

## **SITE HEALTH AND SAFETY PLAN**

# **STORM WATER DRAIN EXCAVATION, CLEANING, REMOVAL, AND REPLACEMENT AT BUILDINGS 5 and 400 ALAMEDA POINT, ALAMEDA, CALIFORNIA (FORMERLY NAVAL AIR STATION, ALAMEDA, CALIFORNIA)**

**Project No. USN 97-032  
Phase III**

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Revision 1

April 1998

Copy #: \_\_\_\_\_

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**SITE HEALTH AND SAFETY PLAN APPROVALS**  
**STORM WATER DRAIN EXCAVATION, CLEANING, REMOVAL, AND**  
**REPLACEMENT AT BUILDINGS 5 and 400**  
**ALAMEDA POINT, ALAMEDA, CALIFORNIA**

Revision 1

April 1998

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N00236.001514  
ALAMEDA POINT  
SSIC NO. 5090.3

SITE WORK PLAN  
SITE HEALTH AND SAFETY PLAN  
SITE QUALITY ASSURANCE PLAN  
PHASE III AND IV  
STORM DRAIN EXCAVATION, CLEANING,  
REMOVAL, AND REPLACEMENT AT  
BUILDINGS 5 AND 400  
REVISION 2

DATED 01 JULY 1998

IS FILED AS ADMINISTRATIVE RECORD NO.  
**N00236.001543**

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## List of Acronyms

AIDS	Acquired Immune Deficiency Syndrome
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
ATSDR	Agency for Toxic Substances and Disease Registry
bpm	Beats Per Minute
BCSP	Board of Certified Safety Professionals
°C	Degrees Celsius
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CO	Contracting Officer
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
dba	Decibels, A-weighted
Daily Logs	Daily Log
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
EKG	Electrocardiogram
EPA	Environmental Protection Agency
EZ	Exclusion Zone
°F	Degrees Fahrenheit
FID	Flame Ionization Detector
FM	Factory Mutual
FR	Federal Register
GFCI	Ground Fault Circuit Interrupter
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HEPA	High Efficiency Particulate Aerosol
HIV	Human Immunodeficiency Virus
HS	Health and Safety
IDLH	Immediately Dangerous to Life and Health
IIPP	Injury and Illness Prevention Plan
IR	Installation Restoration Site
LEL	Lower Explosive Limit
μCi	Micro Curies
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety and Health
NRR	Noise Reduction Rating
NWT	New World Technology
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer

PEL	Permissible Exposure Limit
PID	Photo ionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
ppm	Parts per Million
PS	Project Supervisor
ROICC	Resident Officer In Charge Of Construction
SHSO	Site Health and Safety Officer
SHASP	Site Health and Safety Plan
SIR	Safety Inspection Report
TBA	To Be Announced
TSM	Tailgate Safety Meeting
UL	Underwriter's Laboratory
USA	Underground Services Alert
USCOE	U.S. Army Corps of Engineers
USN	U.S. Navy
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WBGT	Wet Bulb Globe Temperature



## Disclaimer

The enclosed Site Health and Safety Plan (SHASP) has been designed for the methods presently contemplated by New World Technology (NWT) for execution of the proposed work. Therefore, the SHASP may not be appropriate if the work is not performed by or using the methods presently contemplated by NWT.

In addition, as the work is performed, conditions different from those anticipated might be encountered and the SHASP may have to be modified. Therefore, NWT makes no representations or warranties as to the adequacy of the SHASP, except for warranties specifically stated in the SHASP itself.

# 1.0 Introduction

## 1.1 Objective

The objective of this Site Health and Safety Plan (SHASP) is to ensure that safe working conditions exist during the work activities at the Alameda Point, formerly Naval Air Station, Alameda, California (NAS, Alameda) project. The safety procedures outlined have been established based on preliminary analysis of potential hazards within the site. This SHASP describes the health and safety requirements and procedures to be used while conducting fieldwork and includes:

- Responsibilities of persons on site;
- Training Program;
- Specific Work Procedures;
- Medical Surveillance Program;
- Hazard Control Program;
- Decontamination Procedures;
- Emergency Response Plan;
- Monitoring Program;
- Activity Hazard Analysis;

This document, in combination with NWT's Corporate Health and Safety Manual, also serves as the company's Injury and Illness Prevention Plan (IIPP).

## 1.2 Site and Facility Description

Alameda Point, formerly known as Naval Air Station (NAS), Alameda is located in the city of Alameda, California adjacent to the San Francisco Bay. The project will occur at two locations at the base, Installation Restoration (IR) Site 5 consisting of Building 5 and IR Site 10 consisting of Building 400. This section describes each of the buildings and structures of concern and summarizes the information relating to the levels of radiological contamination and any other hazards that may be encountered during the proposed operations. Appendix A contains a copy of the hospital route map and the site map with the two buildings and immediate surrounding structures located at the facility (Figures 1-1 and 1-2, respectively).

### **1.2.1 Building 5**

Building 5 was originally used for the painting of radium dials and for other dial refurbishing related radiological work. Initial surveys of the structure in 1995 revealed the possibility of radiological contamination in drains and related structures within the building. Subsequent to the closure of the facility, in 1996 additional surveys of the storm sewers were performed that confirmed radiological contamination in the sewer piping both inside the structure and continuing down stream outside the structure.

### **1.2.2 Building 400**

Building 400 was originally used for missile rework operations prior to the relocation of all Building 5 operations to this location. Surveys of the structure, performed in 1996, revealed radiological contamination in various spaces and in the drain system in the building. Further surveys of the exterior piping revealed one area of possible contamination in the industrial waste piping beyond the building perimeter.

### **1.2.3 Summary of Contaminates**

The following materials are suspected of being present in the work area:

- Radium 226 – Contaminate
- Hydrogen Sulfide - Evolved gas
- Diesel Exhaust - Heavy equipment
- Gasoline Exhaust – Heavy equipment, support equipment and vehicles
- Benzene - Fuel Component, heavy equipment
- Toluene - Fuel Component, heavy equipment
- Ethyl Benzene - Fuel Component, heavy equipment
- Xylene - Fuel Component, heavy equipment
- Nuisance Dust – Result of work activities

## **1.3 Policy Statement**

It is the policy of New World Technology (NWT) to provide a safe and healthful work environment for all its employees, subcontractors and clients. NWT considers no phase of the operation or administration to be of greater importance than the prevention of injury or illness. Safety takes precedence over expediency or shortcuts, and every reasonable step to reduce the possibility of injury, illness, or accident will be taken.

This SHASP prescribes the procedures that must be followed during fieldwork associated with the NAS, Alameda project. Operational changes which could affect the health or safety of personnel, the community, or the environment will not be made without the prior approval of the NWT Project Manager (PM), and the Health and Safety Manager.

The provisions of this SHASP are mandatory for all NWT personnel and subcontractors assigned to the project. NWT requires all visitors to the work site to abide by the requirements of this SHASP. The Health and Safety Manager will provide written addenda to this SHASP when changes

warrant. No changes to the plan will be implemented without prior approval of the Health and Safety Manager or his authorized representative, and acceptance by the Resident Officer in Charge of Construction (ROICC) assigned to the project.

#### **1.4 References**

This SHASP complies with Federal Occupational Safety and Health Administration (OSHA), California Department of Occupational Safety and Health (CalOSHA or Cal DOSH), United States Environmental Protection Agency (EPA), and certain U.S. Army Corps of Engineer (USCOE) regulations. This SHASP follows the guidelines established in the following documents:

- Standard Operating Safety Guidelines (EPA, June 1992);
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities; Department of Health and Human Services (DHHS), National Institute of Occupational Health and Safety (NIOSH), Environmental Protection Agency (EPA), and U.S. Coast Guard (USCG) Publication No. 86-116;
- Title 29 of the Code of Federal Regulations (CFR), Parts 1910 and 1926;
- Title 8, Division 1, Chapter 4, Subchapter 7 of the California Code of Regulations (CCR), General Industry Safety Orders (GISO)
- Title 22, Division 4, Division 4.5 of the California Code of Regulations (CCR), Environmental Health Standards for the Management of Hazardous Waste
- U.S. Army Corps of Engineers Safety and Health Requirements Manual (USCOE 385-1-1, September 1996);
- NWT Corporate Health and Safety Manual.

The contents of this SHASP are consistent with, or supplement, the NWT Corporate Health and Safety Manual. All applicable provisions of the manual will also be followed during this project. A copy of the Corporate Health and Safety Manual will be maintained at the job site by the Site Health and Safety Officer (SHSO). All NWT employees and subcontractors must follow the facilities' fire, safety, and traffic regulations, all applicable federal, state, and local regulations, as well as the US Army Corps of Engineers (USCOE) Safety and Health Requirements Manual (EM385-1-1).

## 2.0 Responsibilities

### 2.1 All Personnel

Each person is ultimately responsible for their own health and safety, for completing tasks in a safe manner and for reporting any unsafe acts or conditions to his/her line supervisor and the Project Supervisor (PS). All persons on-site are responsible for continuous adherence to health and safety procedures during the performance of any project work. In no case may work be performed in a manner that conflicts with the intent of, or the inherent safety precautions expressed in, this SHASP. After due warning, persons who violate procedure and work rules may be dismissed from the site, terminated, or have their contract revoked. Blatant disregard or repeated infractions of health and safety policies are grounds for disciplinary action up to, and including, dismissal, and/or removal from the work area.

All NWT and subcontractor personnel are required to read and acknowledge their understanding of this SHASP. All project personnel are expected to abide by the requirements of this SHASP and cooperate with project management in ensuring a safe and healthful work site. Site personnel are required to immediately report any of the following to the PS:

- Accidents and injuries, no matter how minor;
- Unexpected or uncontrolled release of chemical substances;
- Any signs or symptoms of chemical exposure;
- Any unsafe or malfunctioning equipment; and
- Any changes in site conditions that may affect the health and safety of project personnel.

In addition to reporting these situations, any employee may halt an activity that, in their judgement, constitutes an Immediately Dangerous to Life and Health (IDLH) situation.

### 2.2 Project Manager

The Project Manager (PM) has overall responsibility for the health and safety of all personnel on the project. The PM's responsibility with regard to health and safety is to maintain company policy and resolve health and safety issues with the assistance and guidance of the Health and Safety Manager. The PM will provide the Health and Safety Manager with the company name and representatives of those contractors being considered for hire, as well as those hired, to allow required preliminary information to be collected in a timely manner.

The PM is responsible to:

- Notify the Health and Safety Manager when field operations begin so that field support can be scheduled;
- Insure that the SHASP is read and signed by all field personnel on the project, including subcontractors. The Health and Safety Manager and the PM must also sign the SHASP;
- Ensure that all provisions of the SHASP are followed. Contact the Health and Safety Manager for any variances or modifications desired;
- Demonstrate a personal commitment to safety on the project;
- Ensure that tailgate safety meetings are conducted daily, signed by all field workers and reviewed by the PS and the PM;
- Ensure that Daily Log (DL) forms are completed for each day of operations, signed and dated by the author, and that all persons listed have signed the SHASP and tailgate safety meeting forms;
- Have supervisors inspect the project at least weekly, with inspections and corrective actions documented on Daily Logs forms;
- Ensure correction of any reported or observed safety hazard;
- Ensure employees are trained on the hazards of any hazardous substances used. MSDSs must be on-hand for all hazardous materials (other than wastes) and containers must be properly labeled;
- Ensure that project safety equipment is inspected regularly (monthly for fire extinguishers);
- Report all near miss, injury, illness and vehicle accident incidents to the Health and Safety Manager and the Resident Officer In Charge Of Construction (ROICC) within 24 hours and ensure that a Safety Inspection Report (SIR) form is initiated. Accidents resulting in a fatality or inpatient hospitalization of an employee must be reported within 8 hours. The ROICC will be notified and be given a copy of the SIR and any follow on inspection documents;
- Notify the Health and Safety Manager when field work lasts more than six months so that the SHASP can be reviewed and updated as needed;
- Immediately notify the Health and Safety Manager and the ROICC upon receiving notice of any regulatory agency inspection;

- Ensure that the project files receive copies of:
  - All internal and external Health and Safety correspondence
  - All air sampling records (including “none-detected”)
  - All accident reports and SIR documentation
  - Documentation of audits and corrective actions
  - All Daily Logs.
- The PM must have completed the Hazardous Waste Supervisor’s 8 Hour course.

The PM will perform at least one site safety audit per month while field activities are conducted and will ensure that all accidents, incidents and/or near-misses are investigated in a timely manner. The PM will ensure that management performs an investigation of all incidents or accidents that have the potential to cause a lost-time or hospitalization incident or fatality within 24 hours of the incident.

The PM for this project is William Haney.

### **2.3 Health and Safety Manager**

The Health and Safety Manager is responsible for the preparation and modification (as necessary) of this SHASP. The Health and Safety Manager will approve changes and update the SHASP as warranted by altered site conditions and shall have the only authorization to effect such changes (except those changes outlined in the Emergency Response Plan). The Health and Safety Manager will advise the PM on health and safety issues that may have an impact on project operations. In addition, the Health and Safety Manager is responsible to:

- Oversee and review the work of the Site Health and Safety Officer (SHSO);
- Administer the general Health and Safety Program;
- Provide technical assistance to the PM and the PS;
- Investigate significant accidents, illnesses and near misses. Recommend corrective actions as appropriate. Review all Safety Inspection Reports (SIR);
- Establish the required personal protective equipment for each work area;
- Assist the PS and SHSO in establishing decontamination area locations;
- Evaluate and approve contractors regarding health and safety compliance both prior to accepting the contract and upon completion of the project, as appropriate; and

- Establish proper employee exposure monitoring and assess the appropriateness of protective measures.

The NWT Health and Safety Manager is Mark Divoky.

## **2.4 Project Supervisor**

The Project Supervisor (PS) reports to the PM and is responsible for field enforcement of the SHASP. This includes communicating project health and safety requirements to all on-site project personnel (both NWT and subcontractor personnel), consulting with the Health and Safety Manager regarding changes to the SHASP, and conducting periodic health and safety inspections with the SHSO. The PS is responsible for informing the Health and Safety Manager and the PM of any changes to the work plan, prior to implementation, so that health and safety issues introduced by those changes may be properly addressed. The PS will be on-site during all project-related activities. If the PS must leave the site, the PM will designate the responsibilities of the PS to a qualified alternate supervisor [i.e., person(s) having 8-hours of hazardous waste operations supervisory training per 8 CCR 5192 (e)(3)(A).]

Other responsibilities include:

- Reading and being familiar with the Project SHASP, as well as appropriate NWT Policies and Procedures;
- Directing work so as to ensure personnel safety and protection of property and the environment;
- Presiding at tailgate safety meetings (a shared responsibility by the SHSO);
- Providing all required safety supplies to work crews prior to each task;
- Demonstrating a personal commitment to safety on the project;
- Observing project personnel for signs of chemical or physical trauma;
- Conducting job site safety audits with the SHSO at least weekly;
- Immediately notifying the PM and Health and Safety Manager upon receiving notice of any job site inspection by a regulatory agency;
- Correcting any hazards disclosed by project workers or the SHSO;
- Rendering appropriate disciplinary action to individuals who do not strictly adhere to the project SHASP;

- Immediately notifying the PM, Health and Safety Manager, and the SHSO of any illnesses, accidents, injuries, or near-misses related to the project, and submitting appropriate documentation to the Health and Safety Manager with 24 hours;
- Assist the Health and Safety Manager and/or SHSO in establishing appropriate site control zones; and
- The PS must have completed the Hazardous Waste Supervisor's course.

The NWT Project Supervisor is Dan Spicuzza. A qualified alternate supervisor designated by the PM will be available in case the PS is temporarily away from the job site (due to illness or other emergency).

### **2.5 Site Health and Safety Officer**

The Site Health and Safety Officer (SHSO) will represent the Health and Safety Manager on-site during field activities. As such, the SHSO will be responsible for providing independent surveillance of the routine implementation of the project SHASP. The SHSO may not, however, authorize changes to or variances from the SHASP. The Health and Safety Manager must approve any modifications of the project SHASP with written concurrence of the ROICC, the Contracting Officer's representative.

Other duties of the SHSO include:

- Immediately stopping work if Immediately Dangerous to Life or Health (IDLH) or other extremely hazardous conditions are encountered;
- Verifying that all personnel has the necessary training and medical clearance prior to entering the site;
- Identifying all site personnel with medical restrictions to the PS;
- Determining that monitoring equipment is properly calibrated and used, and that the results are properly recorded and filed;
- Providing guidance to the Project Administrator for purchasing safety related equipment;
- Informing the Health and Safety Manager of significant changes in either the environment or work procedures which may require modification of the SHASP;
- Observing work party members for symptoms of on-site exposure or stress;

- Overseeing implementation of the SHASP, reporting any deviations from the Plan, regardless of the potential to adversely impact the health and safety of the employees, to the PS and the Health and Safety Manager;
- Immediately notifying the PS of any unsafe conditions observed and providing technical guidance to the PS for the correction of the condition;
- Recording daily weather conditions as part of the HS logs maintained at the site;
- Conducting employee exposure monitoring for workplace contaminants, noise and/or heat stress as outlined in Section 8;
- Monitoring the use of required protective clothing and safe work practices;
- Recording on the Entry Log forms the names of all personnel who enter the Exclusion Zone (EZ) or Contamination Reduction Zone (CRZ);
- Determining and posting routes to capable medical facilities and emergency telephone numbers (including poison control center), and arranging emergency transportation to medical facilities;
- Notifying local public emergency officers of the nature of the operations, and posting of their telephone numbers in an appropriate location;
- Conducting and documenting required project specific training;
- Conducting job site safety audits at least daily;
- Ensuring that training and medical records are maintained on-site for all NWT and subcontractors personnel;
- Monitoring project personnel to ensure ongoing compliance with the SHASP;
- Assisting the PS in establishing appropriate Work Zones;
- Presiding at tailgate safety meetings (a shared responsibility by the PS) and maintaining attendance records;
- Monitoring that decontamination procedures are meeting established criteria;
- Acting as Project Hazard Communication Coordinator as required by 8 CCR 5194;
- Responding to employee's/contractor's health and safety concerns;

- Periodically auditing subcontractor qualifications to ensure only properly qualified personnel are allowed in the work area;
- Ensure employees are trained on the hazards of any hazardous substances used. MSDSs must be on-hand for all hazardous materials (other than wastes) and containers must be properly labeled;
- Ensure that all safety equipment on site is periodically inspected (monthly for all fire extinguishers); and
- The SHSO must have completed the Hazardous Waste Supervisor's course.

The NWT Project Site Health and Safety Officer is Mark Divoky, who also serves as the Corporate Health and Safety Manager for New World Technology. The Project Manager, with the concurrence of the Health and Safety Manager, will designate another suitable project worker to act as alternate SHSO in case the primary SHSO cannot be on site (due to illness or other emergency).

## **2.6 Subcontractor Management and Personnel**

Subcontractor management is responsible for the compliance of their personnel with this SHASP. Since subcontractors are hired for their specific expertise, they must assume primary responsibility for the health and safety of their personnel. The subcontractor's Field Supervisor or Crew Leader will also be responsible for performing a weekly safety inspection of their operations. A copy of this inspection must be submitted to the PS each week. If the subcontractor personnel will be performing work within either the Exclusion Zone (EZ) or Contamination Zone (CRZ), the subcontractor's Field Supervisor must have successfully completed 8 hours of Hazardous Waste Supervisory training per 8 CCR 5192 (e)(4).

Subcontractors must also:

- Comply with all applicable Occupational Safety and Health Administration (OSHA) regulations as defined in 29 CFR 1910 and 1926, 8 CCR and 22 CCR, as well as the United States Army Corps of Engineers "Safety and Health Requirements Manual" (EM 385-1-1).
- Perform all work in accordance with this SHASP.
- If the work will be performed in the EZ or CRZ, provide documentation for each on-site worker of successful completion of 40 hours training in health and safety practices for hazardous waste operations per 8 CCR 5192 (e)(3)(A). This must be received prior to the employee starting work on the site.

- For work in the EZ or CRZ, provide documentation for each on-site worker of a doctor's approval for the worker to perform hazardous waste remediation work based on an annual medical exam and work history review prior to the worker arriving on site.
- Provide updated documentation as on-site individuals complete annual HAZWOPER refresher training and/or receive annual medical examinations for workers entering the EZ or CRZ. Such documentation must be provided prior to the expiration date of the previous year's training/physical examination.
- Provide their own personal protective equipment (including safety boots, safety glasses, hard hats, respirators, protective clothing and the like), unless otherwise specified in the contract documentation.
- Report all incidents/accidents/injuries/near-misses immediately to the PS. Provide input to NWT's investigation of any mishap or near miss. Provide documentation to NWT of the subcontractor's internal investigation of the mishap/near miss.
- Provide proof of additional (non-HAZWOPER) training upon request (e.g., documentation of forklift training, confined space entry, heavy equipment operation). If the requested documentation is not provided, the subcontractor's personnel may not be permitted to perform the work on site that is covered by the required additional training.
- Submit to the Health and Safety Manager a task-specific hazard analysis for their anticipated work.
- Provide awareness level training to affected NWT workers regarding any material, equipment or operation which may pose a hazard to the NWT employees.
- Provide a Material Safety Data Sheet (MSDS) to NWT for all materials used on the project which are regulated by the Hazard Communication Standard (8 CCR 5194). NWT shall approve MSDSs prior to the material being brought on site.
- Notify NWT in writing prior to bringing any radioactive materials or devices (e.g., nuclear density gauges) onto the job site. Such notification must identify by name the subcontractor's Radiation Safety Officer and list the company's radioactive material license number. A federal license or proof of reciprocity to work on a federal installation must be provided.
- Provide own first aid kits and first aid trained individuals (minimum 2 per crew).

- Have in place an active and effective Drug Free Workplace Program in compliance with the Federal Drug Free Workplace Act.
- Provide written notification to subcontractor's own employees of the results of any industrial hygiene monitoring conducted by NWT on those employees.
- Immediately inform the NWT Project Supervisor of the presence, or anticipated presence, of regulatory agency officials at the job site. Provide documentation to NWT of any citations or notices of violation issued to the subcontractor for work on, or associated with the project. Such documentation shall include a copy of the written citation and a summary of the subcontractor's corrective action plan.

