations are secured or anchored.	☐	☐	☐	☐
19. Floor and bench-mounted grinders are provided with work rests.	☐	☐	☐	☐
20. Guards are provided at point of operation, nip points, rotating parts.	☐	☐	☐	☐
21. Fluid used in hydraulic-powered tools is approved fire-resistant fluid.	☐	☐	☐	☐
Electric-Powered Tools (3.2.2)				
22. Electric tools are double insulated or grounded according to SOP HS-23.	☐	☐	☐	☐
23. Electric cords are not used for hoisting or lowering tools	☐	☐	☐	☐
24. Hand-held tools are equipped with appropriate on/off controls.	☐	☐	☐	☐
25. Electric tools used in damp/wet locations are approved or use GFCI.	☐	☐	☐	☐
26. Portable, power-driven circular saws are equipped with proper guards.	☐	☐	☐	☐
Abrasive Wheel Tools (3.2.3)				
27. Employees using abrasive wheel tools are wearing eye protection.	☐	☐	☐	☐
28. Grinding machines are supplied with sufficient power to maintain spindle speed.	☐	☐	☐	☐

29. Abrasive wheels are closely inspected and ring-tested before use. ☐ ☐ ☐ ☐

30. Grinding wheels are properly installed. ☐ ☐ ☐ ☐

31. Cup-type wheels for external grinding are protected by proper guard. ☐ ☐ ☐ ☐

32. Portable abrasive wheels used for internal grinding are protected by safety flange. ☐ ☐ ☐ ☐

33. Safety flanges are used only with wheels designed to fit the flange. ☐ ☐ ☐ ☐

34. Safety guards on abrasive wheel tools are mounted properly. ☐ ☐ ☐ ☐

Pneumatic-Powered Tools (3.2.4)

35. Tools are secured to hoses or whip by positive means to prevent disconnect. ☐ ☐ ☐ ☐

36. Safety clips or retainers are installed to prevent attachments being expelled. ☐ ☐ ☐ ☐

37. Safety devices are installed on automatic fastener feed tools. ☐ ☐ ☐ ☐

38. Compressed air in not used for cleaning unless reduced to <30 psi, with PPE and guarded. ☐ ☐ ☐ ☐

39. Manufacturer's safe operating pressure for hoses, pipes, valves, are not exceeded. ☐ ☐ ☐ ☐

40. Hoses >1/2 inch diameter have safety device at source to reduce upon hose failure. ☐ ☐ ☐ ☐

41. Airless spray guns have required safety devices installed. ☐ ☐ ☐ ☐

42. Blast cleaning nozzles are equipped with operating valves, which are held open manually. ☐ ☐ ☐ ☐

43. Supports are provided for mounting nozzles when not in use. ☐ ☐ ☐ ☐

44. Air receivers drains, handholes, and manholes are easily accessible. ☐ ☐ ☐ ☐

45. Air receivers are equipped with drainpipes, and valves for removal of Accumulated oil and water. ☐ ☐ ☐ ☐

46. Air receivers are completely drained at required intervals. ☐ ☐ ☐ ☐

47. Air receivers are equipped with indicating pressure gauges. ☐ ☐ ☐ ☐

48. Safety valves are tested at regular intervals for assure good operating condition. ☐ ☐ ☐ ☐

49. Safety, indicating, and controlling devices are installed as required. ☐ ☐ ☐ ☐

Liquid Fuel-Powered Tools (3.2.5)

50. Liquid fuel-powered tools are stopped when refueling, servicing, or for maintenance. ☐ ☐ ☐ ☐

51. Liquid fuels are stored, handled, and transported in accordance with SOP HS-21. ☐ ☐ ☐ ☐

52. Liquid fuel-powered tools are used in confined spaces in accordance ☐ ☐ ☐ ☐

with SOP HS-17

53. Safe operating pressures of hoses, valves, pipes, filters, and other Fittings are not exceeded. ☐ ☐ ☐ ☐

Jacking Tools (3.2.6)

54. Rated capacities are legibly marked on jacks and not exceeded. ☐ ☐ ☐ ☐
55. Jacks have a positive stop to prevent over-travel. ☐ ☐ ☐ ☐
56. Base of jacks are blocked or cribbed to provide a firm foundation. ☐ ☐ ☐ ☐
57. Wood blocks are placed between the cap and load to prevent slippage. ☐ ☐ ☐ ☐
58. After load is raised, it is cribbed, blocked, or otherwise secured Immediately. ☐ ☐ ☐ ☐
59. Antifreeze is used when hydraulic jacks are exposed to freezing temperatures. ☐ ☐ ☐ ☐
60. Jacks are properly lubricated. ☐ ☐ ☐ ☐
61. Jacks are inspected as required. ☐ ☐ ☐ ☐
62. Repair or replacement parts are examined for possible defects. ☐ ☐ ☐ ☐
63. Jacks not working properly are removed from service and repaired. ☐ ☐ ☐ ☐