### **2.7 On-Site Personnel and Visitors**

No visitor will be allowed within the Work Zones without authorization from the PM and the PS. Visitors requesting authorization to enter the Contamination Reduction Zone (CRZ) or Exclusion Zone (EZ) must meet the requirements established for Project Personnel, including appropriate medical exams and training. On-site Navy personnel will also be held to these requirements.

## **3.0 Project Hazard Analysis**

### **3.1 Scope of Work**

The NAS, Alameda project will encompass the removal and replacement of storm sewer lines located in and around Buildings 5 and 400. The lines have been shown to be contaminated with Radium 226 and will be removed, cleaned and replaced in their entirety. Wastes generated will be packaged for shipment and disposal. Additional work will include to investigation of a sewer line recently discovered that has no known terminus.

### **3.2 Activity Hazard Analysis**

The activity hazard analysis identifies potential safety, health, and environmental hazards and provides for the protection of personnel, the community, and the environment. Because of the complexity and constant change of remediation projects, supervisors must continually inspect the work site to identify hazards that may harm site personnel, the community, or the environment. The PS must be aware of these changing conditions and discuss them with the PM, the Health and Safety Manager, and the SHSO. The Project PS will keep supervisors for subcontractors informed of the changing conditions. Changes to the hazard analysis may be originated by the SHSO, but must be approved by the Health and Safety Manager. Appendix D contains an activity hazard analysis for each major task associated with this project and is supplemented by the following sections. Tasks to be performed during this project include:

- Mobilization/Demobilization
- Site Preparation
- Saw cutting and Concrete Removal
- Excavation of Non-Contaminated Overburden
- Excavation of Possibly Contaminated Materials
- Excavation of Contaminated Materials
- Pipeline Cleaning
- Pipeline Removal
- Drilling
- Soil & Water Sampling
- Contaminated Waste Packaging

- Pipeline Replacement
- Equipment Decontamination
- Backfill and Site Restoration

The following sections detail hazards likely to be faced by project personnel engaged in site activities.

### **3.2.1 Materials Handling**

Loading and unloading materials such as visqueen, sampling supplies, and decontamination equipment present a variety of hazards. These include cuts and abrasions from sharp objects, back injuries from poor lifting techniques, as well as setting up and dismantling equipment, crushing injuries from falling or moving loads, pinch points, and being struck by moving equipment or loads. The following fundamentals address the proper lifting techniques that are essential in preventing back injuries:

- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weights over 60 pounds. Multiple employees or the use of mechanical lifting devices are required for objects over the 60-pound limit.
- The anticipated path to be taken by the lifter should be inspected for the presence of slip, trip, and fall hazards.
- The feet will be placed far enough apart for good balance and stability (typically shoulder width). **THE FOOTING MUST BE SOLID.**
- The worker will get as close to the load as possible. The legs will be bent at the knees.
- The back will be kept as straight as possible and abdominal muscles should be tightened.
- To lift the object, the legs are straightened from their bending position.
- A worker will never carry a load that cannot be seen over or around.
- When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered.

When two or more workers are required to handle the same object, coordination is essential to ensure that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, will face the direction in

which the object is being carried. In handling bulky or heavy items, the following guidelines will be followed to avoid injury to the hands and fingers:

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

Site operations shall be organized to minimize the amount of drum and container movement. All employees involved in the transfer of drums or containers shall be warned of the potential hazards associated with the contents of the drums or containers during tailgate safety meetings prior to beginning transfer operations. Tailgate safety meetings should also include information on safe handling techniques, including:

- Proper lifting techniques, back injury prevention;
- Procedures and equipment used to minimize sources of ignition during transfer operations;
- Positioning of drums and containers to minimize obstruction of the work site; and
- Employees are not to stand upon or work from drums or containers at any time.

U.S. Department of Transportation (DOT) specified salvage drums or containers and adequate quantities of proper absorbent shall be kept available and utilized in areas where spills, leaks or ruptures may occur. Drums or containers that cannot be moved without rupture, leakage or spillage shall be emptied into a sound container using the appropriate device for the type of material being transferred (i.e. explosion proof construction, compatible seal and diaphragm materials, etc.).

### **3.2.2 Compressed Gas Cylinder Handling**

Damage to compressed gas cylinders can result in the release of toxic substances, rupture of the cylinder or rocket-like activity. All project workers should be informed of the proper storage and handling procedures for compressed gas cylinders, including:

- Cylinders are to be stored only in designated areas away from corrosives and heat.
- Stored cylinders should be segregated by type of material contained. Cylinders containing flammable substances should be separated from those containing oxidizers by a distance of at least 25 feet, or by a noncombustible barrier 5 feet high.

- All cylinders must be clearly labeled.
- Full cylinders shall be stored separately from empty cylinders, and should be arranged so that older stock is placed in the most accessible location(s).
- Cylinder caps will be in place at all times during storage and transport.
- Cylinders shall be stored and utilized in an upright position, and secured to prevent falling with chain or rope. The area around and above each cylinder should be clear of potential falling objects.
- Inspect cylinders and lines prior to use. Lines must be tested for leaks with soapy water.
- Do not use any cylinder that shows signs of damage, including rust, corrosion, deep dents or unusual sounds.
- Cap and secure cylinders to the hand truck or other vehicle during transport.
- Remove cylinder caps by hand or with a friction wrench.

### **3.2.3 Vehicle Traffic**

Vehicle operators will check carefully for nearby traffic before proceeding at a cautious pace on facility roadways. Unless otherwise marked, speeds should be held to 15 mph or less while on site.

Care should be taken to ensure that vehicles, equipment and materials are placed in a manner that keeps obstruction of local traffic to a minimum. During work activities, it may become necessary to move equipment in order to accommodate traffic and site activities.

Workers on foot should not wander into the active roadways. If work in active traffic areas is required, workers will wear bright orange safety vests, and the work zone will be marked with barricades, cones, and/or caution tape to warn traffic.

Where traffic control is necessary, base representatives will be contacted to ensure minimal disruption of base activities. When the base cannot provide traffic control officers, project workers may do so using high visibility road vests, hand-held stop signs and traffic cones.

### **3.2.4 Chemical Hazards**

Health effects along with routes of exposure for health significant site contaminants are detailed in the following paragraphs:

**Radium** – Radium is a radioactive metal with a melting point of 1700 °F. It is highly radioactive, one gram produces 37,000,000,000 disintegrations per minute (dpm). Radium can enter the body through inhalation, ingestion, or injection (cuts, wounds, abrasions, etc.) Radium replaces the calcium in the bone structure and is a source of irradiation to the blood forming organs. Radon gas is a radioactive daughter product of the natural decay of radium. Both radium and radon are known human carcinogens.

**Benzene** - Benzene will cause local irritation to the skin, eyes, and respiratory tract and may cause redness, dryness and scaling of the skin due to defatting. Acute systemic effects include headache, dizziness, convulsions, coma and death may occur due to effects on the heart. Chronic exposures effect the blood-forming tissues primarily, resulting initially in increases in blood cell counts followed by aplastic anemia with an overactive or under active bone marrow. Epidemiological studies have linked benzene with leukemia and it is classified as a suspected human carcinogen.

**Ethylbenzene** - Ethylbenzene will cause local irritation to the skin, eyes, and respiratory tract and may cause defatting, drying and scaling of the skin. Acute systemic effects include headache, dizziness, nausea, loss of appetite, lassitude and eventual coma if exposure is prolonged. Ethylbenzene does not display the effects on the blood forming tissues seen with benzene and is not classified as a carcinogen in humans or animals. Chronic exposures can result in effects on the liver, kidneys and central nervous system.

**Hydrogen Sulfide** – Hydrogen sulfide is a gas that, in high concentrations can cause fatigue to the sense of smell (odor disappears even though the material is still present.) Inhalation of hydrogen sulfide at low concentrations can cause respiratory tract irritation, headache, dizziness, nausea, vomiting, and loss of coordination. Higher concentrations can cause coma and death within a matter of seconds. When removed from the exposure area, affected persons usually recover the ability to smell the material within a matter of hours.

**Toluene** - Toluene will cause local irritation to the skin, eyes, and respiratory tract and may cause defatting, drying and scaling of the skin. Acute systemic effects include headache, dizziness, nausea, loss of appetite, lassitude and eventual coma if exposure is prolonged. Toluene does not display the effects on the blood forming tissues seen with benzene and is not classified as a carcinogen in humans or animals. Chronic exposures can result in effects on the liver, kidneys and central nervous system.

**Xylene** - Acute effects of xylene exposure include skin and mucous membrane irritation, central nervous system effects, and respiratory irritation leading to pulmonary congestion, edema, and hemorrhage. Inhalation exposure can also lead to liver and cardiac damage. Chronic exposure can result in effects on the liver, kidneys and central nervous system and may have an effect on the blood forming tissues. No carcinogenic effects have been documented; possible teratogenic effects have been observed.

Table 3-1 details the chemical specific information for each of the species detailed above.

### ***Other Contaminants***

Activities required during the project may result in some slight exposure of site workers and visitors to contaminants at very low concentrations.

During on-site activities, all personnel will wear appropriate protective clothing whenever the possibility for contact with contaminated soil or groundwater exists (see Section 5.0). If respiratory protection is required, only NIOSH approved non-disposable respirators may be worn. Disposable respirators are not permitted.

Material Safety Data Sheets (MSDSs) will be provided on-site for each hazardous material (other than waste) brought on-site. MSDSs are found in Appendix B.

### **3.2.5 Exposure Standards**

Threshold Limit Values (TLVs), Recommended Exposure Limits (RELs) and Permissible Exposure Limits (PELs) refer to airborne concentrations of substances which represent conditions that nearly all employees may be repeatedly exposed to day after day without adverse effect. The TLVs are prescribed by the ACGIH and are based upon the best available information obtained through industrial experience and animal or human studies. RELs are based upon a combination of industry and government research by NIOSH on industrial exposure to chemical contaminants. The PELs are prescribed by OSHA and have the effect of law. They are the minimum levels that must be followed for worker protection. Due to the wide variation in individual susceptibility, a small percentage of workers may experience discomfort from some substances at concentrations below these values. It has been policy to use the stricter of these three exposure standards for good hygienic practices; however, whenever applicable, even stricter guidelines may be utilized.

Currently, exposure levels to pesticides and other chemical substances are regulated by OSHA and recommended by the ACGIH and NIOSH. These exposures are based upon the time-weighted average (TWA) concentration for a normal 8-hour workday and a 40-hour workweek. Several chemical substances have short-term exposure limits (STEL) or ceiling values, which allow a maximum concentration to which workers can be exposed continuously for a short period of time without suffering from irritation, chronic or irreversible tissue damage, narcosis of a sufficient degree to result in accidental injury, impaired self-rescue abilities, or substantially reduced work efficiency.

The STEL is defined by the ACGIH as a 15-minute TWA exposure that should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA. Exposure above the TLV-TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per 8 hour work shift. There should be at least 60 minutes between successive exposures in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed biological effects. OSHA requires that a 15-minute "Ceiling" concentration never be exceeded for that chemical constituent. This notation appears as the letter "C" after the chemical name. Table 3-2 contains the exposure guidelines for identified health significant contaminants.

### 3.2.6 Drilling Hazards

All persons involved in drilling activities on the sewer pipeline investigation at Buildings 5 and 400 must be aware of the potential for equipment contacting any overhead power lines. Additionally, underground utilities, including water, gas and electrical lines, may be present. The potential for electrocution, equipment damage and disruption of services for residents and businesses exists. Equipment should be oriented to minimize the potential for contact with the lines. Drill rigs must maintain a minimum 20-foot clearance from the overhead lines at all times. If drilling operations must be performed closer than 20 feet from overhead power lines, the Health and Safety Manager must be notified. When clearance to proceed is received from the Health and Safety Manager, the electric utility company must be contacted to turn the power off or physically insulate (protect) the lines until the drilling is finished.

While the rig is being positioned and readied for use, the operator must be completely within the operator's area and no one else shall be permitted to touch the rig until it has been secured. Any vehicles bearing drill rigs or stationary equipment should have the wheels chocked and the parking brake set to prevent accidental movement. Operation and maintenance of the drill rig also presents the hazards of getting caught in or struck by moving parts of the machinery.

Prior to the start of work, the drilling subcontractor will inspect all drilling equipment in the presence of the PS and the SHSO. The inspection will be documented in the field records. If field operations last longer than one week, the drilling equipment inspection must be repeated on a weekly basis.

The location of underground utilities must be ascertained and confirmed prior to the start of drilling operations. In addition to obtaining the utility locations from the client, local utilities, or Underground Services Alert (USA), or a qualified subcontractor, will make a utility survey of each drilling point. The utility survey shall be performed using such equipment that the utility location contractor determines as appropriate. This equipment may include a magnetometer or a ground penetrating radar. Documentation that nearby utilities have been marked on the ground, and that the drill site has been cleared shall be in the possession of the PS (or qualified designee) and the SHSO prior to commencement of the intrusive investigation at that point of the site.

All operations involving the use of powered drilling rigs will follow generally accepted drilling practices. One person will be assigned the responsibility of Lead Driller. Additional personnel will assist with equipment as needed. The Lead Driller will be responsible for operating the drilling rig and ensuring safety.

General rules associated with drilling rig operations will be as follows:

- An "Exclusion Zone" will be established around the drilling rig using barricade tape physical barrier;

- All operators and crewmembers will be familiar with the rig operations and will have received practical training;
- Procedures for equipment and tool chemical and radioactive decontamination will be followed;
- Hard hats are required when working within the drilling rig work zone;
- Goggles or safety glasses with side shields will be worn when operating power tools, sanding, grinding, hammering, or filing;
- No loose fitting clothing, jewelry, or free long hair is permitted near the drilling rig or moving machinery parts;
- Hands and loose clothing must be kept away from moving parts of the machinery;
- Drilling must cease immediately if combustible gas concentrations greater than 10 percent of the Lower Explosivity Limit (LEL) are detected at the borehole;
- A first aid kit and fire extinguisher will be available nearby at all times;
- If lubrication fittings are not accessible with guards in place, machinery must be stopped for oil and greasing;
- Rigging equipment for material handling should be checked prior to use on each shift and as often as necessary to ensure it is safe. Defective rigging shall be removed from service immediately;
- The area around the derrick ladder must be kept clear to provide unimpeded access to the ladder;
- Work areas and walkways must not be obstructed;
- The work area around the borehole shall be kept free of obstructions, and free of undue accumulation of oil, water, ice or circulating fluids;
- No drilling will occur during impending electrical storms or tornadoes, or when rain, ice, snow, or wind conditions create undue potential hazards;
- One worker shall not lift auger flights by himself or attempt to carry equipment or materials of excessive weight;

- The driller will not attempt to reach a well or borehole location in a manner that compromises the safety of the rig or crew;
- The drill crew to ensure that a stable surface exists will inspect all well or borehole locations;
- The drill rig will be properly blocked and leveled prior to raising the mast;
- The drill rig shall be driven or moved only after the mast has been lowered; and
- The leveling jacks shall not be raised until the derrick is lowered.

When drilling is to be conducted in contaminated soil, appropriate monitoring shall be conducted to assess worker exposure as well as effectiveness of control measures. Monitoring to be conducted will be specified in the SHASP. Additional PPE may be required during these conditions.

### ***3.2.6.1 Hoisting Operations***

The following procedures shall be followed during hoisting operations:

- Drillers must never engage the rotary clutch without watching the rotary table, and ensuring it is clear of personnel and equipment;
- Unless the drawworks is equipped with an automatic feed control, the brake must not be left unattended, without first being tied down;
- Drill pipe or casing must not be picked up suddenly;
- Drill pipe must not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrickman has signaled that he may safely hoist the pipe;
- During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller may be on the rig floor, and no one may be on the rig or derrick;
- The brakes on the drawworks of every drilling rig must be tested by each driller, when he comes on shift to determine whether they are in good order. The brakes must be thoroughly inspected by a competent individual each week;
- A hoisting line with a load imposed must not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact;
- Workers must never stand near the boring whenever any wire line device is being run;

- Hoisting control stations must be kept clean and controls labeled as to their functions; and
- Under no circumstances will personnel be permitted to ride the traveling block or elevators, nor will the catline be used as a personnel carrier.

### ***3.2.6.2 Catline Operations***

The following procedures shall be followed during catline operations:

- Only experienced workers will be allowed to operate the cathead controls. The kill switch must be clearly labeled and operational prior to operation of the catline;
- The cathead area must be kept free of obstructions and entanglements;
- The operator must not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted;
- Personnel must not stand near, step over, or go under a cable or catline which is under tension; and
- Employees rigging loads on catlines must:
  - Keep out from under the load,
  - Keep fingers and feet where they will not be crushed,
  - Be sure to signal clearly when the load is being picked,
  - Use standard visual signals only and not depend on shouting to co-workers, and
  - Make sure the load is properly rigged, since a sudden jerk in the catline will shift or drop the load.

### ***3.2.6.4 Derrick Operations***

The following procedures shall be followed during derrick operations:

- The derrick climber must be used whenever climbing the derrick. Personnel on the derrick must be tied off, or otherwise protected from falling when working in an unguarded elevated position;
- All stands of pipe and drill collars racked in a derrick must be secured with rope or otherwise adequately secured;
- Tools, derrick parts, or materials of any kind shall not be thrown from the derrick; and

The elevators must be properly clamped onto all pipe joints prior to the driller engaging the load.

### **3.2.6.5 Making and Breaking Joints**

The following procedures will be followed when making and breaking joints:

- Tongs shall be used for the initial making up and breaking of the joint. The rotary table shall not be used for the initial breaking of a joint.
- Employees making or breaking joints shall not be permitted to stand within the arc of the tong handles when the tong pull line is in tension. Employees shall handle the tongs only by the appropriate handles.
- Employees shall be trained in the safe use of spinning chains. Spinning chains must not be handled near the rotary table while it is in motion.

### **3.2.7 Excavation Procedures**

Excavation activities will occur in the sewer pipeline removal at Buildings 5 and 400. Excavation of soil is generally accomplished using heavy earthmoving equipment. This equipment introduces loud noise levels that may cause hearing loss, and may also present a risk of workers being struck by the machinery. Earthmoving equipment can also tip over if positioned improperly or overextended.

Falls can result from unbarricaded excavations. If workers must enter the excavation, they risk being engulfed or otherwise injured by moving soil unless the excavation is properly shored or sloped. Hazardous atmospheres can also be generated in and around excavations.

When performing excavation activities, the NWT Procedure HS 21.0 for excavation and trenching must be followed. A copy of this procedure along with all other NWT H&S Policies and Procedures will be maintained with the SHSO's field office. Any excavation four (4) feet deep or greater, into which persons will enter and perform work, must be shored, sloped, or otherwise made safe for entry. Excavations less than four (4) feet in depth and which a competent person examines and determines there to be no potential for cave-in do not require protective systems.

All excavations will be performed from a stable ground position. A competent excavation safety person, one who has received training in excavation safety, will make daily inspections of the excavation and who has been designated a competent excavation safety person by NWT. The competent person will determine the likelihood of a cave-in, and remedial action such as sloping or shoring will be taken if the walls appear to be unstable. The competent person will verify that adequate means of egress are available.

All excavated soils will be located at least 2 feet from the edge of the excavation to prevent it from falling back into the excavation. Perimeter protection will be used for all excavation activities at the

site, consisting of warning barricades or fencing placed at a distance not closer than 6 feet from the edge of the excavation and displaying adequate warning at an elevation of 3 feet to 4 feet above ground.

All project personnel will participate in the site-specific training session and be instructed on the following requirements.

- Before excavating, the existence and location of underground pipe, electrical equipment, and gas lines will be determined and documented. If the locations of any lines are in question, metal detectors will be used to positively locate all suspected lines.
- No ignition sources are permitted if the ambient airborne concentration of flammable vapors exceeds 10 percent of the lower explosive limit (LEL) during the excavation. A calibrated combustible gas indicator (CGI) will be used to make this determination.
- Operations must be suspended and the area vented if the airborne flammable concentration reaches 10 percent of the LEL in the area of an ignition source (i.e., sparks from bucket of excavator).
- Combustible gas readings of the general work area will be made regularly.
- If excavating equipment is located in the vicinity of overhead power lines, Table 3-4 will be used to determine safe working distances.
- Ladders will be provided and placed at an angle not more than 30 degrees from vertical, and secured as necessary. Ladder side rails will extend at least 3 feet above the ground surface.
- No one shall enter a trench, greater than four feet in depth, without proper shoring, sloping or benching in place. Entry into trenches and/or excavations also requires daily inspections by a competent person, continued supervision from outside the excavation, and atmospheric testing.
- Excavations greater than four feet in depth that require personnel to enter will have sufficient means of entry and egress (stairs, ladders, ramps). Means of entry/egress will not require personnel to travel laterally further than 25 feet.
- Excavations occurring within 3 feet of existing utilities will be performed by hand digging until the utility line is exposed.

- Crossing directly over the trench will be permitted only where approved walkways with handrails or sufficient trench plates are provided. All other traffic is to be directed around the trench, at a safe distance from the trench edges.
- The trench will be completely filled and compacted upon completion of the work.

### **3.2.8 Heavy Equipment**

Heavy equipment produces loud noise levels that may cause hearing loss, and may also present a risk of workers being struck by the machinery. Earthmoving equipment can also tip over if positioned improperly or overextended.

- Prior to use, all heavy equipment will be inspected. This inspection will be documented in the Daily Logs.
- Heavy equipment not being used in the excavation and trenching operations will be placed a sufficient distance from the trench so that their weight and/or movement does not weaken the excavation walls.
- Blades and buckets on heavy equipment will be lowered during transport and whenever the operator leaves the machine.
- Heavy equipment will have an audible reverse signal alarm that operates automatically with backward movement.
- The operator will check the condition of equipment each day before operating. This check will include brakes, clutches, steering mechanisms, hydraulic and electrical systems, and signs of abnormal wear.
- No worker will use a piece of equipment unless they are familiar with its operation and have been given a performance test by the PS.
- Personnel are not allowed to work off machine implements or to use them as ladders or scaffolds.
- Unauthorized riding on equipment or riding parts of equipment not intended for occupancy by either operator or passenger is prohibited.

### **3.2.9 Pressure Washing**

Pressure washing will be used for pipeline cleaning and possibly for equipment decontamination activities. Because of the significant hazard of cutting and injecting water into the body, refer to HS 23.0 Pressurized Water Cleaning and Cutting Equipment.

Training and providing the proper PPE is extremely important prior to using the pressure-washing unit. At a minimum, safety glasses, a face shield, and leg/metatarsal guards will be worn during all pressure washing activities regardless of the rated operating pressure of the unit being used.

### **3.2.10 Pipeline Identification and Location**

Prior to breaking ground, the areas will be marked for underground utilities and dig permits will be obtained from the Department of Public Works. In addition, an independent geophysical line locating advisory service, such as "Dig Alert," will be used to confirm the location of identified or marked underground utilities and to identify any unidentified, mismarked, and/or additional underground utilities.

Prevention of potential discharge is stressed as a high priority by project management. The primary spill risk is from the activities associated from the removal of the pipelines. To help prevent discharge, the pipeline will be pumped down to the maximum extent possible prior to removal.

Excavation of the pipeline will be conducted with the excavation sidewalls stabilized by sloping, benching, or shoring as appropriate. The excavated materials will be stored on visqueen at the site or moved to a designated contaminated soils stockpile area.

Immediately prior to removal, the pipeline ends will be temporarily sealed with plastic sheeting to prevent the possible spillage of contaminated sludge from the interior. The pipeline sections will be lifted from the excavation and placed on plastic sheeting prior to interior cleaning. All rinse materials generated will be collected and drummed prior to profiling for disposal. Once cleaned the interiors of the pipe sections will be surveyed for residual contamination. Should such contamination exist, the pipe section will be broken up with heavy equipment prior to being placed in the appropriate disposal containers.

### **3.2.11 Maintenance/Troubleshooting**

Equipment and machinery maintenance and troubleshooting work can expose project workers to contaminated materials and other hazards. Troubleshooting electrical and mechanical equipment can expose workers to shock hazards, and crushing or pinch hazards.

Whenever employees or subcontractors are working on equipment or in areas where the activation of the equipment or the charging of hazardous materials lines might endanger the worker's safety, lockout and tagout procedures (NWT Policy HS 20.0) are required. Should the project extend more than 30 days with lockout/tagout planned for more than seven calendar days, or when locking/tagging out specialized equipment having its own lockout requirements, the Health and Safety Manager shall be notified for an addendum to this SHASP.

### **3.2.12 Hand Tools**

Use of hand tools may expose workers to cuts, lacerations or puncture wounds if adequate hand protection is not worn or tools are improperly used or stored. Damaged hand tools may also expose employees to injuries from shattered tools and flying debris.

The following safe work practices apply to the use of hand tools:

- Only use a tool for its designed use.
- Do not use damaged tools.
- Driving faces of hammers, chisels, drift pins, bars, and similar tools must be inspected to eliminate mushroomed heads, broken faces and other defects.
- Tools must be returned to their proper storage place.
- Sharp tools must not be carried in pockets.
- Wood handles must be sound and securely wedged or fastened to the tool. Tape must not be used to cover defects such as cracks.
- When hand tools are being used overhead, those working or standing below must be notified.
- Pipe wrenches must be inspected regularly. Replace the heel and jaw sections if found to be defective or worn out.
- Pipe wrenches must not be used to bend, raise or lift pipe.
- Always wear safety glasses to protect the eyes.

### **3.2.13 Power Tools**

Power tools present many potential hazards, including shock and electrocution, injuries from accidental activation and injuries from using damaged or malfunctioning equipment.

When using power tools, the following precautions shall be followed:

- Power tools will be inspected and their operation tested prior to being placed in service.
- Eye protection (safety glasses or goggles) must be worn whenever operating power tools.
- Power tools must be grounded or of the double-insulated type.
- Power tools shall not be used in wet locations.

- A Ground Fault Circuit Interrupter (GFCI) must protect all power tools.
- Splicing, cutting or “repairing” electrical wire or extension cords by unauthorized personnel is prohibited.
- Plugs and cords must be protected from damage.
- Grounding plug pins are never to be removed.
- Electrical tools are not to be used inside a confined space without prior approval by the SHSO or Health and Safety Manager.
- All electrical tools must be turned off before connecting or disconnecting the power supply.
- Extension cords must be visually inspected each time they are used. Cords must be disconnected from the power source before coiling for storage.
- Extension cords used with portable electric tools shall be of three-wire type and shall be rated for hard or extra-hard usage (Types S, ST, SO, STO, SJ, SJO, SJT, or SJTO).

### **3.2.14 Ladders**

The use of ladders on the project can expose employees to injuries from falls and falling objects, in addition to electrocution hazards.

The following rules apply to all ladders used on the project.

#### ***3.2.14.1 Safe Ladder Design***

- Rungs must be spaced 12 inches apart vertically.
- Width of ladder must not be less than 15 inches nor more than 20 inches.
- Stepladders must not exceed 20 feet in length. (Use of such ladders taller than 12 feet is not anticipated.)
- Cleat ladders must not exceed 30 feet in length. Double cleat ladders are required for two-way traffic or when used by 25 or more employees.
- Extension ladders shall not exceed 44 feet in length. (Such lengths are also not anticipated.)

- The overlapping section of extension ladders shall not be less than 10 percent of the working length.
- All ladders must have a warning sign prohibiting standing on the top step.

### ***3.2.14.2 Safe Ladder Use***

- Do not stand on the top 3 rungs of ladders unless you are protected by a safety belt.
- Remove damaged ladders from use. Tag with "DO NOT USE."
- Do not place ladders where they can be accidentally struck or displaced.
- Secure ladders in use against displacement.
- Extend ladder side rails at least 3 feet above the landing, unless handholds are provided.
- Place ladders outward at approximately 7:1 pitch.
- Do not place planks on top (cap) of stepladders.
- Do not splice ladders together.
- Do not use metal ladders for electrical work or near live electrical parts.
- Mark portable metal ladders:

#### **CAUTION - DO NOT USE AROUND ELECTRICAL EQUIPMENT**

- Portable ladders must be inspected prior to each use for cracks, splits, loose rungs, etc.
- Portable metal or aluminum ladders must be equipped with non-skid feet.
- Wooden portable ladders must not be painted.
- Ladders must not be used in a horizontal position as a scaffold.
- Portable ladders must be secured in place. If not possible, the ladder must be held by another person.
- Heavy, bulky tools and material must be hoisted up separately. Light tools, equipment, etc., must be attached to one's person.

- Personnel must not reach beyond arm's length of the side rails of a ladders to gain better access. The ladder must be moved.
- Only one person is allowed on a ladder at any given time.

### **3.2.15 Forklift Operations**

Forklifts may be required for materials movement during project activities. Forklifts present the potential for damage to equipment or materials due to impaling or striking personnel or materials with the forklift. Additionally, forklifts may tip if they are incorrectly loaded, driven at excessive speeds or operated with the forks too high.

The following rules apply whenever a forklift is used on the project:

- The rated lifting capacity must be posted in a location readily visible to the operator.
- A forklift truck must not be used to elevate employees unless a platform with guardrails, a back guard, and a kill switch are provided on the vehicle. NOTE: When guardrails are not possible, safety belt protection is required.
- The PS must post and enforce a set of operating rules for forklift trucks.
- Only trained and authorized drivers will operate forklifts.
- Stunt driving and horseplay are prohibited.
- Passengers or riders on forklifts are prohibited.
- Employees must not ride on the forks.
- Employees must never be permitted under the forks (unless forks are blocked).
- The driver must inspect the forklift once a shift and document this inspection.
- The operator must look in the direction of travel and must not move the vehicle until all persons are clear of the vehicle.
- Forks must be carried as low as possible.
- The operator must lower the forks, shut off the engine, and set the brakes (or block the wheels) before leaving the forklift operator's position unless maintenance or safety inspections require the forklift to be running.

- Trucks must be blocked and have brakes set when forklifts are driven onto their beds.
- Extreme care must be taken when tilting elevated loads.
- Every forklift must have operable brakes capable of safely stopping it when fully loaded.
- Forklifts must have parking brakes and an operable horn.
- When the operator is exposed to possible falling objects, industrial trucks must be equipped with overhead protection (canopy).

### **3.2.16 Cranes**

A crane may be utilized during sewer pipeline removal on this project. The hazards associated with crane operations include falling loads due to damaged/improperly selected rigging or improperly secured loads, being struck by booms or swinging loads, crushing injuries due to incorrect loading techniques and traffic-related injuries or equipment damage.

Wind is of concern at all sites when crane operations are underway. Wind speed and direction shall be monitored during all lifting operations. Whenever wind speed reaches 20 mph, the qualified person and the SHSO will determine the safety of the planned lift. This determination shall be made prior to commencing the actual lift. They shall stop the lift if in their opinion wind speed exceeds safe parameters. While 20 mph is set forth as a benchmark, this is not meant to preclude stopping a lift at a lower wind speed if necessary or allowing a lift at higher wind speeds if safety is not compromised.

In accordance with the U.S. Army Corps of Engineers Health and Safety Requirements Manual (EM385-1-1), crane operators will work a maximum of 10 hours in any 24 hours when engaged in crane operations during any part of the day. However, time in excess of the 10 hours is authorized before crane operations begin for the daily tailgate safety meeting.

The following rules apply whenever a crane is used on the project:

- Each crane must be certified annually by a qualified person.
- Prior to initial use on the project, all cranes shall be inspected to ensure compliance with NWT Procedure HS 24.0 "Mobil Crane Inspection." All provisions of this procedure shall apply to the use of mobile cranes. Documentation of this inspection will be recorded in the Daily Logs.
- Tag lines shall be attached to guide all lifted loads.
- Hooks must be equipped with safety latches.

- All cranes must be equipped with an audible warning device controllable by the operator.
- No crane shall be operated with wheels or tracks off the ground unless properly bearing on outriggers.
- A signal person shall be provided when the point of operation is not in full and direct view of the crane operator.
- All wire rope and other rigging removed from service due to defects shall be cut up to prevent further use.
- The swing radius of the rear of the rotating crane will be barricaded to prevent an employee from being struck or crushed by the crane

#### ***3.2.16.1 Mobile Hydraulic Cranes***

- A load-rating chart must be posted at a location readily visible to the operator.
- Each hydraulic crane shall have the following capabilities:
  - Outriggers must be used according to certifying agent requirements.
  - Boom angle indicator must be clearly visible from the operator's station.
  - Boom length indicator (telescopic booms) must be installed.
  - Boom hoist disconnect (boom stop) must be installed.
  - A boom stop is required.

#### ***3.2.16.2 Boom-Type Mobile Cranes***

- This section applies to motor truck cranes.
- All mobile cranes operated by NWT regardless of capacity must be equipped with a load indicating device (or equivalent) approved by Cal/OSHA.
- A readily visible boom angle or boom radius indicator is required for variable radius cranes, and cranes with a boom longer than 50 feet or a maximum rated capacity above 15 tons.
- A fire extinguisher of type 1A5BC rating shall be accessible to the operator's station.
- An operable boomstop is required on any crane which could fall over backwards.

- A canopy-type guard or cab roof must protect the operating station.
- Safe access (by steps and handholds) must be provided.
- The boom hoist must be capable of:
  - Raising the boom with a rated load.
  - Holding a rated load without operator attention.
  - Lowering a rated load only when coupled to the prime mover.
- The boom-hoist mechanism must have:
  - A device permitting immediate starting or stopping of the boom drum.
  - A self-setting safety brake.

### **3.2.16.3 Slings**

- Slings and attachments must be inspected daily for damage or defects.
- Damaged/defective slings must be removed from service immediately and cut up to prevent further use.
- Chain or wire rope slings must not be shortened by knots, bolts, or other means.
- Sling legs must not be kinked.
- Slings must not be overloaded.
- Slings must be padded to protect against damage from sharp loads.
- Suspended loads must be kept clear of all obstructions.
- Wrought iron chains must be annealed every six months; alloy chains must not be annealed.
- Avoid operations that expose employees to overhead loads.
- Deformed, elongated or defective sling hooks and rings must not be used and must be cut up to prevent further use.

### **3.2.17 Confined Space Entry**

It is not anticipated that any work conducted during this project will require entry into a confined space. A confined space is defined as an enclosure which is large enough for an employee to enter,

but which has limited means of access and egress and is not designed for continuous employee occupancy.

A permit-required confined space is a confined space as defined above which also contains one or more health and/or safety hazards. This can include chemical, mechanical, electrical, or other hazards.

A survey of the project site will be made by the SHSO to identify any potential permit required confined spaces. All identified permit required confined spaces will be appropriately marked to provide warning to personnel not to enter.

In the event that entry into a confined space is required, the Health and Safety Manager must be notified and a more detailed health and safety requirements established as addenda to this SHASP and NWT Procedure HS 17.0: "Confined Space" followed. Prior to entry, a NWT Entry Supervisor will certify the confined space. Initial monitoring for combustibility, toxicity, and oxygen content will be conducted to determine the atmospheric class and subsequent protection level required. In addition, personnel entering the confined space must have completed training specifically for confined space entry.

### **3.2.18 Noise**

Some of the equipment used on the project generates loud noise. Exposure to sound levels above 85 dBA can cause temporary impairment of hearing. Prolonged and repeated exposure to sound levels above 85 dBA can cause permanent hearing damage. The risk and severity of hearing loss increases with the intensity and duration of the exposure. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of incidents.

All on-site NWT and subcontractor personnel shall wear hearing protection, with a Noise Reduction Rating (NRR) of at least 25, when noise levels exceed 85 dBA (or wherever voices must be raised in order to be understood at arms length). The SHSO will perform sound level monitoring or noise dosimetry on operations that require hearing protection. All site personnel who may be exposed to noise shall also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss, in accordance with NWT Procedure HS 6.0.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, wherever possible, barriers or increased distance will be used to minimize worker exposure to noise.

### **3.2.19 Fire Prevention and Protection**

Fire prevention is of primary importance to this project. Every effort will be made to prevent the start of any fires. If a fire should occur, the Alameda County Fire Department will be called, even if the fire has been extinguished.

All flammable liquids will be stored in Underwriters Laboratory (UL) approved storage cans. Small quantities of most flammable liquids (five gallons or less) may be carried in vehicles, providing those materials will be used that day and will be contained in a safety can or other approved container. Class IA flammable liquids should be limited to five gallons in an approved safety can. Any flammable wastes will be stored or disposed of in metal containers, clearly marked as containing flammable materials. Storage of combustible materials, in work areas, will be kept to a minimum.

In order to provide fire protection, NWT will provide and maintain portable fire extinguishers in the following manner:

- Portable fire extinguishers will be provided, where needed, and inspected on a monthly basis. A visual inspection will be made to ensure that extinguishers are fully charged and in an operable condition. Hoses, nozzles, brackets, and supports will be inspected for deficiencies and corrected. Safety pins will be inspected to ensure that the breakaway seal is unbroken. If the breakaway seal is broken, a service technician must service the extinguisher. Gauge pressure will be checked monthly on pressurized units to ensure units are fully charged and non-pressurized units will have their cartridges weighed on an annual basis. The chemical within dry chemical extinguishers will be inspected on an annual basis to ensure that it is powdery and in a free-running condition. An inspection tag will be attached to all extinguishers to designate that they have received an annual inspection.
- Fire extinguishers will be suitably placed, distinctly marked, and readily accessible.
- A fire extinguisher with a rating of not less than 10-B will be located within 50 feet wherever more than 5 gallons of flammable liquid is being used on the work site (this does not apply to integral fuel tanks of motor vehicles).
- A fire extinguisher with a rating of not less than 20-B will be located outside of and within 10 feet of the door opening into any room, building, or trailer used for storage of more than 60 gallons of flammable or combustible liquids.
- If flammable liquids are being stored in an outside location, at least one portable fire extinguisher with a rating of not less than 20-B will be located at least 25 feet from the storage area, but not more than 75 feet away.
- All tank trucks or vehicles used for transporting and/or dispensing flammable or combustible liquids will have a portable fire extinguisher with not less than a 20-BC rating.
- A portable fire extinguisher with a rating of not less than 20-BC will be placed within 50 feet of each service or fueling area.

- Fire extinguishers will be placed in storage areas so they are capable of extinguishing materials being stored.
- A nationally recognized testing laboratory will approve all fire extinguishers.
- At least one dry chemical or carbon dioxide fire extinguisher, with a 5-BC rating minimum, will be available for placement on each unit of heavy equipment, and each site vehicle (excluding rental cars).
- At least one dry chemical fire extinguisher with a rating of 2A 10BC shall be provided in any trailer used as office or work area. If computers or other electronic equipment is in use, an additional CO<sub>2</sub> extinguisher of a 5BC rating may be advisable.

Fuel handling is another hazard that will be present during this task. Refueling of the equipment poses burn hazards. All refueling and fuel handling equipment must be Underwriters Laboratories (UL) listed and Factory Mutual (FM) approved. The refueling must be done in a designated area to prevent contamination from minor spills and to reduce the risk of fires. The following guidelines must be followed whenever personnel are dispensing flammable and combustible liquids:

- Flammable liquid dispensing systems will be electrically bonded and grounded. All tanks, hoses, and containers of 5 gallons or less will be kept in metallic contact while flammable liquids are being transferred; transfer of flammable liquids in containers in excess of 5 gallons will be done only when the containers are electrically bonded.
- Flammable or combustible liquids will be drawn from, or transferred into, vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited.
- Areas in which flammable or combustible liquids are transferred in quantities greater than 5 gallons from one tank or container to another will be separated from other operations by at least 25 feet, or a barrier having a fire resistance of at least 1 hour. Drainage or other means will be provided to control spills.
- Natural or mechanical ventilation will be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower explosivity limit (LEL).
- Dispensing units will be protected against collision damage.
- Dispensing nozzles and devices for flammable liquids will be of an approved type.

In case of a fire on the site, the PS will assess the situation and direct fire fighting activities. NWT personnel trained in the use of extinguisher may attempt to extinguish the fire with available extinguishers, if safe to do so. Fire fighting is a job for the fire department. No property or equipment is so important as to risk an employee's life.

### **3.2.20 Electrical Power**

All electrical equipment must have a GFCI as part of the circuit. All equipment must be suitable and approved for the class of hazard. Temporary wiring conductors installed for operation of construction tools and equipment will be either Type TW or THW contained in metal raceways, or will be hard usage or extra hard usage multiconductor cord. Temporary wiring will be secured above the ground or floor in a workmanlike manner and will not present an obstacle to persons or equipment. Applicable Cal/OSHA standards for electrical power will apply.

### **3.2.21 Portable Electric Equipment**

Various types of portable electric equipment (including portable generators, ground fault circuit interrupters and flexible cords) may be used during the course of the project. To minimize electric shock hazards, the following rules apply to these pieces of equipment.

#### ***3.2.21.1 Portable and Vehicle-Mounted Generators***

All portable and vehicle-mounted generators must be grounded, except under the following conditions:

- The noncurrent-carrying metal parts of equipment located on the vehicle and the equipment grounding conductor terminals of the receptacles are bonded to the generator or vehicle frame, and;
- The generator supplies only equipment located on the vehicle or the generator and/or cord - and plug - connected equipment through receptacles mounted on the vehicle or on the generator, and;
- The frame of a vehicle-mounted generator is bonded to the vehicle frame, or;
- The generator is single-phase, portable or vehicle-mounted, rated not more than 5 kW and the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces.

#### ***3.2.21.2 Ground Fault Circuit Interrupters***

Ground fault circuit interrupters will be used, and tested daily, on all electrical power lines used at the project site. In each case, the ground fault interrupter will be placed as close to the power source as feasible.

#### ***3.2.21.3 Flexible Cords***

Flexible cords and cables will be protected from accidental damage. Sharp corners and projections will be avoided. When passing through doorways or other pinch points, protection will be provided to avoid damage. Flexible cords used will be of three-wire type and rated for hard or extra-hard usage.

### **3.2.22 Dust Control**

Remediation and demolition activities can create airborne dust. Excessive generation of dust can limit visibility, cause irritation to workers and create airborne chemical contamination which spreads the overall extent of contamination and puts nearby unprotected personnel at risk of overexposure.

Project personnel will take all reasonable precautions to minimize the generation of dust at the work site. Such precautions include operating vehicles in a slow and deliberate manner and working materials in a wet state whenever possible. Where dust generation is significant, the Health and Safety Manager will be contacted to establish an air monitoring program and dust reduction measures (up to and including misting of the dust cloud or ceasing operations) shall be implemented.

The most effective way to control dust is to minimize its initial generation. Preventative measures will be implemented by project personnel to maintain fugitive dust emissions at levels below action levels established in Table 8-1. The following list indicates methods and measures to be applied.

#### ***Methods and Measures***

- Enforcement of speed limits on haul roads.
- Use of dust suppressants during loading and hauling operations. Suppressants may include water spraying of haul roads, stockpile(s) and loading equipment.
- Use manufactured dust suppressants that are environmentally acceptable.
- Schedule and stage operations to take advantage of prevailing winds.
- Schedule hauling operations to minimize trips on dirt haul roads.
- Covering of stockpiles for long term storage.
- Air blowing shall not be permitted of cleaning surfaces or clothing.
- Only wet cutting is permitted for cutting concrete blocks and concrete.

### **3.2.23 Slip, Trip, and Fall Hazards**

Poor housekeeping results in a workplace that is laden with slip, trip and fall hazards. Such accidents can cause serious injuries, including broken bones, contusions, and/or deep lacerations.

Much of the work we perform involves working on wet visqueen. This can increase the chances of slip, trip, and fall injuries.