Hand Tools(3.2.7)

64. Wrenches are not used when jaws are sprung to the point of slippage. ☐ ☐ ☐ ☐
65. Impact tools are kept free of mushroomed heads. ☐ ☐ ☐ ☐
66. Wooden handles of tools are kept free of splinters or cracks and are tightly fitted in tool. ☐ ☐ ☐ ☐

XXXV. CONCRETE AND MASONARY

Safe Work Practices (3.1)

1. Personnel on areas where concrete is being poured are wearing PPE. ☐ ☐ ☐ ☐
2. Protruding rebar is adequately guarded to control impalement hazards. ☐ ☐ ☐ ☐
3. Personnel do not ride concrete buckets or position themselves in lifting areas. ☐ ☐ ☐ ☐
4. Personnel maintain safe distance from formwork, shoring, percast, and lift-slab operations. ☐ ☐ ☐ ☐
5. Personnel do not enter limited access zones during masonry wall work. ☐ ☐ ☐ ☐
6. Personnel are not permitted under loads being lifted or walls being jacked. ☐ ☐ ☐ ☐
7. Personnel access is limited in areas where post-tension operations are performed. ☐ ☐ ☐ ☐
8. Scaffolding conforms to the requirements of SOP HS-73 prior to use. ☐ ☐ ☐ ☐

9. Excavations conform to the requirements of SOP HS-32 prior to entry.	☐	☐	☐	☐
10. Lifting and rigging devices conform to the requirements of SOP HS-44.	☐	☐	☐	☐
General (3.2.1)				
11. Concrete structures where loads to be placed, inspected.	☐	☐	☐	☐
12. Protruding rebar, guarded.	☐	☐	☐	☐
13. No employees permitted behind jack during tensioning unless directly involved in the operation	☐	☐	☐	☐
14. Signs/barriers are erected to limit employee access to post tension areas.	☐	☐	☐	☐
Tools, Materials, and Equipment				
15. Requirements for confined space entry and lockout/tagout are met.	☐	☐	☐	☐
16. Concrete mixers have cleaning devices and guards installed.	☐	☐	☐	☐
17. Portable/rotating concrete troweling machines have shutoff devices.	☐	☐	☐	☐
18. Concrete buggy handles do not extend beyond the wheels on either side.	☐	☐	☐	☐
19. Concrete pumping systems using discharge pipes are supproted.	☐	☐	☐	☐
20. Concrete buckets w/hydraulic or pneumatic gates have positive lock.	☐	☐	☐	☐
21. Employees not permitted under concrete buckets during lifts and lowers.	☐	☐	☐	☐
22. Elevated concrete buckets are routed around employees.	☐	☐	☐	☐
23. Employees do not ride concrete buckets.	☐	☐	☐	☐
24. Sections of tremies or similar concrete conveyances are secured with wire rope.	☐	☐	☐	☐
25. Bull float handles were contact with electrical lines, are nonconductive.	☐	☐	☐	☐
26. Masonry saws are guarded with a semicircular enclosure over the blade.	☐	☐	☐	☐
27. Employees applying concrete through a hose are wearing PPE.	☐	☐	☐	☐
Formwork and Shoring (3.2.3)				
28. Formwork is capable of supporting loads that may be reasonably anticipated to be applied.	☐	☐	☐	☐
29. Drawings and plans required to be at the jobsite are available.	☐	☐	☐	☐
30. Shoring equipment is inspected prior to erection.	☐	☐	☐	☐
31. Damaged shoring equipment is not used.	☐	☐	☐	☐

32. Erected shoring is inspected prior to, during, and immediately after concrete placement.	☐	☐	☐	☐
33. Sills from shoring are sound, rigid, and capable of carrying the maximum intended load.	☐	☐	☐	☐
34. Base plates, shore heads, extension devices, and adjustment screws are installed correctly.	☐	☐	☐	☐
35. Eccentric loads on shore heads and similar are prohibited unless designed for such loads.	☐	☐	☐	☐
36. Whenever single-post shores are tiered, shoring is designed and inspected	☐	☐	☐	☐
37. Tiered single-post shores are vertically aligned and adequately braced.	☐	☐	☐	☐
38. Adjustment of single-post shores to raise framework is not made after placement of concrete.	☐	☐	☐	☐
39. Re-shoring is erected when concrete is required to support loads in excess of its capacity	☐	☐	☐	☐
40. Forms/shores are only removed when concrete has gained sufficient strength as needed.	☐	☐	☐	☐
41. Re-shoring is not removed until concrete being supproted has attained adequate strength to support its weight and all loads placed upon it.	☐	☐	☐	☐

XXXVI. AERIAL LIFTS