To minimize slip trip and fall hazards caused by poor housekeeping, the following measures shall be taken:

- Work areas shall be inspected daily for adequate housekeeping and findings recorded on daily inspection reports.
- All stairways, passageways, gangways, and access ways shall be kept free of materials, supplies, and obstructions at all times.
- Loose or light material shall not be stored or left on roofs or floors that are not closed in, unless safely secured.
- Tools, materials, extension cords, hoses, or debris shall not be placed where they may cause tripping or other hazards.
- Tools, materials, and equipment subject to displacement or falling shall be adequately secured.
- Empty bags having contained lime, cement, and other dust-producing material shall be removed and properly disposed of immediately.
- Scrap lumber and debris shall be cleared from work areas and access ways.
- Personnel will avoid walking on visqueen whenever possible.
- Field technicians will work together when repositioning sandbags, pulling visqueen, or moving bales of hay (wet hay bales are extremely heavy).

### **3.2.24 Environmental Hazards**

Poisonous or stinging insects, spiders and/or snakes may be a concern for project personnel during sewer pipeline cleaning and other site activities. Disease vectors, such as ticks, may also be present. Poison oak or other noxious flora may be present on or near the site, and can cause severe skin irritation on contact. Physical hazards are also posed by native vegetation in the area, including thistles and other thorny weeds.

Site workers should inspect protected areas (e.g., boreholes, pits and storage areas) prior to reaching into them or entering them in any way. Portable toilets have been a source of spider and snakebites. Stinging insects and their nests shall be avoided wherever possible, and workers shall wear long

pants and if necessary, long sleeved shirts and gloves to protect them from insect bites and sharp or irritating plants.

#### **3.2.24.1 Ticks**

Ticks are vectors of many different diseases including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever, and Lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites. Periodically during the workday, employees will inspect themselves for the presence of ticks. If a tick is discovered, the following procedure should be used to remove it:

- Do not try to detach a tick with your bare fingers; microorganisms from a crushed tick may be able to penetrate even unbroken skin. Fine-tipped tweezers should be used.
- Grip the tick as close to your skin as possible and gently pull it straight away from you until it releases its hold.
- Do not twist the tick as you pull and do not squeeze its bloated body. That may actually inject microorganisms into your skin.
- Thoroughly wash your hands and the bite area with soap and water. Then apply an antiseptic to the bite area.
- Save the tick in a small container with the date, the body location of the bite, and where you think the tick came from.
- Notify the SHSO of any tick bites as soon as possible.

Recently, Lyme disease has been the most prevalent type of disease transmitted by ticks in the United States.

#### **3.2.24.2 Poisonous Plants**

Three or five leaves radiating from a stem identify poison ivy, poison oak, and poison sumac. Poison ivy is in the form of a vine while oak and sumac are bush-like. All produce a delayed allergic hypersensitivity. The plant tissues have an oleoresin, which is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur within 24 to 48 hours after exposure resulting in burning or stinging, and weeping and/or crusted blisters. Should exposure to any of these plants occur, rinse the affected area with a warm water, but do not scrub the area in order to prevent spreading the materials to unaffected areas. The best antidote for poisonous plants is recognition and avoidance.

### **3.2.24.3 Snakes**

There are various types of poisonous snakes indigenous to the western United States. The degree of toxicity resulting from snakebites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches.

The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than halves of all bites are on the lower part of the leg. No attempt at killing snakes should be made; many people are bitten in such an attempt.

If a potentially poisonous snake bites someone, the following treatment should be initiated:

- Keep patient calm.
- Notify emergency medical services.
- Wash the wound and keep the affected body part immobile.
- Apply direct pressure to site of bite if bleeding is extreme.
- Keep the affected area lower than the heart.
- Carry a victim who must be transported, or have him/her walk slowly.
- Transport to closest medical facility.

### **3.2.24.4 Flying Insects**

Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while site activities occur. Table 3-3 discusses problems associated with them.

### **3.2.24.5 Bird Excrement**

Accumulation of bird excrement can pose a biological threat to site workers and visitors. There is a group of pulmonary disease and disorders that result from exposure to infected bird droppings. The inhalation of dust from infected droppings can result in one of these pulmonary infections. All site activities that deal with the disturbance of bird excrement will be performed in Level C PPE using high efficiency particulate air (HEPA) respirator filters at a minimum.

### **3.2.24.6 Hantavirus**

Rodents, such as deer mice, can potentially carry Hantavirus. Deer mice usually live at higher elevations, like mesas, and can be distinguished from other rodents by their small size (2 to 4 inches long) and by their bi-colored tail. However, the Center for Disease Control believes that other

rodents also have the potential to carry the virus, so precautions must be taken when dealing with any species of rodent. It is not possible to distinguish whether a rodent carries the Hantavirus by observation.

Hantavirus affects the respiratory system in humans. The first symptoms of infection can occur at any time up to 45 days after exposure and include one or more of the following: fever, muscle aches, headache, or coughing. These symptoms progress rapidly into a severe lung disease that often requires intensive care treatment. Hantavirus can be transferred to humans, primarily from breathing infected rodent excreta particles that have become airborne or ingesting excreta particles that have clung to hands or clothing. It can also be contacted from rodent bites or transferred through broken skin. Though the illness caused by Hantavirus is severe, it is a relatively rare illness that can be prevented by simple precautions and common sense.

The best way to avoid contact with Hantavirus is to avoid contact with rodents and their excreta. Do not leave food or garbage where rodents have access to them; this includes leaving food items and wrappers in vehicles. When possible, seal any opening greater than 1/4-inch diameter in vehicles or structure to prevent rodent access.

Personnel, provided precautions are taken may dispose of minor amounts of rodent excreta and rodents bodies caught in mousetraps. A suggested procedure is:

- When excreta or dead rodents are discovered in an enclosed area, ventilate the area for 30 minutes; the more air flow the better.
- Wear the proper PPE.
- Implement dust suppression techniques (such as use of a “bug” sprayer filled with water and a small amount of detergent to lightly spray the floor prior to entry) may have to be used.
- To dispose of wastes, place the rodent excreta or dead rodent in a plastic bag. Rinse gloved hands with bleach solution of 1 part bleach to 10 parts water, then doff any PPE in proper order, placing disposable items, such as boot covers and respirator cartridges in with the wastes. Place the waste, if any, into a plastic bag and mark the bag clearly as “POTENTIALLY INFECTIOUS.” Wet the wastes with the bleach solution, seal the plastic bag, place it into a second plastic bag, and seal this bag. Spray the outside of the plastic bag with a commercial spray disinfectant. The waste may be disposed of as regular garbage.
- After the wastes are properly bagged, spray the surfaces where the wastes originally were found with disinfectant.

- Thoroughly wash hands, face, and forearms with soap and water.

When mousetraps are used to control rodents, the traps should be checked on a regular basis. Dead rodents should be disposed of immediately; the trap may be discarded along with the dead rodent.

### **3.2.25 Use of a Nuclear Density Gauge**

- Soil density testing may be conducted using a nuclear density gauge. A nuclear density gauge is an electronic instrument that uses a small amount of radioactive material to measure the density and moisture of construction materials. The Cesium-137 (Cs-137) source capsule is in a holder threaded and adhered in the base of the gauge. The Americium-241/Be (Am-241, Be-7) source is within the gauge and cannot be reached without disassembly of the gauge.

The radioactive material used in the gauge is in a dual sealed source capsule. This means it is inside of a stainless steel capsule that is sealed by welding, and inside of a second stainless steel capsule that is sealed by welding. There is little possibility that the radioactive material will escape. Current source construction techniques are to diffuse the radioactive Cesium-137/Be-7 into a ceramic matrix. If a source constructed in this manner was breached, the radioactive material may possibly break or chip, but it would not be in an inhalable form. The use of a ceramic binder would compromise the intimacy of the Americium-Beryllium mixture so the Am-241/Be is pressed into a pellet.

All use of nuclear density gauges by sub-contractor personnel must be performed in compliance with the following requirements:

- Only authorized users may operate the density gauge. An authorized user has been properly trained on the use of the device and the hazards of radiation, and has been so designated by NWT's Radiation Safety Officer (RSO). Authorized users must carry a letter of designation from the RSO.
- In the case of sub-contractor use of a nuclear density gauge or other instrument with a radioactive source, NWT will make sure that the subcontractor provides a copy of their license and that they can operate the nuclear density or other instrument on property with exclusive federal jurisdiction. This shall include proof of current reciprocity with the U.S. Nuclear Regulatory Commission (NRC)
- The SHSO will assure that gauges are stored and secured in an appropriate area.
- All use of the nuclear density gauge shall comply with NWT 's Radiation Safety Plan, and each user shall have read and reviewed a copy of this plan.
- When using the NDG keep all unauthorized persons out of the immediate operating area (at least 5 feet away).

- The operator must verify that the gauge has had radioactive source capsule leak test measurements at the proper interval.
- When not being used for field measurements the gauge will be placed in the “SAFE” position and returned to its storage case.
- When using the gauge the operator will wear the personal monitoring device (radiation dosimeter) assigned. When the operator is not using the gauge, the monitoring device will be kept in a low background, low heat area (out of direct sunlight, such as the dashboard of a crew vehicle.)
- During transportation the gauge shall be fully secured in the transporting vehicle and located away from personnel. When transported in a closed vehicle (car or van), the case will be locked and the vehicle will be locked when the operator is not with the vehicle. When transported in an open bed vehicle (pickup truck), the case will be locked and the case securely fastened and locked to the truck bed when the operator is not with the vehicle. The gauge will only be transported in an approved DOT shipping container with all the required labels and marking. The authorized user will inspect the shipping case to assure that it is physically sound and that all closure devices (hinges, hasps, latches, etc.) are properly installed, secured and free of defects.
- No one shall attempt to repair, modify or open the sealed source under any circumstances.
- The operator shall examine the integrity of the shutter of the gauge prior to use. If shutter integrity is in question, do not operate the gauge and notify the RSO.
- When field-testing is complete the gauge will be returned to its place of storage as soon as possible.
- At all times, operators will observe as low as reasonably achievable (ALARA) principles to minimize any dose received. This may include: being near the equipment only when necessary, standing away from the equipment when possible during operation, always have base pointed away from body, etc.
- The following documents will be with the equipment storage case at all times (except as required during transport of the gauge):
  - Copy of the License,
  - Copy of authorization letter/card from RSO,
  - Copy of the Gauge Operations Manual,
  - Copy of the current Leak Test Certificate,
  - Copy of the current Transit Case Certificate.

All personnel using the gauges will be assigned a personal monitoring device (dosimeter). These will be either a film badge, or a thermoluminescent dosimeter that will be exchanged on a routine basis per the NWT Radiation Safety Policies. The badge will be returned to the NWT RSO at the designated time. Badge loss must be reported immediately and supported by a memo to the RSO that includes date of incident, persons involved, description of the incident, and measures taken to prevent a reoccurrence.

All radioactive material/equipment will be stored in the designated area only. Equipment will be locked in its case while not in use. The storage area will be locked at all times and key access authorized for operators only. Regulation requires that the storage area meet the following:

- Storage locker or separate room with a minimum of 10 feet from any permanent work station;
- Security against unauthorized removal with key/combination lock control;
- Signs posted which state:
  1. "CAUTION RADIOACTIVE MATERIAL"
  2. Notice to Employees (Form RH-2364).
  3. Notice of where a copy of the; License and Title 17 CCR may be viewed.
  4. Name and phone number of the NWT Radiation Safety Officer (RSO).
- Area includes sufficient electrical circuits for charging equipment.

While in-transit involving over-night storage, the case should be covered so it is not visible from outside the vehicle while the operator is not present. If appropriate, the gauge should be chain locked in its case to the steering wheel in the cab of the truck.

Any incident involving potential dispersal of radioactive material, theft or loss of the gauge must be immediately reported to the NWT RSO and subcontractor's RSO as appropriate. Notification to the US Nuclear Regulatory Commission (NRC) and State Health Department may also be necessary and will be coordinated by the NWT RSO

### **3.2.26 Sanitation**

#### **3.2.26.1 Break Area**

A designated break area shall be established in the support zone. The break area shall contain drinking water and be arranged to provide shade to workers during hot weather (>85°F.)

#### **3.2.26.2 Potable Water**

The following rules apply for all field operations:

- An adequate supply of potable water shall be provided;
- Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap;
- All containers used for drinking water shall be clearly marked and not used for any other purpose; and,
- Disposable cups or personal, marked, insulated drink containers will be supplied. If disposable cups are used, both a sanitary container for unused cups and a receptacle for disposing of used cups shall be provided.

Outlets for nonpotable water shall be identified and labeled to clearly indicate that the water is unsafe and is not to be used for drinking or washing. There shall be no cross connection (open or potential) between potable and nonpotable water systems. Nonpotable and potable water systems shall be physically separated so as to minimize confusion and possible cross contamination.

#### **3.2.26.3 Toilet Facilities**

A minimum of one separate toilet facility shall be provided for each 20 employees or fraction thereof, of each sex. Such facilities may include both urinals and toilets, with the provision that the number of toilets is at least half of the minimum required number of facilities. Where there are less than five employees, separate toilet facilities for each sex are not required provided the toilet facilities can be locked from the inside and contain at least one toilet.

Toilet facilities on the site are to be kept clean, sanitary, maintained in good working order and provided with an adequate supply of toilet paper. Toilets are to be placed only in cleared areas to reduce the chance of becoming home to reptiles, insects, spiders, etc. The toilet should be inspected before each use.

#### **3.2.26.4 Food Handling and Storage**

There shall be no handling of food in the contaminated work areas of the work area. Food may be stored in refrigerators, however, those refrigerators may only be used for storage of foods, and beverages. Refrigerators used for sample or chemical storage should be clearly marked as such.

### **3.2.26.5 Trash Collection**

Trash generated by project personnel will properly be disposed of in trash receptacles. These receptacles will be emptied regularly.

### **3.2.27 Other Safe Work Practices**

- Horseplay is not permitted at anytime on the job.
- Workers shall not use equipment on which they have not been trained.
- Eating, drinking, smoking and applying cosmetics are allowed only in clean areas.

**Table 3-1  
HAZARDOUS AND TOXIC MATERIALS**

CONTAMINANT (SYNONYM)	PHYSICAL DESCRIPTION	CHEMICAL & PHYSICAL PROPERTIES	INCOMPATIBILITIES	SOURCES & ANTICIPATED CONCENTRATION	TARGET ORGANS	SYMPTOMS OF EXPOSURE
Benzene	Colorless liquid with aromatic odor.	MW: 78 BP: 176°F MP: -142°F VP: 75 mm Hg Sol: 0.18% FP: 12°F LEL: 1.3% UEL: 7.1% IP: 9.25 eV	Chlorine, bromine with iron; strong oxidizers	Fuel in equipment, Paint ingredient, possible soils contaminant	Blood, bone marrow, eyes, skin, respiratory system, CNS.	Irritation of eyes, nose, respiratory system; headache, nausea, dizziness; fatigue, anorexia; dermatitis; abdominal pain, bone marrow depression.
Diesel exhaust	Appearance and odor vary - petroleum like combustion odor.	MW: N/A BP: N/A MP: N/A VP: N/A Sol: N/A FP: N/A LEL: N/A UEL: N/A IP: N/A	None anticipated	Vehicle - operations requiring diesel fuel	Eyes, respiratory system	Eye irritation, pulmonary function changes, carcinogen
Ethylbenzene	Colorless liquid with aromatic odor.	MW: 106 BP: 277°F MP: -139°F VP: 10 mm Hg Sol: 0.01% FP: 55°F LEL: 1.0% UEL: 6.7%	Strong oxidizers	Fuel in equipment, possible soils contaminant	Eyes, skin, upper respiratory system, CNS.	Irritation of eyes, mucous membranes; dermatitis; headache, narcosis, coma.

CONTAMINANT (SYNONYM)	PHYSICAL DESCRIPTION	CHEMICAL & PHYSICAL PROPERTIES	INCOMPATIBILITIES	SOURCES & ANTICIPATED CONCENTRATION	TARGET ORGANS	SYMPTOMS OF EXPOSURE
		IP: 8.76 eV				
Gasoline exhaust	Colorless odorless gas	MW: Variable. BP: N/A MP: N/A VP: N/A Sol: N/A FP: N/A LEL: N/A UEL: N/A IP: N/A.	None anticipated	Vehicle operations requiring gasoline fuel	Eyes, respiratory system, CNS	Irritation of the eyes, respiratory system, headache, nausea, dizziness coma, death
Hydrogen Sulfide	Colorless gas with rotten egg odor	MW: 34.1 BP: -77°F MP: N/A VP: 17.6 mm Hg Sol: 7.0% FP: N/A LEL: 4.0% UEL: 44.0% IP: 10.46 eV	Strong oxidizers, nitric acid, metals	Pipelines	Eyes, respiratory system, CNS	Irritation of the eyes, respiratory system, headache, nausea, dizziness, coma, GI disturbance, death
Radium 226	Faintly luminescent off-white solid	AW: 226 BP: 1737°F MP: 700°F VP: <1 mm Hg Sol: ins FP: N/A LEL: N/A UEL: N/A IP: N/A	None anticipated	Paint ingredient, possible soil and pipe contaminant	Skin, eyes, liver, kidneys, bone, pulmonary.	Dermatitis, various carcinomas osteogenic sarcoma, osteitis, blood dyscrasias

CONTAMINANT (SYNONYM)	PHYSICAL DESCRIPTION	CHEMICAL & PHYSICAL PROPERTIES	INCOMPATIBILITIES	SOURCES & ANTICIPATED CONCENTRATION	TARGET ORGANS	SYMPTOMS OF EXPOSURE
Radon Daughter product of Radium 226	Colorless, odorless, inert gas	MW: 222 BP: -62°F MP: N/A VP: >100 mm Hg Sol: 50% FP: N/A LEL: N/A UEL: N/A IP: N/A	None anticipated	Possible soil and pipe contaminant	Skin, eyes, liver, kidneys, pulmonary.	Osteogenic sarcoma, osteitis, blood dyscrasias, various carcinomas
Toluene	Colorless liquid with an aromatic odor similar to benzene.	MW: 92 BP: 231°F MP: -139°F VP: 22 mm Hg Sol: 0.05% FP: 40°F LEL: 1.3% UEL: 7.1% IP: 8.82 eV	Strong oxidizers	Fuel in equipment, Paint ingredient, possible soils contaminant	Skin, liver, kidneys, CNS.	Dermatitis; weakness, fatigue, dizziness; euphoria; dilated pupils, photophobia.
Xylene	Colorless liquid with an aromatic odor.	MW: 106 BP: 281-292°F MP: -12-55°F VP: 7-9 mm Hg Sol: 0.00003% FP: 81-90°F LEL: 1-1.1% UEL: 6-7% IP: 8.44-8.56 eV	Strong oxidizers.	Fuel in equipment, Paint ingredient, possible soils contaminant	Eyes, skin, gastrointestinal tract, blood, liver, kidneys, CNS.	Eye, nose and throat irritation; dermatitis; corneal lesions; dizziness, poor equilibrium; anorexia, vomiting, abdominal pain.

MW: Molecular weight.  
BP: Boiling point at 1 atmosphere pressure, in degrees Fahrenheit (°F).  
MP: Melting point in °F.  
VP: Vapor pressure at 1 atmosphere pressure and 68°F.  
Sol: Solubility in water at 68°F, as percentage (%) by weight.  
FP: Flash point closed cup method, in °F.  
LEL: Lower explosive limit in air, as % by volume.  
UEL: Upper explosive limit in air, as % by volume.  
IP: Ionization potential, in electron volts (eV).  
CNS: Central nervous system.  
mm Hg: Millimeters of mercury.  
eV: Electron volts.  
°F: Degrees Fahrenheit  
°C: Degrees Celsius  
%: Percent  
ppm: Parts per million  
mg/m3: Milligrams per cubic meter.  
µl: Micrograms per liter.  
>: Greater than.  
<: Less than.  
N/A: Not applicable.

**Table 3-2  
EXPOSURE GUIDELINES FOR IDENTIFIED  
HEALTH SIGNIFICANT SITE CONTAMINANTS**

CONTAMINANT (SYNONYMS)	OSHA PEL		ACGIH TLV		NIOSH REL		IDLH
	8-HR TWA	15-MIN STEL	8-HR TWA	15-MIN STEL	8-HR TWA	15-MIN STEL	
Benzene	1 ppm	5 ppm	10 ppm	-	0.1 ppm	1 ppm	Carcinogen: confirmed Teratogen
Diesel exhaust	-	-	-	-	ALARA	-	Carcinogen
Ethylbenzene	100 ppm	-	100 ppm	125 ppm	100 ppm	125 ppm	
Gasoline Exhaust	-	-	-	-	-	-	Carcinogen
Hydrogen Sulfide	-	20 ppm	10 ppm	15 ppm	-	10 ppm	
Radium 226	-	-	-	-	-	-	Carcinogen
Radon	-	-	-	-	-	-	Carcinogen
Toluene	200 ppm	300 ppm	50 ppm	-	100 ppm	150 ppm	
Xylene	100 ppm	-	100 ppm	150 ppm	100 ppm	150 ppm	

OSHA: Occupational Safety and Health Administration. Permissible Exposure Limit.  
 ACGIH: American Conference of Government Industrial Hygienists.  
 TLV: Threshold Limit Value.  
 TWA: Time-weighted average.  
 STEL: Short-term exposure limit.  
 Hr: Hour.  
 Min: Minute.  
 ppm: Parts per million by volume.

**Table 3-3**  
**FLYING INSECTS**

<b>Organism</b>	<b>Description</b>	<b>Habitat</b>	<b>Problem</b>	<b>Severity</b>	<b>Protection</b>
Hornet	One inch long with some body hair. Abdomen is mostly black.	Round, paper-like nest hanging from trees, shrubs, or under eaves of buildings.	One nest may contain up to 100,000 hornets which will attack in force at the slightest provocation.	Severe pain, allergic reactions similar to bees.	Do not come near or disturb nest. If a hornet investigates you, do not move.
Mosquito	Small, dark, fragile body with transparent wings. From 1/8 to 1/4 inch long.	Where water is available for breeding.	Bites and sucks blood. Itching and swelling result.	Can transmit encephalitis and other diseases. Scratching causes secondary infections.	Use plenty of insect repellent and wear gloves.
Wasp	Very thin waist. Color can be black, yellow or orange with stripes.	Underground nest. Paper-like honeycomb nests in abandoned buildings, hollow trees, etc.	Stings. Some species will attack if you get too close to the nest.	Severe pain, allergic reactions similar to bees. Can be fatal.	Avoid nest. Do not swat at them.
Bee	Generally has yellow and black stripes and two pair of wings.	Hollow logs, underground nest, old buildings,	Stings when annoyed. Leaves venom sac in victim.	If person is allergic, nausea, shock, constriction of the airway can result. Death may result.	Be careful and watch where you walk. Cover exposed skin. Avoid areas where bees are swarming. Avoid wearing sweet fragrances and bright clothing. Move slowly or stand still when bees are swarming about you.

**Table 3-4**  
**Minimum Clearance from Energized Overhead Electric Lines**

Nominal System Voltage	Minimum Required Clearance
0 - 50 kV	10 feet
51 - 100 kV	12 feet
101 - 200 kV	15 feet
201 - 300 kV	20 feet
301 - 500 kV	25 feet
501 - 750 kV	35 feet
751 - 1000 kV	45 feet

NOTE: Whenever equipment operations must be performed closer than 20 feet from overhead power lines, the Health and Safety Manager must be notified. When clearance to proceed is received from the Health and Safety Manager, the electric utility company must be contacted to turn the power off, or physically insulate (protect) the lines if the operation must be performed closer to the power line than is allowed in this table.

**Table 3-5**  
**Fire Extinguisher Requirements**

Area	Rating	Location
Flammable liquids 5 gal or more used on work site (not integral fuel tanks of motor vehicles.	10B	Within 50 feet.
Flammable or combustible liquids 60 gal or more. Stored inside a room, building or trailer.	20B	Outside of door of storage area and within 10 feet of the door.
Flammable liquids stored outside.	20-B	At least 25 feet but not more than 75 feet from storage area.
Tank trucks or vehicles used to transport or dispensing flammable or combustible liquids.	2A-20-BC	Mounted in or on vehicle.
Fueling area.	20-BC	Within 50 feet of service or fueling area.
Other storage areas.	2A-10-BC	Near exit no more than 75 feet unobstructed travel to extinguisher from anywhere in storage area.
Vehicle and heavy equipment.	1A-5-BC	Mounted in or on vehicle/ equipment.
Trailers/offices.	2A-10-BC	Mounted near exit not more than 75 unobstructed travel from anywhere in trailer/office.
Hot work activities	2A	Within 50 feet.

Note: These extinguisher ratings are the minimum acceptable for each listed application. Extinguishers with higher ratings may be substituted. For applications not listed, contact the Health and Safety Manager for guidance.

## 4.0 Buddy System

Project staffing during hazardous waste operations shall meet the requirements and intent of the “buddy system,” which requires that at least two persons are required to be at the work area when work is conducted in the exclusion zone, which might result in worker contamination.

The buddy system is a method of organizing employees into work groups and is designed to provide those employees with assistance when needed. Each employee in a work group will be observed by at least one other person. Assignment of designated partners should take place during the Tailgate Safety Meeting (TSM).

The responsibility of the buddy is to:

- Provide assistance if needed;
- Maintain, at all times, line of sight contact or verbal contact with workers in the EZ;
- Observe for signs of chemical or physical trauma or heat/cold stress such as:
  - Changes in complexion and skin discoloration,
  - Changes in coordination or demeanor,
  - Excessive saliva and pupillary response,
  - Changes in speech pattern;
- Periodically verify the integrity of all protective clothing; and
- Notify the SHSO if emergency help is needed.

Entry to or exit from the EZ under the conditions described earlier without a designated partner is prohibited.

The buddy system shall be used whenever workers enter the Exclusion Zones or whenever confined space entry or hot work is performed.

## 5.0 Personal Protective Equipment

### 5.1 Levels of Protection

The EPA's terminology for personal protective equipment (PPE) is used on this project (Levels D, C, B, and A). The levels of protection for each task have been assigned in accordance with Table 5-1.

At a minimum, four sets of appropriate PPE will be maintained at the site for visitors. This does not include respiratory protection equipment that is to be supplied to non-NWT personnel by their specific employer, nor does this include other government contractors who must supply their own PPE.

#### 5.1.1 Level D Protection

Level D PPE shall be used when:

- Work functions preclude significant splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals.
- Atmospheric concentrations of contaminants are less than one-half the TLV/PEL.

Level D PPE at a minimum shall consist of:

- Standard work uniform or coveralls.
- Steel-toed work boots, ANSI approved.
- Safety glasses, ANSI approved.
- Hearing protection (if necessary) 25 dBA or greater protection.
- Splash shield (if necessary).
- Hard-hat, ANSI approved.
- Leather palm gloves (if necessary).

Heat stress monitoring will be conducted in accordance with section 8.3 of this SHSP.

Level D-modified PPE at a minimum shall consist of:

- Standard work uniform or coveralls.

- Steel-toed work boots, ANSI approved.
- Steel-toed PVC boots - if liquids encountered, ANSI approved.
- Tyvek\* coveralls with hoods and elastic wrists and ankles.
- Leather-palmed gloves.
- Latex or Nitrile gloves (inner) - if liquids encountered.
- Nitrile gloves (outer) - if liquids encountered.
- Hearing protection (if necessary) 25 dBA or greater protection.
- Splash shield (if necessary).
- Hard-hat, ANSI approved.
- Safety glasses, ANSI approved.
- Rain gear or poly-coated Tyvek\* for pressure washing activities.
- Metatarsal guards (pressure washing activities).

\*Or constructed of other materials as appropriate

Openings in the PPE (i.e., ankles, wrists, zippers, etc.) will be duct taped to seal the opening.

Heat stress monitoring will be conducted in accordance with section 8.3 of this SHSP.

### **5.1.2 Level C Protection**

Level C protection shall be used when:

- The types of air contaminants have been identified, concentrations have been measured, and an air-purifying respirator (APR) is available that can remove contaminants.
- Oxygen is at least 20 percent and the lower explosive limit (LEL) is less than 10 percent.
- The substance has adequate warning properties and all criteria for the use of an APR has been met.

Level C protective equipment at a minimum shall consist of:

- Full-face APR with NIOSH/Mine Safety and Health Administration (MSHA)-approved cartridges.
- Combination filter/cartridge providing protection against:
  - Not more than 1,000 parts per million (ppm) organic vapors, chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide, and escape only from hydrogen sulfide
  - Dusts, fumes, and mists having a TWA less than 0.05 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ).
  - Asbestos-containing dusts and mists.
  - Radionuclides.
- Cartridges approved for the specific contaminants if the cartridge above is not appropriate.
- Surgical scrubs\*.
- Steel-toed PVC boots - if liquids encountered, ANSI approved.
- Tyvek\* coveralls with hoods and elastic wrists and ankles (poly-coated\* when there is a potential for contaminated water contact).
- Leather-palmed gloves.
- Latex or Nitrile gloves (inner) - if liquids encountered.
- Nitrile gloves (outer) - if liquids encountered.
- Hearing protection (if necessary) 25 dBA or greater protection.
- Hard-hat, ANSI approved.
- Safety glasses, ANSI approved if Full-faced APR not worn.
- Splash shield (if necessary). If full-faced APR not worn. Must be worn with safety glasses, ANSI approved.

\*Or constructed of other materials as appropriate.

Openings in the PPE (i.e., ankles, wrists, zippers, etc.) will be duct taped to close the openings.

Heat stress monitoring will be conducted in accordance with section 8.3 of this SHSP.

### **5.1.3 Level B Protection**

Level B Protection is required when airborne concentrations of hazardous materials exceed or are expected to exceed twice the OSHA permissible exposure limit (PEL) in confined spaces. Level B protection will not be used on this project without contacting the Health and Safety Manager for an addendum to this SHSP. The equipment listed for Level C protection will be used for Level B protection except a full-face, pressure demand, supplied air respirator, either self contained or an airline with an egress bottle will be substituted for the air purifying respirator worn in Level C.

Heat stress monitoring will be conducted in accordance with section 8.3 of this SHSP

### **5.1.4 Level A Protection**

Level A protection use is not anticipated during this project.

## **5.2 Respiratory Protection**

Respiratory protective equipment shall be NIOSH-approved and respirator use shall conform to American National Standards Institute (ANSI) Z88.2, Cal/OSHA 8 CCR 5144 requirements. NWT Procedure HS 11.0 AND HS 12.0 further defines the respiratory protection program which details the selection, use, inspection, cleaning, maintenance, storage, and fit testing of respiratory protective equipment. This procedure complies with the requirements contained within 8 CCR 1531 and will be maintained in the SHSO's site office along with the rest of NWT's Health and Safety Policies and Procedures.

- All site personnel will have a separate assigned respirator face piece.
- Only properly cleaned, maintained, NIOSH-approved respirators are to be used on this site.
- Contact lenses are not to be worn when a respirator is required
- All site personnel will be clean-shaven in facial areas that touch the sealing surface of the respirator.
- Respirators will be regularly inspected. A positive and negative pressure test will be performed prior to each use.
- When respirators are being used, they shall be cleaned at the end of the work shift using mild soap and warm water, and left to air dry. After drying, the respirator will be stored in a clean plastic bag.

All personnel (including visitors) performing on-site activities, and using an air purifying respirator must have successfully passed a qualitative respirator fit test in accordance with OSHA 8 CCR 1531

within the last 12 months. Documentation of fit testing is the responsibility of each employer. Fit testing and any training related to respiratory protection for NWT personnel will be documented on the NWT Respiratory Training Completion Form.

### **5.3 Using Personal Protective Equipment**

All persons entering the EZ shall don the required PPE in accordance with the entries listed in Table 5-1. When leaving the EZ, PPE will be removed in accordance with the procedures listed, in order to minimize the spread of contamination.

#### **5.3.1 Donning Procedures**

These procedures are mandatory, only where Modified Level D or higher PPE is required for the project:

- Remove bulky outerwear.
- Put on the required chemical protective coveralls.
- Put on chemical protective boots.
- Tape the legs of the coveralls to the boots with duct tape.
- Put on chemical protective gloves.
- Tape the wrists of the protective coveralls to the gloves.
- Don respirator if required, and perform appropriate fit check.
- Put hood or head covering over head and respirator straps.
- Don remaining PPE, such as safety glasses or goggles and hard hat.

If these procedures are instituted, one person shall remain outside the work area to ensure that each person entering has the proper protective equipment. No persons shall be allowed to enter an EZ if they are not wearing the required PPE.

#### **5.3.2 Doffing Procedures**

Whenever a person leaves a work site requiring Modified Level D or higher PPE, the following decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated materials from the boots.
- Clean reusable protective equipment.

- Remove protective garments, equipment, and respirator (if worn). All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels.
- Wash face and hands immediately and shower as soon as possible.
- Proceed to clean area and dress in clean clothing.
- Clean and disinfect respirator for next use.

All disposable equipment, garments, and PPE shall be bagged in plastic bags, and properly labeled for disposal.

The level of personal protection selected will be based upon real-time air monitoring of the work environment and an assessment by the Health and Safety Manager or SHSO of the potential for skin contact with contaminated materials. The PPE selection is given in Table 5-1.

#### **5.4 Personal Protective Equipment for Visitors**

An adequate supply of hard hats, safety glasses and other personal protective equipment shall be maintained on-site for use by government personnel and other visitors except other government contractors who must supply all of their own personal protective equipment.. Visitors are not to be supplied with chemical protective clothing without prior approval by the SHSO, and proper training documentation. Respirators will not be issued to non-NWT personnel.

#### **5.5 Activity Specific Levels of Protection**

The required level of protection is specific to the activity being conducted. At NAS, Alameda, the initial levels of PPE are listed in Table 5-1.

**Table 5-1**  
Activity/Level of Protection

<b>Task</b>	<b>Activity</b>	<b>Initial Levels of PPE</b>
1	Mobilization/Demobilization	D
2	Site Preparation	D
3	Drilling	Mod D
4	Concrete Cutting and Removal	Mod D
5	Excavation of Clean Soils	Mod D
6	Excavation of Suspect or Contaminated Soils	C
7	Pipeline Removal	Mod D
8	Pipeline Cleaning	C
9	Waste Packaging	Mod D
10	Soil & Water Sampling	Mod D
11	Pipeline Replacement	D
12	Support Activities	D
13	Equipment Decontamination	Mod D
14	Backfill and Site Restoration	D

As site activities progress, levels of PPE are subject to change or to modification. Upgrading of PPE can occur when action levels are exceeded or whenever the need arises to protect the safety and health of site personnel. Levels of PPE will not be downgraded without prior approval from the Health and Safety Manager.

## 6.0 Site Control

The project area will be divided into three work zones: exclusion zone (EZ), a contamination reduction zone (CRZ), and a support zone. The PS and Health and Safety Manager or SHSO shall together be responsible for designation of the work zones. Based upon the exposure to contaminated materials or anticipated hazards associated with the work.

The EZ will include any area where chemical contamination may be encountered and will be marked with barrier tape or other means to warn personnel of the hazards. The EZ will be large enough to prevent contamination from leaving the marked area.

Immediately adjacent to the EZ, a CRZ with a decontamination area for equipment and personnel will be established. This area will also be delineated with traffic cones and/or barrier tape. The CRZ will be large enough to provide a safety zone to prevent the movement of contaminants from the EZ into the support zone.

The remainder of the NWT project area will be designated as the support zone. No special markings or warning labels are required for this area.

Only personnel who have completed 40 hours of hazardous waste operations as defined under 8 CCR 5192 (e), hazardous waste refresher training within the past 12 months, have been certified as fit for hazardous waste operations by a physician within the past 12 months and are wearing the proper PPE shall be allowed within the EZ or CRZ. Personnel without such training may only enter the designated support zone.

### 6.1 Hazard Briefing

No person will be allowed on the site during site operations without first being given a site hazard briefing. In general, the briefing will consist of a review of the tailgate safety meeting. All persons on the site, including visitors, must sign the site-specific tailgate safety meeting form. Tailgate safety meetings shall be held daily, involving all personnel on site.

### 6.2 Documentation of Certification

A subcontractor training and medical file will be established for the project and kept on site during all site operations. The 40-hour training, update, and specialty training (first-aid/cardiopulmonary resuscitation [CPR]) certificates, as well as the current annual medical clearance for all subcontractor personnel, will be maintained within that file. All NWT and subcontractor personnel must provide their training and medical documentation to the SHSO prior to the start of fieldwork. This documentation will be maintained at the project home office at the close of the project.

### 6.3 Entry Log

The SHSO at the site will maintain a site entry log with the names of all personnel who enter the CRZ and EZ. These logs will be incorporated into the project file.

## **6.4 Emergency Entry and Exit**

The exclusion zone, contamination reduction zones, evacuation routes, and emergency equipment locations will be included on a site map prior to the initiation of on-site activities. During an emergency, the evacuation routes noted on the site map should be followed. If conditions such as wind direction or physical hazards do not allow access to the prescribed evacuation routes, evacuate by the safest route available and decontaminate to the greatest extent possible. Additional emergency procedures can be found in Section 12

## **6.5 Entry Requirements**

In addition to the entry requirements listed above, no personnel will be allowed in any EZ or CRZ unless they are wearing the minimum PPE as described in Chapter 5.0.

## 7.0 Decontamination

In general, everything that enters an EZ at a site must either be decontaminated or properly discarded upon exit from an EZ. All personnel must enter and exit an EZ through a CRZ. Prior to movement from an EZ, contaminated equipment will be decontaminated and then inspected by the SHSO before it is moved into the support zone. This inspection will be noted in the daily log.

### 7.1 Procedures for Equipment Decontamination

Any item or vehicles taken into an EZ must be assumed to be contaminated and must be carefully inspected and/or decontaminated prior to leaving that particular EZ. A visual inspection of the frame and tires of all vehicles and equipment leaving an EZ will be completed.

In order for a vehicle or equipment to pass inspection, it must be in a broom-clean condition, water washed, and free of loose dirt or sludge material on tailgates, axles, wheels, bucket, etc.

Surveys of all possibly contaminated surfaces shall be performed to insure that any smearable contamination has been completely removed from the equipment.

A steam pressure washer will be on site so that any vehicles or equipment can be steam cleaned if the Health and Safety Manager or SHSO deem necessary. All pressure washing activities will be conducted in accordance with section 3.2 of this SHSP.

The equipment decontamination area will be used to remove soil from all equipment leaving the work area. Decontamination procedures will consist of washing equipment to remove mud and/or dirt.

Following the wash, surveys of all possibly contaminated surfaces shall be performed using handheld instruments. Should readings above background be detected a second wash will be performed and the surface survey repeated.

If the second survey indicates the presence of radionuclides, smears of the effected areas will be taken to determine the level, if any, of smearable materials remaining on the equipment. At no time will equipment still deemed contaminated be allowed to leave the decon area.

Once the RSO has determined that all smearable materials have been removed, written permission to remove the equipment will be issued.

Personnel who must come in contact with the equipment during vehicle maintenance and repair will utilize a special "clean area". All equipment requiring maintenance or repair will be staged in a CRZ prior to servicing.

Personnel assigned to vehicle decontamination will wear the protective equipment, clothing and respiratory protection consistent with this SHSP. Seats and flooring in equipment and vehicles that are to be used in the EZ will be covered to the greatest extent possible with disposable polyethylene.

## **7.2 Personnel Decontamination**

NWT will establish personnel decontamination facilities on site to ensure that personnel maintain a high degree of personal hygiene and minimize the possibility of exposure to chemical hazards.

These personnel hygiene facilities will conform to the requirements specified in 8 CCR 5192 (f).

A personnel decontamination area will be established in the CRZ immediately outside the EZ to facilitate decontamination and PPE removal. All personnel exiting the EZ will pass through the decontamination area to remove any contamination. Standard NWT decontamination procedures are as follows:

### ***Decontamination Procedures***

- Step into first wash tub and wash PVC boots and outer gloves with soap solution and scrub brush.
- Step into second wash tub and rinse boots and outer gloves with clean water and scrub brush.
- Remove outer gloves (e.g., Nitrile) and dispose in the proper receptacle.
- Remove outer Tyvek coveralls and dispose in the proper receptacle.
- Remove PVC boots and place in boot rack.
- Remove respirator, place in container to be cleaned.
- Perform frisk of extremities and torso.
- Remove inner gloves and dispose in proper receptacle.
- Wash hands and face before eating, drinking, or smoking (break/end of shift).

Personnel are required to wash hands, face, and other exposed skin areas prior to leaving the CRZ for breaks or lunch.

Towels, washcloths, and soap will be provided to personnel as required.

With the exception of work within the SZ, no disposable work clothing, shoes, or boots will be worn off or carried out of the CRZ.

Non-disposable soiled work clothes will be surveyed and if found to be free of contamination will be allowed to leave the site.

Should surveys of the soiled clothing indicate that contamination is present, the clothing will be confiscated and included with the other PPE for disposal. Personnel will be required to provide back-up street clothing in case the clothing they are wearing has become contaminated and must be included with other wastes generated at the site.

Boots and respirators will be decontaminated prior to being taken into the support zone.

All rinse waters will be collected and treated as contaminated waste until proven otherwise.

## 8.0 Site Monitoring

This section covers site-monitoring requirements for all site contaminants of concern.

### 8.1 Monitoring

Monitoring is essential to ensure that all field personnel are adequately protected from contaminants. Whenever work is performed that might generate gases, organic vapors, dusts, fumes, mists or exposure to contaminated soils or water is possible, monitoring will be conducted.

- Photo ionization detector (PID) or flame ionization detector (FID) will be used to measure gasses and organic vapors in the work area.
- Mini Ram aerosol monitors will be used to measure respirable dust, fume, and mist emissions.
- Combustible gas and oxygen reading instruments will be used in the work area if flammable contaminants are anticipated.
- Calorimetric detector tubes will be used to detect the presence of benzene, hydrogen sulfide, or other specific contaminants when use is directed by the SHSO or the Health and Safety Manager.
- Micro R and Beta/Gamma ( $\beta/\gamma$ ) meters will be used to determine if radiation is present in the work area. High volume air samples for Radon will be used when the presence of contaminants are confirmed by other means.
- All monitoring results will be documented in project logs.

Monitoring will be used to determine the effectiveness of engineering control in keeping the readings below the action levels as specified in Table 8-1.

The Health and Safety Manager may direct the SHSO to conduct integrated personal exposure monitoring. Integrated air samples will be analyzed through a laboratory accredited by the American Industrial Hygiene Association (AIHA) or a NAVLAP Certified laboratory in the case of personal radiological dosimetry.

#### 8.1.1 Monitor Locations

All personal, integrated air monitoring samples shall be collected/taken in the approximate "breathing zone" of site personnel and direct reading instrumentation readings taken for the purpose of determining appropriate health and safety precautions shall be taken from suspected contaminated surfaces or materials. Locations to be monitored are found in Table 8-2.

If entry into a confined space is deemed necessary, combustible gas, oxygen, hydrogen sulfide, and total organics readings will be collected and recorded from the top, middle, and bottom of the confined space prior to initial entry.

Surveys shall be taken of ambient dose rates to determine if limited duration tasks will be required to prevent radiation exposure above the regulatory limits. Once the NWT entry supervisor and/or SHSO has reviewed this information, determined the PPE necessary for entry, and the entry has been initiated, readings shall be taken in the approximate "breathing zone" of the NWT employee(s) working within the confined space.

Readings may also be taken in other locations to determine areas of localized contamination or combustibility within the confined space. Work shall stop and all personnel shall exit the confined space when readings exceed acceptable values at any location within the space.

### **8.1.2 Frequency**

Breathing zone air monitoring must be conducted periodically throughout the day while work is being performed in the EZ regardless of the level of protection being worn. Such readings must be documented on Daily Logs forms even if contaminant concentrations are "nondetectable" or read "no meter response." Frequency requirements for monitoring are found in Table 8-2. At a minimum, hourly monitoring is required during active excavation of contaminated soils, removal of pipelines, cleaning of pipeline, during confined space entry, and during decontamination activities. The SHSO may reduce the frequency of the monitoring only after receiving approval from the Health and Safety Manager.

### **8.1.3 Monitoring Equipment Maintenance and Calibration**

All monitoring equipment (e.g., photo ionization detectors, flame ionization detectors, radiation meters, etc.) will be maintained in accordance with NWT Procedure HS 7.0 and the specific manufacturer's instructions. Calibration/source checking will occur before and after each use.

All personal sampling pumps shall be calibrated in accordance with OSHA sampling protocols and NIOSH methods for the analyte of interest.

All direct reading instrumentation calibrations should be conducted under the approximate environmental conditions the instrument will be used. All monitoring equipment calibrations and maintenance activities shall be documented on the NWT Daily Logs, or equivalent.

When applicable, only manufacturer-trained and/or authorized NWT personnel will be allowed to perform instrument repairs or preventive maintenance.

## **8.2 Noise Monitoring**

Noise monitoring may be performed by the SHSO under the direction of the Health and Safety Manager if high noise levels are routinely encountered. High noise levels are considered to be noise

levels that make normal conversation difficult to understand at arm's length. The PS is to contact the SHSO or Health and Safety Manager if this situation is routinely present.

### **8.3 Heat Stress**

When workers are in Level D protective equipment, heat stress monitoring shall be initiated whenever ambient temperatures on site exceed 85°F. When workers are in Level C or modified Level D protective equipment, physiological monitoring will begin at 78°F. When workers are in Level B protective equipment, physiological monitoring will begin at 70°F. These benchmarks are not to preclude heat stress monitoring at lower temperatures if workers exhibit signs of heat stress. At the discretion of the Health and Safety Manager, additional environmental and/or physiologic monitoring will be carried out. Physiologic monitoring may consist of pulse rate, external body or body core temperature determinations.

### **8.4 Safety Reviews**

All levels of project management shall conduct project site safety reviews (audits). Specifically:

- The SHSO shall inspect the job site at least daily. Findings shall be documented on Daily Logs and communicated to the PS.
- The PS shall conduct a safety audit with the SHSO at least weekly. Findings shall be documented on Daily Logs and communicated to project workers, the PM and Health and Safety Manager.
- The PM shall conduct an on-site safety audit at least monthly. Findings shall be documented on Safety Inspection Report (SIR) forms and copied to the Health and Safety Manager. Whenever possible, the Health and Safety Manager shall be included in these audits.
- The Health and Safety Manager or designated representative may conduct unannounced job site safety audits at anytime. Findings will be documented on SIRs and copied to the PM and Program Director.

### **8.5 Monitoring Records**

The SHSO shall ensure that site-monitoring records are complete and incorporated into the project file. The Health and Safety Manager will be responsible for establishing, maintaining, and forwarding to other NWT offices (as necessary) all required monitoring information as described below for placement in individual employee files:

- Employee name, social security number, payroll number.
- The date, time, pertinent task information, exposure information.
- Description of the analytical methods, equipment used, and calibration data.

- Type of PPE worn.
- Engineering controls used to reduce exposure.

### **8.6 Notification**

The Health and Safety Manager will ensure that each employee is informed in writing of the results that represent that employee's exposure. Monitoring results representative of an employee's exposure shall be reported in writing to the affected employee, with copies retained in the project file and the employee's medical file.

Whenever the results indicate that the representative employee exposure exceeds the Permissible Exposure Limit (PEL), the notification shall state that the PEL was exceeded, and shall provide a description of the corrective action taken to reduce exposure to a level below the applicable PEL.

NWT may conduct industrial hygiene monitoring on subcontractor employees. Notification of subcontractor personnel, of industrial hygiene monitoring results is the responsibility of the subcontractor.

**Table 8-1**  
**Action Levels**

When in Level D PPE

Analyte	Action Level <sup>1</sup>	Required Action <sup>2</sup>
Dust Unknown VOC.	≥ .5 mg/m <sup>3</sup> above background ≥ 10 ppm above background	Upgrade to Level C Detector tube for Benzene, continue work if no Benzene detected
Airborne radionuclides	> 3 x 10 <sup>-10</sup> μCi/ml	Upgrade to Level C
Benzene	≥ 1 ppm ≤ 5 ppm ≥ 5 ppm	Upgrade to Level C Stop work; contact Health and Safety Manager <sup>3</sup>
Hydrogen Sulfide	≥ 5 ppm ≤ 10 ppm	Upgrade to Level C
O <sub>2</sub>	≥ 23.5% or ≤ 20%	Stop work; determine cause <sup>3</sup>
LEL	≥ 10% of LEL	Stop work; determine cause <sup>3</sup>

When in Level C PPE

Analyte	Action Level <sup>1</sup>	Required Action <sup>2</sup>
Dust Unknown VOC.	≥ 5.0 mg/m <sup>3</sup> above background ≥ 50 ppm above background in breathing zone (BZ)	Stop work; initiate dust suppression <sup>3</sup> Stop work; detector tube for benzene; if no benzene continue in Level C <sup>3</sup>
Airborne radionuclides	> 3 x 10 <sup>-9</sup> μCi/ml	Stop Work, contact Health and Safety Manager <sup>3</sup>
Benzene	≥ 5 ppm ≤ 50 ppm	Stop Work, contact Health and Safety Manager <sup>3</sup>
Hydrogen Sulfide	≥ 10 ppm	Stop Work, contact Health and Safety Manager <sup>3</sup>
O <sub>2</sub>	≥ 23.5% or ≤ 20%	Stop work; determine cause <sup>3</sup>
LEL	≥ 10% of LEL	Stop work; determine cause <sup>3</sup>

When in Level B PPE

Analyte	Action Level <sup>1</sup>	Required Action <sup>2</sup>
Unknown VOC.	≥ 100 ppm above background in BZ	Stop work; detector tube for benzene; contact Health and Safety Manager <sup>3</sup>
O <sub>2</sub>	≥ 23.5% or 20%	Stop work; determine cause <sup>3</sup>
LEL	≥ 10% of LEL	Stop work; determine cause <sup>3</sup>

- <sup>1</sup> Five excursions above the action level in any 15 minute period or a sustained reading in excess of the action levels for 5 minutes will trigger a response.
- <sup>2</sup> Frequency of air monitoring may be adjusted by the Health and Safety Manager after sufficient characterization of site contaminants has been completed, tasks are modified or site controls have proven effective.
- <sup>3</sup> Contact with the Health and Safety Manager must be made prior to continuance of work. The Health and Safety Manager may then initiate integrated air sampling along with additional engineering controls.

**No one is permitted to downgrade levels of PPE without authorization from the Health and Safety Manager.**

**Table 8-2**  
Monitoring Frequency and Location

WORK ACTIVITY	INSTRUMENT	FREQUENCY <sup>1</sup>	LOCATION
<b>Task 1</b>			
Mobe/Demobe	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
<b>Task 2</b>			
Site Preparation	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A N/A N/A Background Survey N/A	N/A N/A N/A General work area N/A
<b>Task 3</b>			
Drilling	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	Continuously N/A N/A Periodically Periodically	Borehole N/A N/A Concrete samples Based on PID readings
<sup>a</sup> <b>Task 4</b>			
Concrete Cutting and Removal	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A Continuously N/A N/A N/A	N/A Downwind N/A N/A N/A
<b>Task 5</b>			
Excavation of Clean Soils	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A Continuously N/A N/A N/A	N/A Downwind N/A N/A N/A
<b>Task 6</b>			
Excavation of Suspect and Contaminated Soils	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	Periodically Continuously N/A Periodically Periodically	Excavation site Downwind N/A Soil stockpile area Based on PID readings
<b>Task 7</b>			
Pipeline Removal	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	Periodically N/A Periodically Periodically Periodically	Each pipe section N/A Each pipe section Each pipe section Based on PID readings

<b>Task 8</b>			
Pipeline Cleaning	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A N/A N/A Periodically N/A	N/A N/A N/A Initial entry and waste stream N/A
<b>Task 9</b>			
Waste Packaging	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A N/A N/A Periodically N/A	N/A N/A N/A Each item and container N/A
<b>Task 10</b>			
Soil and Water Sampling	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	Periodically N/A N/A Periodically N/A	Each sample N/A N/A Each sample N/A
<b>Task 11</b>			
Pipeline Replacement	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
<b>Task 12</b>			
Support Activities	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
<b>Task 13</b>			
Equipment Decontamination	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A N/A N/A Periodically N/A	N/A N/A N/A Cleaned surfaces N/A
<b>Task 14</b>			
Backfill and Site Restoration	PID Miniram O <sub>2</sub> /LEL NaI and β/γ Detector Tubes	N/A Continuously N/A N/A N/A	N/A Downwind N/A N/A N/A

<sup>1</sup> Frequency of monitoring may be adjusted by the Health and Safety Manager after sufficient characterization of site conditions has been completed. Periodic is defined as at least once an hour unless sampling data demonstrates a less frequent monitoring schedule is justified.

## **9.0 Employee Training**

### **9.1 General**

All personnel entering the EZ or CRZ shall have completed at least 40 hours of hazardous waste operations-related training, as required by 8 CCR 5192 (e). All field employees must have received a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Those personnel who completed the 40-hour training more than 12 months prior to the start of the project shall have completed an 8-hour refresher course within the past 12 months. The PS, PM, Health and Safety Manager, and the SHSO must have completed an additional 8 hours of relevant supervisory health and safety training. With the exception of subcontractor personnel who will be working only in the support zone, subcontractor personnel must meet the above training requirements and subcontractor supervisors must also have the 8-hour hazardous waste supervisor training.

A copy of each training certificate will be maintained at the project job site. Subcontractors must provide certificates of training for the project file for all employees assigned to the project, if they will be working in either the EZ or CRZ. Training certificates for both subcontractor and NWT personnel shall be maintained on-site.

#### **9.1.1 Tailgate Safety Meetings**

Prior to the start of the project, all personnel will participate in an initial tailgate safety meeting. During the initial tailgate safety meeting, the SHSP will be discussed. The PS will ensure that the anticipated site hazards are summarized and explained to all personnel, and that those personnel are aware of the precautions they must take to minimize their exposure to those hazards. Tailgate safety meetings will be held at the start of each work shift. All new employees must attend the meeting and be familiar with this SHSP. The PS will not delegate all safety-related training to the SHSO.

Written attendance records and meeting notes shall be maintained with the project file.

### **9.2 Hazard Communication**

All personnel performing field activities will receive basic hazard communication training that involves a review of the NWT Written Hazard Communication Program (NWT Health & Safety Procedures HS 1.0, HS 4.0, AND HS 8.0), MSDSs, container labeling, and chemical health hazards. Personnel will be trained on the hazards of chemicals handled or used on site by reviewing the Chemical Hazards listed in Section 3.2 of the SHSP and the MSDSs in Appendix B. MSDSs will be obtained for all materials purchased for the site that require them.

#### **9.2.1 Site-Specific Health and Safety Plan**

The SHSO will present the SHSP (including all attached MSDSs) and discuss it with all personnel assigned to the project. All workers and visitors must read and sign the SHSP acknowledging acceptance of site rules and understanding of site hazards before the start of the site work.

### **9.3 Site Workers' Basic Course**

Each site worker will have received training in basic 40 hour HAZWOPER course and be current in that training through an annual 8 hour refresher training as required, as well as site specific training prior to performing field work. The content of the 40-hour HAZWOPER training will consist of:

- General site safety.
- Physical hazards (fall protection, noise, heat stress, cold stress).
- Names and titles of key personnel responsible for site health and safety.
- Safety, health, and other hazards typically present at hazardous waste sites.
- Use of PPE.
- Work practices by which employees can minimize risks from hazards.
- Safe use of engineering controls and equipment on site.
- Medical surveillance requirements including recognition of symptoms and signs which might indicate overexposure to hazards.
- Worker right-to-know (Hazard Communication, 8 CCR 5194).
- Routes of exposure to contaminants.
- Engineering controls and safe work practices.
- Components of the site health and safety program.
- Decontamination practices for personnel and equipment.
- Confined-space entry procedures.
- Emergency response plan.

### **9.4 Supervisors' Course Content**

Management and supervisors must receive an additional eight hours of training that includes:

- General site safety and health programs.
- PPE programs.

- Air monitoring techniques.
- Spill containment techniques.

### **9.5 Site-Specific Training**

Site-specific training will be accomplished through an initial review of this SHSP by the SHSO and through the daily tailgate safety meetings. All such training shall include training date and signatures of all attendees and shall be documented in the project files.

### **9.6 First Aid and Cardiopulmonary Resuscitation (CPR)**

At least two employees current in first aid/CPR will be assigned to the project, and at least one of these will be on the site whenever operations are ongoing. First aid trained personnel shall also be trained in Bloodborne pathogens hazards and precautions as described in Section 11.0.

First aid and CPR training courses are offered to all NWT employees. Refresher training in first aid and CPR is required to maintain a current certificate. The SHSO and the PS shall be current in first aid/CPR training.

## **10.0 Medical Surveillance Program**

### **10.1 Medical Examination**

As required by NWT Policy and Procedure HS 6.0, all personnel on site working within a CRZ or EZ will have successfully completed a preplacement or periodic/updated physical examination. The contents of this examination have been determined by Federal and State regulation and are consistent with the medical surveillance requirements for hazardous waste operations.

#### **10.1.1 Preplacement Examination**

This examination has been designed to meet 8 CCR 5192 (f) requirements for hazardous waste site operations.

The NWT medical surveillance program examination at a minimum consists of:

- Medical and occupational history questionnaire which includes information on past gastrointestinal, hematologic, renal cardiovascular, immunological, and neurologic problems.
- Physical examination.
- Blood pressure measurements.
- Complete blood count (CBC) and differential to include hemoglobin and hematocrit determinations, red cell indices, and smear of peripheral morphology.
- Blood urea nitrogen and serum creatinine.
- Blood chemistry (SMAC 24).
- Pulmonary function test.
- Audiogram.
- Electrocardiogram (EKG) for employees over 35 years old or when other complications indicate the necessity.
- Visual acuity.

The following information is provided to the examining physician:

- A copy of 8 CCR 5192 (f) and associated Appendices.
- A description of employee's duties.

- A list of potential contaminants which the employee may be exposed to.
- A description of the PPE to be used.
- Information from previous medical exams.

The medical surveillance provided to the employee includes a judgment by the medical examiner as to the ability of the employee to use either positive-pressure or negative-pressure respiratory equipment. Any employee found to have a medical condition that could directly or indirectly be aggravated by exposure to these chemical substances or by the use of respiratory equipment will not be employed for the project. A copy of the medical examination is provided to the employee.

The employee will be informed by the examining physician of any medical conditions that would result in work restriction, or that would prevent them from working at hazardous waste sites.

#### **10.1.2 Annual Examination**

NWT employees receive either an annual or biannual update examination meeting the requirements of 8 CCR 5192 (f) depending upon the attending physician's determination based on employee exposure, if any. The results of these exams are compared to previous results and the baseline physical to clear the employee for continued work. If any indication of over exposure to hazardous materials is found, appropriate actions are taken as recommended by the occupational medicine physician.

#### **10.1.3 Exit Examination**

NWT offers exit physical examinations for all employees involved in the medical surveillance program who are leaving the company for any reason to ensure they are in good health.

### **10.2 Subcontractor Requirements**

Subcontractors must provide documentation that all their employees have successfully completed a physical examination by a qualified physician. The physical examinations will meet the requirements of 8 CCR 5192 (f) and 8 CCR 1531, Respiratory Protection. Subcontractors will provide this documentation by supplying copies of the medical examination certificate for each employee they have on site.

### **10.3 Medical Records**

Medical and personal exposure monitoring records will be maintained according to the requirements of 8 CCR 5192 (f) and will be kept for duration of employment plus a minimum of 30 years. Confidentiality of employee medical records will be maintained. The written medical opinion from the physician will be made available upon request to the ROICC site representative for any site worker.

## 10.4 Medical Restrictions

When a medical care provider identifies a need to restrict work activity, the employee's home office will communicate the restriction to the employee, the PS, the SHSO, and the Health and Safety Manager. The terms of the restriction will be discussed with the employee and the PS. Every attempt will be made to keep the employee working, while not violating the terms of the medical restriction. Employees that experienced chemical overexposure will not return to the EZ until given a written release by the occupational medicine physician.

## 10.5 First-Aid and Medical Treatment

All persons on site must report any near-miss incident, accident, injury, or illness to their immediate supervisor or the Field Supervisor. The employees trained in first aid or the SHSO will provide first aid on site. Injuries and illnesses requiring medical treatment will be accompanied by an "Authorization for Treatment" Form initiated by the SHSO. The employee's supervisor or the Field Supervisor will complete the "Supervisor's Employee Injury Report" and conduct an accident investigation as soon as emergency conditions no longer exist and first-aid and/or medical treatment has been rendered. The investigation should follow the Accident/Injury Investigation Report. These two reports must be completed and submitted to the SHSO within 24 hours after the incident. The PS shall notify the PM as soon as possible after the incident occurs. The ROICC must also be notified of the accident by the PM within 24 hours. The SHSO will notify the Health and Safety Manager of all incidents.

First-aid kits are kept at the CRZ and in all NWT vehicles. If treatment beyond first aid is required, the injured should be transported to the medical facility listed in Chapter 12.0 of this SHSP and the PS should immediately contact the Human Resources Administrator at 925-443-7967 to initiate case management procedures. The PS should describe to the Human Resources Administrator, the circumstances leading to the injury or illness. The Human Resources Administrator will contact the Health and Safety Manager for follow-up on the treatment that the employee is receiving, the work restrictions, and the return to work authorization.

**NOTE:** If the injured is not ambulatory or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics **MUST** be summoned. If there is any doubt as to the injured worker's condition, let the local paramedic or ambulance service examine and transport the worker.

## **11.0 Bloodborne Pathogen Exposure Control Plan**

This section serves as a Bloodborne Pathogen Exposure Control Plan for NWT workers who may serve as voluntary first aid and CPR care providers. At all times, at least one person on site will be adequately trained in first aid and CPR, in the requirements of the Bloodborne Pathogens Standard as listed in 8 CCR 5193, and in the contents of this plan.

### **11.1 Definitions**

#### **11.1.1 Bloodborne Pathogens**

Bloodborne pathogens are those agents (i.e., bacteria, virus, fungi) found in blood, blood components, certain body fluids, and other materials, objects, or surfaces that have had contact with blood or body fluids that are capable of causing human disease or death to unprotected people who come into contact with them. Diseases caused by bloodborne pathogens include, but are not limited to, hepatitis B virus (HBV), human immunodeficiency virus (HIV), hepatitis C, malaria, and syphilis. The most significant and of greatest concern are HBV and HIV.

#### **11.1.2 Hepatitis B**

HBV is the major bloodborne pathogen hazard that first aid/CPR care providers may encounter. The HBV can remain infectious for up to 10 days even in dried blood. The virus adversely affects 8,000 to 10,000 workers annually resulting in approximately 200 deaths each year. Hepatitis means "inflammation of the liver" causing severe liver damage or cirrhosis. Exposure symptoms include fever, fatigue, nausea, vomiting, muscle aches, loss of appetite, and jaundice (yellowing of the eyes or skin). Hepatitis diagnosis is difficult because some symptoms are similar to the flu, except for the discoloration of the skin and eyes, and may remain mild for an extended period of time. Presently, no cure exists for hepatitis, but it can be prevented with a vaccination.

#### **11.1.3 Human Immunodeficiency Virus**

HIV attacks and deteriorates the body's immune system and eventually weakens it to the point that infection sets in causing the disease Acquired Immune Deficiency Syndrome (AIDS). HIV is primarily transmitted through sexual contact, but may also be transmitted through contact with blood and body fluids. HIV is not transmitted by touching or working with people who are HIV-positive.

#### **11.1.4 Human Immunodeficiency Virus Exposure Symptoms**

HIV leads to AIDS-related illnesses that eventually cause neurological problems, cancer, pneumonia, and death. People may carry the virus for many years of their lives without experiencing any symptoms. Upon development, symptoms may include weight loss, skin lesions, dry cough, fever, fatigue, diarrhea, or swelling of the lymph glands.

Presently, no cure exists for HIV or AIDS and no vaccination is currently available.

## **11.2 Exposure Determination**

Persons in any job classifications at NWT may be exposed to bloodborne pathogens when administering first aid or CPR, or during decontamination of equipment/surfaces contaminated by blood or other potentially infectious materials during an incident.

NWT employees could be subject to bloodborne pathogen exposure due to:

- Punctures through the skin with a contaminated sharp object (i.e., scissors, needles, broken glass, etc.)
- Contact or absorption of blood or blood-contaminated objects through open or broken skin (i.e., cuts, scratches, rashes.)
- Blood splashes to their eyes, nose, or mouth or other mucous membranes.

Workers can reduce their risk of contacting HBV or HIV by implementing the proper work practices (outlined in this plan) before, during, and after responding to emergency medical incidents involving personal injuries.

## **11.3 Measures for Prevention**

The establishment of work practice controls is an integral part of an effective exposure control plan in preventing accidental infection of employees. These work practices are designed to protect employees from reasonably foreseeable occupational exposures to bloodborne pathogens from blood and other potentially infectious material. The work practice controls outlined in this section are applicable to the administration of first aid in emergency situations and subsequent cleanup only.

### **11.3.1 Universal Precautions**

Universal precautions is an approach to infection control which operates on the assumption that all human blood and bodily fluids are to be treated as if they are known to be contaminated with HIV, HBV, or other infectious diseases. Universal precautions shall be implemented whenever there exists a foreseeable potential for contact with blood or bodily fluids.

### **11.3.2 Engineering Controls**

As a result of the location of the work site, the nature of work in outdoor locations with potential exposure to airborne chemical contaminants, and the potential for exposure being limited to emergency situations, the implementation of engineering controls is not feasible. Exposure control shall be accomplished through implementation of work practice controls and use of personal protective equipment.

### **11.3.3 Work Practice Controls**

Work practice controls shall be instituted whenever foreseeable potential contact with, or exposure to, blood and other bodily fluids exist. Examples of situations in which these controls are to be implemented include, but are not limited to, accidents or injuries in which administration of first aid

is required, application of bandages to minor cuts and abrasions of another person, and contact with sores, wounds, or broken skin.

Following are specific work practice controls that shall be implemented:

- Prior to examining or providing first aid treatment to an injured person, put on a pair of clean impervious gloves. Gloves are provided in the first aid kits, latex or nitrile gloves may also be used.
- Open wounds or cuts will be promptly bandaged.
- Wash hands and face as soon as possible after administering first aid or CPR. If wash facilities are not readily available, stock disposable one-time use towelettes.
- No eating, drinking, or smoking is allowed in any work area where a potential exists for occupational exposure to blood borne pathogens.
- Non-disposable equipment or materials that have or may have blood or infectious fluid contact must be washed immediately after their use, (a 1:10 solution of bleach and water is the recommended proper decontamination media.)
- Any clothing that becomes contacted with blood or infectious fluids shall be removed as soon as possible after administering first aid or CPR.
- No personal clothing that becomes contacted with blood or infectious fluids shall be laundered off-site.
- First-aid kits on-site are to be equipped with a pair of surgical gloves and CPR mouthpieces.

Direct contact with blood and bodily fluids should be kept to an absolute minimum, as required in a particular situation. In situations where direct contact is likely, personal protective equipment shall be worn to help prevent infection.

Based upon professional judgment, an employee may choose to temporarily forego the use of PPE if he determines that the use of PPE will further jeopardize his well being or that of the injured worker. The employee must carefully evaluate this limited application. If this does occur, NWT is obligated to investigate and document the circumstances in an effort to provide alternative means to avoid further occurrence.

#### **11.3.4 Personal Protective Equipment**

The following are specific personal protective equipment items that shall be implemented:

- Always wear hand (i.e., latex or nitrile surgical gloves) and eye (i.e., safety glasses, or goggles) protection to administer or apply first aid or CPR.
- Always use CPR mouthpieces or ventilation devices.
- Inspect PPE prior to use to ensure it is in good working order and without flaws.
- Do not reuse gloves once removed.
- After use, remove gloves from top to bottom inside out, not allowing unprotected skin to contact the exterior of the gloves.

### **11.3.5 Waste Handling and Disposal**

Disposable items that have or may have blood contact must be bagged separately from other trash. These wastes must be placed in leak proof containers or bags and labeled. A collection container for contaminated articles will be available on-site. Wastes used in medical emergency treatment (i.e., gloves, towels, and gauze) shall be disposed in the infectious waste container(s). The container will be replaced as needed and not be overfilled.

The waste will remain on site in approved container(s) until an approved disposal facility capable of receiving medical wastes is identified. If emergency medical teams who respond to an incident are unable to accept blood-contaminated waste, the Health and Safety Manager shall be contacted to arrange for proper disposal.

## **11.4 Medical Requirements**

### **11.4.1 Hepatitis B Vaccination**

All potentially exposed employees will have made available to them at no cost a Hepatitis B vaccination. The employee will also receive training as to the vaccine's efficacy, safety, benefits, and consequences prior to administration. The vaccination series shall be initiated within 24 hours of providing first aid/CPR in an incident and shall be administered under the supervision of a licensed physician. Employees may at their own discretion decline the vaccination, in which case documentation of declination will be completed and employees may be assigned immediately. If an employee covered by this exposure plan decides to accept the vaccination at a later date, the vaccination will be offered at that time at no cost to the employee.

### **11.4.2 Post-Exposure Procedures and Evaluation**

Subsequent to all reported exposure incidents, a confidential medical evaluation and follow-up shall be made available to each employee exposed in the incidents.

### **11.4.3 Documentation Procedures**

Documentation of the exposure incident shall be recorded as soon as possible, and include the route(s) of exposure, the circumstances surrounding the incident, and the identification of the source

individual. Additionally, each incident shall be placed on the “first aid incident list” attached to the location OSHA Log of Occupational Injuries and Illnesses.

#### **11.4.4 Blood Testing**

As soon as feasible, the source individual in an exposure incident will be asked to consent to a blood test to determine HBV and HIV infectivity. Where applicable laws require employee consent, written consent shall be obtained prior to testing. If an employee refuses the blood test, documentation of the refusal will be made. Documentation of the test results shall be made available to the exposed employee(s). All results should be kept confidential.

Exposed employees will be asked to consent to a blood test for HBV and HIV serological status. If consent to HIV testing is denied, the blood sample will be preserved for 90 days, within such time the employee may elect to consent to the HIV test.

#### **11.4.5 Post-Exposure Medical Evaluations**

Exposed employees shall receive a healthcare professional's written opinion for post-exposure evaluations. The written opinion shall include the results of the evaluation and any medical conditions resulting from the exposure incident which requires further medical treatment.

### **11.5 Bloodborne Pathogen Hazard Communication**

- Containers used for disposal of blood-contaminated supplies and waste will be labeled in accordance with the word “biohazard.”
- Warning signs are not applicable, as there are no designated areas for medical treatment on site. In cases of potential exposure, observers and non-essential personnel should be verbally warned to keep a safe distance from injured personnel.
- All associates who are first aid/CPR trained and may provide assistance shall be trained in the requirements of HS 4.0 and this SHSP.

### **11.6 Record keeping**

#### **11.6.1 Training Records**

All employees on the project shall review this plan and sign it to document their review. All employees who are trained to provide first aid and/or CPR shall be trained in the bloodborne pathogen standard. Records of this training shall be included in the employees' personnel file.

#### **11.6.2 Medical Records**

Medical records necessary for NWT employees must include documentation on HBV vaccination status, medical follow-up, post-exposure testing, and a medical professional's written evaluation. The employee medical records will be forwarded to the Human Resources Administrator (see Chapter 12.0) for inclusion in the employee's medical file.

NWT shall maintain the employee medical records for the duration of the employee's employment plus 30 years thereafter. If, for whatever reason, NWT no longer does business and no successor exists, NWT will notify the Director of NIOSH in writing three months prior to the disposal of records. If so directed, the records shall be transferred to the Director of NIOSH.

**11.6.3 Incident Recording**

An incident that occurs as a result of rendering emergency medical care will be recorded on the OSHA 200 log as OSHA defines work-related injuries and illnesses. All injuries involving the release of blood or other bodily fluids must be immediately reported to the Health and Safety Department to ensure proper reporting and follow-up.

## **12.0 Emergency Response Plan and Contingency Procedures**

Site personnel must be prepared to respond and act quickly in the event of an emergency or accidental contaminant release. Emergency preparedness and response procedures will aid in protecting site workers and the surrounding environment. Preplanning measures will include employee training, fire and explosion prevention and protection, chemical spill and discharge prevention and protection, and safe work practices to avoid personal injury or exposure.

### **12.1 Personnel Roles/Lines of Authority**

The roles and responsibilities of NWT personnel for response to emergencies at NAS, Alameda will be clearly defined and coordinated with NWT subcontractors, ROICC personnel, and the Alameda County Fire Department emergency support services. The Alameda County Fire Department will evaluate the emergency situation and make the determination whether to involve the HAZMAT Unit in the response. The responsibilities of specific project individuals and the coordination of the Alameda County Fire Department are defined as follows.

#### **12.1.1 Project Superintendent**

At all times during scheduled work activities, a designated PS will be present on site. This individual will be responsible for implementing these procedures and determining appropriate response actions. Depending upon the circumstances and time permitting, the PS will review proposed response actions with the SHSO, and the ROICC site representative. Specific responsibilities for the PS include:

- Evaluating and assessing emergency incidents or situations.
- Assigning personnel and coordinating response activities on site.
- Assuring that field personnel are aware of the potential hazards associated with the site.
- Summoning the local emergency response team.
- Notifying the Project Manager or, in the PM's absence, the Program Director of an emergency situation.
- Coordinating response to an incident with the ROICC site representative.
- Assuring that all NWT emergency equipment is routinely inspected and functional.
- Working with the SHSO regarding the correction of any work practices or conditions that may result in injury to personnel or exposure to hazardous substances.
- Assuring that appropriate emergency response agencies are aware of the provisions made herein.

- Evaluating the safety of site personnel in the event of an emergency, and providing evacuation coordination if necessary.
- Maintaining site facilities and assisting site personnel in accessing those facilities.
- Complete the appropriate form or forms and submit them to the program Health and Safety Manager within one business day of the incident.

The PS will direct all emergency response activities conducted or managed by NWT and is responsible for field implementation and enforcement of health and safety policies and procedures. The PS will be fully trained in health and safety procedures and maintain current certification in standard first aid and CPR. Other responsibilities include overall supervision and management of field activities.

### **12.1.2 Site Health and Safety Officer**

The SHSO is responsible for implementing, communicating, and enforcing health and safety policies and procedures during the course of the project. The SHSO will review the fitness and training records of all field personnel for compliance with the established requirements and will assist in arranging proper training and medical examinations. He will also assist in evaluating health and safety concerns with respect to environmental releases and emergency response actions. In the event of an injury, contact the NWT Human Resources Administrator at 925-443-7967.

### **12.1.3 Project Manager**

The PM will provide support to emergency responders and dedicate appropriate project resources to the response effort. If required, the PM will mobilize additional personnel and equipment to the site. The PM will notify the ROICC site representative and provide recommendations concerning any additional action(s) to be taken.

## **12.2 List of Emergency Contacts and Notification**

The PS and SHSO will be notified immediately in the event of an emergency. The PS will immediately evaluate the incident and, if necessary, notify the ROICC and Alameda County Fire Department emergency support services. If not previously notified, the PM, ROICC, and designated environmental contact will be advised of the situation. Telephone numbers for emergency contact personnel are listed in Table 12-1. The list will be maintained with current contacts, and telephone numbers will be posted along with other emergency telephone numbers at all project telephone locations.

The information provided to the notified person should include the nature of the incident and the exact location and suspected contaminants or material involved. Information regarding the incident that should be reported to the emergency operator includes the following:

- Name and telephone number of the individual reporting the incident.

- Location and type of incident.
- Nature of the incident (fire, explosion, spill, or release) and substances involved.
- Number and nature of medical injuries.
- Movement or direction of spill/vapor/smoke.
- Response actions currently in progress.
- Estimate of quantity of any released materials.
- Status of incident.
- Other pertinent information.

Once the urgency of the emergency incident has been resolved, a complete incident report will be completed by the PS with the aid of SHSO and provided via the PM to the ROICC.

### **12.3 Medical Emergency Response**

Prior to fieldwork, the SHSO will contact all potential emergency organizations and coordinate any expected response in the event of a medical emergency. In the event of severe physical or chemical injury, the Alameda County Fire Department personnel will be summoned for emergency medical treatment and ambulance service. Their response time is estimated to be between 5 to 10 minutes upon initial notification. The Alameda County Fire Department responders will be utilized to provide care to severely injured personnel. In serious cases, the normal chemical and radiological decontamination procedures may be abbreviated or bypassed. Care must be taken to prevent exposure to the emergency medical responders. Once an initial assessment is made by the emergency medical technicians, the decision on using ground or air transportation for the victims will be made. Qualified first-aid/CPR providers will treat minor injuries on site. These less serious injuries may only be treated after the employee has been decontaminated. If additional treatment beyond first aid is required, the injured personnel will be transported to the Alameda Community Hospital located at 2070 Clinton Avenue, which can provide 24-hour emergency medical care along with the services of a critical care center.

All employee injuries must be promptly reported to the PS who is to contact the Human Resources Administrator to initiate case management procedures. See Section 10-5 for details.

Transportation routes and maps will be posted in the project office and in each site vehicle prior to the initiation of on-site activities. A copy of this map has been provided in Appendix A.

## 12.4 Personal Exposure or Injury

Every precaution will be taken to aid in the prevention of injuries and/or exposure to contaminants. These precautions are detailed in this SHSP and generally consist of the following measures:

- Personnel will be properly trained for their work duties.
- Site personnel will wear appropriate PPE for each specific task or work assignment.
- Site personnel will follow the proper field safety protocols as defined.
- Site controls will be enforced so that only authorized personnel are able to access the work zones.
- Site personnel will be made aware of potential environmental and chemical hazards.
- Real-time air monitoring will be performed to evaluate the effectiveness of engineering controls and levels of personal protection.
- Proper decontamination procedures will be followed for personnel and equipment.

In the event of personal exposure to contaminants, the following general guidelines will be adhered to:

- Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the exclusion zone, shall immediately proceed to the eyewash station, set up in the contamination reduction zone. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Thoroughly flush the eye with clean water for at least 15 minutes. Arrange prompt transport to the designated medical facility.
- Contact/Absorption through skin - Copious amounts of potable water will be used to flush, for at least 20 minutes, contaminants from the skin. This activity will occur in the on-site shower trailer if available, otherwise use the closest source of potable water available. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. The condition of the individual will be assessed and transport to a medical center arranged if necessary. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport.
- Inhalation - The victim will be moved immediately to an area providing fresh air. Decontamination of the victim and rescue breathing or Cardiopulmonary Resuscitation will be provided if necessary. The condition of the individual will be assessed and transport to a medical center arranged if necessary via ambulance.

- Ingestion - Immediately contact local poison control center. The victim will be decontaminated, if necessary, and transported to a medical facility via ambulance.

## **12.5 Fire Control**

Prior to intrusive activities at the site, a tour conducted by the SHSO and PS will be given to the Base and Alameda County Fire Department and HAZMAT Unit personnel. Specific hazards inherent with the site will be conveyed at that time. In the event of a fire or explosion, or imminent danger of fire or explosion, all activities will halt and the Alameda County Fire Department will be notified immediately. If it is safe to do so, site personnel may use fire-fighting equipment available on site to remove and isolate flammable or other hazardous materials that may contribute to the fire. Upon arrival of the Alameda County Fire Department emergency responders; the PS will advise the fire chief or lead representative of the location, nature, and identification of the hazardous materials on site.

The following measures will be implemented during site field activities to minimize the risk of fire and/or explosion:

- Smoking is permitted on site only in the designated smoking areas.
- Good housekeeping procedures will be required on site.
- Material storage methods will be in accordance with manufacturers' recommendations.
- Flammable liquids will be stored in approved containers and cabinets only.
- Trained personnel will conduct all storage, handling, or use of flammable and combustible materials.
- Entry and exit pathways will be kept clear of debris or obstacles.
- Work areas will be cleared of excess vegetation and obstructions.

Any base-specific guidelines established by the Navy or civil authorities will be strictly enforced. Any fire, no matter how small, must be reported to the Alameda County Fire Department and ROICC.

## **12.6 Spills or Leaks**

NWT will maintain the following equipment and materials in the CRZ for use during spill response activities:

- Absorbent pads.
- Granular absorbent material (noncombustible).

- Polyethylene sheeting.
- 55-gallon drums.
- Shovels and assorted hand tools.

If a hazardous waste spill or material release to the air, soil, or water at the site is observed, NWT will immediately notify the ROICC site representative. An assessment will be made of the magnitude and potential impact of the release. If it is safe to do so, site personnel will attempt to locate the source of the release, prevent further release, and contain the spilled and/or affected materials as follows:

- The spill or release area will be approached cautiously. Real-time air monitoring will be continuously performed in the spill vicinity.
- Hazards will be identified based on available information from witnesses or material identification documents (placards, MSDSs, logs). The potential hazards will be evaluated to determine the proper personal protection levels, methods, and equipment necessary for response.
- If necessary, the release area will be evacuated, isolated, and secured.
- If possible, spill containment will initially be made without entering the immediate hazard area.
- Entry to the release area will be made with the PPE, personnel, methods, and equipment necessary to perform the work. Hazardous spill containment and collection will be performed in four steps as follows:
  - Contain the spill with absorbent socks, booms, granules, or construction of temporary dikes.
  - Control the spill at the source by plugging leaks, righting containers, over packing containers, or transferring contents of a leaking container.
  - Collect the spilled material with shovels or heavy equipment as necessary.
  - Store the spilled material for further treatment or disposal. Treatment and/or disposal options of the material will depend on the amount and type of material.

If site personnel cannot safely and sufficiently respond to an environmental release, evacuation of the area may be warranted. The decision to evacuate will depend upon the risk of exposure to personnel and the severity of the release. The Alameda Fire Department will be notified in the event of a significant spill. Upon their arrival at the site, the PS will brief them on the current situation at hand and any potential hazards the team may be faced with.

## 12.7 Safety Signals

While working on site, the following hand signals will be used for communication when necessary.

<u>Hand Signal</u>	<u>Meaning</u>
Arms crossed over head	Shut-off equipment
Hand gripping throat	Out of air, can't breath
Both hands around waist	Leave area immediately
Wave hands over head	Need assistance
Thumbs up	Okay, I am all right, I understand
Thumbs down	No, negative

Vehicle or portable air horns will be used for alarm signals as follows:

- One long blast: Emergency evacuation of the site.
- Two short blasts: Clear working area around powered or moving equipment.

## 12.8 Site Evacuation Procedures

The authority to order personnel to evacuate the area rests with the PS and SHSO. In the event that site evacuation is required, a continuous, uninterrupted air horn will be sounded for approximately ten seconds. Air horns will be located in the work area. Radio communication, if appropriate, will also be used to keep continuous communication between the site and the main office.

Personnel working in the EZ or CRZ will immediately make their way to the pre-designated muster point for a "head count." Depending on the severity of the event and allowable time, personnel exiting the EZ and CRZ may be instructed to forgo or modify decontamination procedures.

Personnel in the support zone will immediately report to the muster point for a "head count" and further instructions. The PS and the SHSO will remain in contact to ensure that evacuation procedures are properly executed. If the muster point is inaccessible, personnel will evacuate to an upwind location as determined by the windsock and perform a "head count."

Situations requiring evacuation may include unusually severe weather conditions, fires, or significant chemical spills or releases. In the event of project evacuation, the ROICC site representative, Alameda County Fire Department, and City of Alameda Police Department will be notified immediately. A site emergency map that delineates evacuation routes, emergency air horn locations,

first-aid kit locations, rally point, and site contamination control zone perimeters will be developed once an on-site evaluation of conditions and topography is complete.

## **12.9 Emergency Decontamination Procedures**

Treatment of illnesses or injuries to personnel working within the contaminated areas of the site may be more difficult because of protective clothing requirements and the potential for exposure to the contaminants. The SHSO or Emergency Medical Care Provider must quickly assess the extent of the injury or illness of the victim. A determination will be made if lifesaving medical treatment is critical and if personal decontamination procedures will create additional injuries or aggravate the existing condition. Life-threatening injuries must receive immediate medical attention. Decontamination procedures may be modified, simplified, or eliminated completely under such circumstances.

The following guidelines are established for responding to minor emergencies where an individual may have been injured or overcome by exposure to a hazardous substance at the site. If a truly serious injury exists, only portions of these guidelines may be appropriate to ensure prompt medical treatment.

- Notify supervisory and safety personnel.
- Select an emergency decontamination location upwind and/or uphill (upslope) from any spills, and determine most effective pathway for emergency vehicles.
- Field decontamination should be performed in two stages: washing with soapy water, followed by a clear water rinse.
- Upon reaching the injured party, stabilize any life-threatening problems, such as spills or fires, and remove (i.e., brush or blot with absorbency pads) visible, gross contamination. If possible, prevent coming in contact with any contamination present at the scene. However, do not delay with this task, and be prepared to transport immediately to the decontamination area.
- Have support personnel perform real-time air monitoring.
- Determine type, nature, and extent of exposure or injury based on mechanism.
- Quickly cut or tear first layer of protective clothing (outer suit) off of the injured party and discard. If cutting, always cut away from the body toward the extremities to avoid inflicting further injury.
- Without delay, efficiently move the injured away from the accident scene, possible contamination, or any hazardous substances. Relocate to a nearby “clean” area to expedite removal of respiratory protection and establish communication.

- If the individual is unconscious, evaluate if an adequate airway exists and breathing and circulation are present (ABCs). If absent, commence rescue breathing or CPR without delay.
- Move the injured personnel to the decontamination area and transfer responsibilities to support personnel.
- Using soapy solution, support personnel should carefully wash outer garments as needed and adequately rinse.
- Spray outer protective clothing with clear water.
- Quickly remove tape from the injured individuals wrists and ankles—assume the individual is injured until an assessment indicates otherwise.
- Carefully, but quickly, cut second layer of protective clothing (inner suit, boots, and gloves) off injured party. Always cut away from the body toward the extremities to avoid inflicting further injury.
- Be prepared to turn emergency care over to Emergency Medical Service personnel. Otherwise, administer appropriate standard first aid to injuries.
- Following stabilization of any injuries, monitor and be on the alert for shock, wrap the injured in a warm blanket or other items to conserve body heat, and be prepared for vomiting.
- Cover any contact surfaces of transport equipment with a protective sheet or plastic.
- Inform all arriving personnel and transport crew of nature and extent of injuries and any potential hazards present.

## **12.10 Adverse Weather Conditions/Natural Disasters**

Adverse weather and natural disasters can take many forms. Thunder and lightning storms, hail, high winds, tornadoes and earthquakes are examples. Sudden changes in the weather, extreme weather conditions, and natural disasters can create a number of subsequent hazards. Generally, poor working conditions occur, and slip, trip and fall hazards exist. Natural disasters can create many secondary hazards such as release of hazardous materials to the environment, structure failure and fires.

Routinely monitoring weather conditions and reports may help reduce the impact of severe weather and natural disasters. It may be necessary to halt certain hazardous operations or stop work

altogether to allow the situation to pass. The SHSO must decide what operations, if any, are safe to perform based on existing and anticipated conditions.

The best protection against most severe weather episodes and natural disasters is to avoid them. This means seeking shelter before the storm hits. Stay away from pipes and electrical equipment, including telephones, should lightning be a threat and watch for damage caused by lightning strikes nearby.

### **12.10.1 Earthquakes**

The following general guidelines will be adhered to in the event of an earthquake:

- If you are indoors, duck or drop down to the floor. Take cover under a sturdy desk, table or other furniture. Hold on to it and be prepared to move with it. Hold the position until the ground stops shaking and it is safe to move. Stay clear of windows, fireplaces, and heavy furniture or appliances. Do not rush outside. Falling glass or building parts may injure you. Do not try using the stairs or elevators while the building is shaking or while there is danger of being hit by falling glass or debris.
- If you are outside, get into the open, away from all buildings and power lines.
- If you are driving - stop if it is safe - but stay inside the vehicle. Do not stop on or under a bridge, overpass or tunnel. Move your car as far out of the normal traffic pattern as possible. Do not stop under trees, light posts, electrical power lines or signs.

### **12.11 Critique and Follow-Up of Emergency Procedures**

The ROICC site representative will be verbally notified immediately and receive a written notification within 24 hours of all accidents or incidents including releases of toxic chemicals, fires, or explosions. The report will include the following items:

- Name, organization, telephone number, and location of the contractor.
- Name and title of the person(s) reporting.
- Date and time of accident/incident.
- Location of accident/incident (i.e., site location, facility name).
- Brief summary of accident/incident including pertinent details such as type of operation ongoing at time of accident.
- Cause of accident/incident, if known.
- Casualties (fatalities, disabling injuries).

- Details of any existing chemical hazard or contamination.
- Estimated property damage, if applicable.
- Nature of damage, effect on contract schedule.
- Action taken by Contractor to ensure safety and security.
- Other damage or injuries sustained (public or private).

The PS and the SHSO will investigate the cause of the incident to prevent its reoccurrence. The investigation should begin as soon as practical after the incident is under control, but not later than the first work day after the incident. Investigations will follow the procedures described below:

- Interview witnesses and participants as soon as possible or practical.
- Determine the chronological sequence of events (opinions as to cause should not be solicited at this time).
- Note the location, movement, displacement, liquid levels, sounds, noises, or other sensory perceptions experienced by the participants or witnesses.
- Obtain weather data.
- Ascertain the location and position of all switches, controls, etc.
- Verify the condition of all safeguards.

After the facts have been collected, causal factors should be identified. Two causal factors typically exist, apparent and contributing; and there may be several of each. Apparent factors are those which are self-evident or readily deduced. Contributing factors usually become apparent by questioning why the apparent causal factor was allowed to exist.

## Table 12-1

### EMERGENCY PHONE NUMBERS

Alameda County Fire Department Emergency	911	
City of Alameda Police Department Emergency	911	
Alameda Community Hospital Emergency	(510) 522-3700	
<b><i>Key Project and NWT Personnel</i></b>		
Program Director:	William Haney Pager	(419) 855-4640 (510) 448-6368
Health and Safety Manager	Mark Divoky Pager	(925) 443-7967 (510) 448-1657
Project Manager:	William Haney Pager	(419) 855-4640 (510) 448-6368
Site Health & Safety Officer:	Mark Divoky Pager	(925) 443-7967 (510) 448-1657
Project Superintendent	Dan Spicuzza Pager	(925) 443-7967 (510) 448-0858
Occupational Physician	Dr. Blackwell	(925) 373-0337
Navy Contact ROICC	TBD	
Emergency Medical Care Hospital	Alameda Community Hospital	911 (510) 522-3700
Directions to Medical Care	Exit base, turn right to Central, continue on Central to Encinal, right on Willow.	

## **13.0 Record Keeping and Data Management**

Proper record keeping and data management are essential in the implementation of this SHSP. The forms associated with the record keeping and data management requirements must be completed in an accurate, timely fashion and filed with the appropriate entities. It is the responsibility of the PS to ensure that the forms are properly completed. Completed forms will be kept and maintained by NWT. These records will be maintained for a five-year period. Subcontractors will also be responsible for keeping a copy of the forms pertaining to their personnel.

### **13.1 Logs**

The SHSO will maintain and complete a daily log for each day's work. The daily log will document chronologically each day's health and safety activities in sufficient detail for future reference as needed. Other relevant data and field information will be recorded on separate log forms for air monitoring, sampling, equipment calibration inspections, and incident reporting.

An EZ sign-in log will be maintained that will provide a project record of the following information for confined space entry activities:

- Worker's name.
- Work area.
- Duties performed.
- Level of protection.
- Time in/time out.

All personnel will be required to log in and out of the EZ.

A visitor's sign-in log will be maintained in the project office and administration area. Visitors requesting access to hazardous field activities must have appropriate project approval, be medically qualified, and have the health and safety training prerequisites for hazardous waste operations.

An OSHA 200 Log will be kept in the site administration facility.

### **13.2 Safety Inspections**

NWT's accident prevention program is centered on the following key procedures:

- Project reporting, investigation, and review of all near misses, incidents, and accidents.
- Management reviews of all incident/accident reports, corrective action, and project safety concerns.

- Review of project, operations, and construction activities by health and safety professionals.

Safety reviews and inspections are conducted by all tiers of the management structure and are documented. A list of all corrective action items will be maintained showing the corrective action, responsible person, and the date action is to be completed. Health and safety personnel to ensure that corrective actions or measures have been implemented conduct follow-up inspections.

The PS will inspect the site weekly and interview one or two site workers regarding areas of safety concerns or ideas for safety improvement. Site supervisory personnel will inspect site conditions and activities daily to identify changing conditions or potential hazards. Identified safety and occupational health deficiencies and suggested corrective measures will be brought to the attention of the PS and SHSO. Safety review inspections will be recorded and filed for reference by project management and ROICC personnel.

### **13.3 Accident Reporting and Investigation**

All project personnel are required to report all near misses, injuries, illnesses, and accidents to their immediate supervisor. The SHSO will immediately arrange appropriate medical care as required. Once immediate medical care for the injured personnel has been accomplished, the SHSO will complete and submit the appropriate report forms within 24 hours. The appropriate form(s) to be completed may include:

- NWT Safety Inspection Report.
- NWT Vehicle Accident Report.

Copies of the NWT forms listed in Appendix C of this SHSP have been sent to the SHSO in a separate Postings, Permits and Forms package.

Identified safety and occupational health deficiencies and corrective measures will be documented and filed on site for reference by the ROICC or designated representative.

On-site management personnel will investigate all near misses, injuries, illnesses, and accidents. The PS and SHSO will investigate the conditions that led to the accident. They will document how the accident occurred and identify unsafe acts or conditions that occurred or existed at the time of the accident. Corrective actions will be determined and implemented to prevent recurrence of the accident, and responsibility for implementation of corrective actions will be assigned. The investigation will be started immediately, and all information will be collected as soon as possible after the occurrence. The final report and required forms will be submitted to the PM for signature and forwarding to the ROICC and other appropriate personnel.

## 14.0 Summary and Checklist

### 14.1 Summary

A brief summary of equipment requirements of the project SHSP is provided here. The project employees are provided this for quick reference.

### 14.2 Checklist

- First aid kits (one per vehicle and facility)
- Fire extinguishers (one per vehicle and facility)
- Safety glasses or goggles, ANSI approved
- Hard hats, ANSI approved
- Ear plugs 25 dBA or greater
- Under gloves (latex, nitrile)
- Impermeable gloves
- Work gloves
- Steel toed work boots, ANSI approved
- Tyvek suits (sizes XXL - XXXXL)
- Duct tape
- Trash bags
- Eyewash
- Portable toilet
- Drinking water and disposable cups
- Air purifying respirators (full-face)
- Multigas/HEPA cartridges, NIOSH approved
- Thermometer
- Barricade tape (yellow and red)
- O<sub>2</sub> LEL Meter
- Photo ionization Detector (PID)
- Mini Ram Aerosol Monitor
- Micro R meter
- Beta/Gamma ( $\beta/\gamma$ ) radiation survey meter
- Decon tubs
- Brushes
- Hand/face wash station
- Paper towels
- Complete H&S Plan
- MSDSs
- Rubber boots/boot covers
- Sun block
- Shade awnings (portable)
- Air horn
- Thermoluminescent dosimeters (TLD's)

- Traffic control signs
- Traffic control vests
- Traffic cones
- Scrubs
- Towels
- Laundry service
- Pulse rate meter
- HiVol air samplers
- Air flow calibrator
- PVC rain gear
- Detector tubes: benzene, hydrogen sulfide
- Sensodyne/Drager pump
- Isobutylene calibration gas
- Ear muffs
- Full body harness
- Extraction device

**APPENDIX A**

**SITE AND HOSPITAL LOCATION MAPS**

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Insert SITE MAP

Insert WORK AREA MAP

**APPENDIX B**  
**MATERIAL SAFETY DATA SHEETS**

Radium MSDS

Benzene MSDS

Toluene MSDS

Ethyl Benzene MSDS

Hydrogen Sulfide MSDS

Gasoline Vapor MSDS

Diesel Vapor MSDS

Nuisance Dust MSDS

**APPENDIX C**

**JOB SITE POSTINGS, PERMITS AND FORMS**

Job site postings, permits and forms, as listed below, are being provided to the SHSO for use on the job site only:

**Postings:**

- Safety & Health Protection on the Job Poster
- Notice - On-The-Job Injuries
- Access to Medical & Exposure Records
- Emergency Phone Numbers
- Workers Compensation Instructions

**Human Resource Postings:**

- NWT affirmative action program
- Handicapped Individuals and Veterans of the Vietnam Era
- Discrimination in Employment is Prohibited by Law
- Minimum Wage
- EDD Notice to Employees
- Notice: Employee Polygraph Protection Act
- Notice to All Employees Working on Federal Or Federally Financed Construction Projects
- Notice to Employees Working on Government Contracts
- Your Rights Under the Family and Medical Leave Act of 1993
- Payday Notice

**Forms:**

- Tailgate Safety Meeting
- Safety Inspection Reports (5 pages)
- Vehicle Accident Report  
Accident Diagram
- Accident/Injury Report
- Photoionization Detector Calibration Log
- Colorimetric Detector Tube Log
- Combustible Gas/Oxygen Meter Calibration Log
- Integrated Air Sampling Log
- Real Time Aerosol Monitoring Log
- Confined Space Entry Permit
- Underground and Overhead Utility Checklist

**APPENDIX D**  
**ACTIVITY HAZARD ANALYSIS**

General Physical Hazards	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Hard Hat - Safety glasses with side shields - Steel-toe Boots - Work Gloves  <u>Inspection Requirements</u> - Daily during TSM.  <u>Training Requirements</u> - Project-specific training - Proper use and operation of hand tools - First Aid/CPR (American Red Cross)	- Slip, trip, fall	- Site employees will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe boots beyond the Main Office Complex and other field offices. - Whenever possible, avoid routing cords, ropes, and hoses across walking pathways. - Flag or cover inconspicuous holes to protect against falls.
	- Poor housekeeping	- Work areas will be kept clean and orderly. - Garbage and trash will be disposed of daily in approved refuse containers. - Tools and accessories will be properly maintained and stored. - Work areas and floors will be kept free of dirt, grease, and slippery materials. - Materials shall be stored to allow clear access to aisles, pathways, and travel routes. - Field vehicles will be kept clean and orderly (i.e., cab, truck beds, tool boxes, trunk, camper shells).
	- Manual lifting	- Size up the job. Think it through- - Lift with your legs, not your back. Use mechanical equipment whenever possible. - Get assistance when manually lifting awkwardly-sized items or those items over 60 pounds.
	- Minor cuts and	- Workers shall wear appropriate field attire (i.e., no tank tops, shorts, open-toe shoes, jewelry). - Tools not functioning properly shall be removed from service immediately and tagged for repair. - Workers shall wear cotton or leather work gloves when handling equipment. - Have at least two NWT persons on site trained in First Aid/CPR. - All crew personnel on site shall use the buddy system (working in pairs or teams).
	- Chemical contact	- Material Safety Data Sheets (MSDSs) shall be obtained for chemicals brought on site. - MSDSs shall be reviewed with project personnel before using the chemical material.

Materials Handling	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Flammable storage containers/cabinets - Drum dolly - Forklift  <u>Inspection Requirements:</u> - Daily  <u>Training Requirements:</u> - HazWOPER - Safe lifting practices	- Back injury	- Size up the job. Use mechanical equipment to lift and move items, when necessary. Lift with your legs, not your back. - Do not lift awkwardly sized items and those items over 60 pounds. - Get assistance when necessary. - If a worker loses control of item, STAND CLEAR and DO NOT try to prevent its fall. - Assure path is clear while transporting items manually (housekeeping).
	- Pinch points	- Keep hands and feet clear of moving/suspended materials and equipment. - Wear steel toe/shank safety shoes/boots.
	- Drum	- Use a drum dolly or forklift to move drums. - Label all drums as to their contents. - Do not move bulging or leaking drums.
	- Slip, trip, or fall	- Assure path is clear while transporting items manually (housekeeping). - Do not stand on drums, boxes, or bags of stored materials. - Get assistance when necessary. - Use mechanical equipment to lift and move items when necessary.
	- Cuts, bruises	- Use cotton or leather work gloves for materials handling.
	- Splashes	- Wear eye protection as needed (i.e., safety glasses/goggles, and face shield)
	- Chemical burns	- Wear appropriate protective clothing and chemical resistant gloves as specified.

Motor Vehicle Operations/Traffic	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Passenger vehicles - Traffic cones - Orange vests - Barricades - Flag person(s)  <u>Inspection Requirements:</u> - Continuous - Annual check of employee motor vehicle records - Monthly Vehicle Inspection  <u>Training Requirements:</u> - Driver's license	- Vehicle accidents - Personal injury	- Place physical (i.e., barricades, fencing) around work areas regularly occupied by pedestrians. - If working adjacent to roadways, have workers wear fluorescent orange vests. - Use warning signs or lights to alert oncoming traffic. - Assign flag person(s) if necessary to direct local traffic. - Set up temporary parking locations outside the immediate work area. - Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits. - Wear seat belts when vehicles are in motion. - Contractor employees are not authorized to operate NWT motor vehicles without authorization from the Project Manager. - Passenger vehicles and light trucks yield to heavy equipment.

Construction/Heavy Equipment	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u> (Check all that apply)</p> <p><input type="checkbox"/> Forklift</p> <p><input checked="" type="checkbox"/> Crane</p> <p><input checked="" type="checkbox"/> Drill rig</p> <p><input type="checkbox"/> Front-end loader</p> <p><input checked="" type="checkbox"/> Backhoe</p> <p><input checked="" type="checkbox"/> Trackhoe</p> <p><input type="checkbox"/> Grader</p> <p><input type="checkbox"/> Dozer</p> <p><input checked="" type="checkbox"/> Compactor</p> <p><input type="checkbox"/> Excavator</p> <p><input type="checkbox"/> Other: _____</p> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Daily by operator</li> <li>- Check brakes and all required safety devices</li> <li>- Monthly maintenance</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Qualified equipment operators</li> <li>- Drill Rig Safety</li> </ul>	<ul style="list-style-type: none"> <li>- Personal injury</li> <li>- Property damage</li> <li>- Equipment damage</li> </ul>	<ul style="list-style-type: none"> <li>- Only authorized personnel who are qualified and trained shall operate heavy equipment.</li> <li>- Moving heavy equipment must have properly functioning back-up alarms.</li> <li>- Spotters on the ground will assist operators in manipulating vehicles and equipment into tight or confined spaces.</li> <li>- Operators shall maintain a constant awareness of personnel and equipment in the work areas.</li> <li>- Machinery or equipment shall not run unattended unless secured by the operator. No equipment shall be left running beyond a shift's end.</li> <li>- Blade, bucket, etc. will be fully lowered or blocked when not in use or being repaired.</li> <li>- Rollover protection shall be used when conditions call for such use.</li> <li>- No overhead work shall be performed when, as a result of that work, the possibility of a falling object striking any person exists.</li> <li>- When any machinery or equipment is found to be unsafe as a deficiency is noted, the equipment shall immediately be taken out of service and its use prohibited until unsafe conditions have been corrected.</li> <li>- Machinery or equipment shall not be operated in a manner that will endanger persons or property nor shall the safe operating speeds or loads be exceeded.</li> <li>- Getting off or on any equipment while it is in motion is prohibited.</li> <li>- Seats should be provided for each occupant of the equipment.</li> <li>- Safety belts shall be used by the operator while equipment is in use.</li> <li>- Equipment operated on the highway shall be equipped with headlights, taillights, brake lights, back-up lights, and turn signals visible from the front and rear.</li> <li>- All mobile equipment and the areas in which they are operated shall be adequately illuminated.</li> <li>- Mechanized equipment shall be shut down prior to and during fueling operations.</li> <li>- Whenever equipment is parked, the parking brake shall be set.</li> <li>- The rated capacity on lift trucks and cranes shall be posted on the vehicle so as to be clearly visible.</li> <li>- The load capacity ratings shall not be exceeded at any time.</li> <li>- No guard, safety appliance, or device shall be tampered with.</li> <li>- Heavy equipment operators shall inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgment.</li> <li>- When conditions are such that lightning is occurring, all equipment operations shall cease. Operations shall not start up again for 30 minutes after last occurrence.</li> <li>- Personnel are not allowed to work off of machinery or to use them as ladders.</li> <li>- Never walk or work directly in back of or to the side of heavy equipment without the operator's knowledge.</li> </ul>

Excavation/Trenching	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Backhoe/excavator - Barricades/barriers  <u>Inspection Requirements:</u> - Daily prior to start-up - Prior to each entry throughout excavation activities  <u>Training Requirements:</u> - Excavation Safety Training - NWT Policy Excavation and Trenching	- Cave-Ins	- Entry into any excavation shall be allowed only after consultation with the HS Manager. Regulatory notice shall be given prior to excavation entry > 5 feet deep. - Excavations >5 feet deep shall not be entered unless sloped, stepped, or shored. - Design of any support system shall be reviewed and approved by a professional engineer. - A competent person will be present in the field and shall perform/document daily inspections on all excavations > 4 feet deep. - Nonessential equipment will be staged at least 6 feet outside the immediate work area. - Material used for piling, bracing, shoring, and under-pinning shall be in good serviceable condition. - Foundations adjacent to where the excavation is to be made below foundation depth shall be supported by shoring, bracing, or underpinning.
	- Slip, trip, fall	- All work shall be performed from a stable ground position. - For entry into excavations 4 feet or greater, a means of entry/egress shall be provided every lateral 25 feet. - Spoil material shall be placed at least 2 feet from the edge of the excavation to avoid load strain on the sidewalls. - The excavation shall be guarded on all sides, if traffic (pedestrian/vehicle) may be in area. - Excavations shall be backfilled as soon as practical after work is completed and all associated equipment removed. - Ladders placed into excavation shall extend 3 feet above the top of the excavation. - Excavation/trench shall be secured properly and clearly visible to prevent unauthorized personnel from entering during non-working hours.
	- Underground	- Identify work area to be cleared. - Look at underground drawings/trenching. - Receive approval for excavation or relocate activities. - Complete the Underground/Overhead Utilities Checklist.
	- Hazardous	- Excavations > 4 feet which have potential for hazardous atmospheres, <u>and</u> personnel may enter, shall have air monitoring performed to determine potential risk.

Drilling/Crane Operations	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Crane</li> <li>- Drill Rig</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Daily inspection by the operator</li> <li>- Check brakes and all required safety devices</li> <li>- Load capacity rating of crane</li> <li>- Monthly Equipment Inspection</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Qualified crane operator(s)</li> <li>- NWT Mobile Crane Inspection</li> </ul>	<ul style="list-style-type: none"> <li>- Personnel injury</li> <li>- Property damage</li> <li>- Equipment damage</li> </ul>	<ul style="list-style-type: none"> <li>- Use qualified and trained crane operators.</li> <li>- Ground personnel shall not be allowed to work under suspended loads.</li> <li>- The operator shall not exceed the load capacity rating for the crane.</li> <li>- The load capacity shall be posted and clearly visible on the crane.</li> <li>- The crane jacks must be placed on firm ground before picking up a load.</li> <li>- Loads shall be lifted to the minimum height necessary to accomplish the task.</li> <li>- The load shall be well secured and balanced in the sling or hook before being lifted more than a few feet.</li> <li>- Crane operators shall inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgment.</li> <li>- Personnel shall not be lifted with cranes unless designed specifically for that purpose.</li> <li>- Drill rigs shall have a minimum 20 feet clearance from underground utilities.</li> <li>- The hoist rope or cable shall not be wrapped around the load.</li> <li>- Cranes, derricks, drill rigs, booms or similar equipment shall have a minimum 20 feet clearance from overhead electrical power lines.</li> <li>- Loads shall never be carried over personnel.</li> <li>- The rated capacity on lift trucks and cranes shall be posted on the vehicle so as to be clearly visible.</li> <li>- The load capacity ratings shall not be exceeded at any time.</li> <li>- Drill rig shall only be moved with the derrick lowered.</li> <li>- The operator and NWT Representative shall pre-inspect/assess for safe access to the given worksite.</li> <li>- The operator and crew shall wear required PPE at all time's when drill rig/crane is in operation and for in exclusion zone.</li> <li>- The operator shall operate/maintain drill rig systems (ie. lifting lines, drilling tools, air, downhole or casing hammer, mud etc...) in a safe manner.</li> <li>- Maintain good housekeeping in rig vicinity to prevent slip, trip, fall hazards.</li> <li>- Be aware of possible thunderstorm activity, shut down and disperse from rig/mast area if thunderstorm in near vicinity.</li> </ul>

Noise	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Ear plugs</li> <li>- Ear muffs</li> <li>- Ear canal caps</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Start-up</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Use of sound level meter</li> <li>- Annual hearing conservation</li> <li>- NWT Policy Hearing Conservation</li> </ul>	<ul style="list-style-type: none"> <li>- Temporary threshold shift.</li> <li>- Permanent threshold shift.</li> </ul>	<ul style="list-style-type: none"> <li>- Review elements of Hearing Conservation Program.</li> <li>- Employees shall be informed of high noise areas where hearing protection is required and these areas marked.</li> <li>- Provide annual audiograms for employees.</li> <li>- Conduct noise surveys on activities in question.</li> <li>- Provide hearing protection on site.</li> <li>- Require use of hearing protection when noise levels are at exceed 85 dBA.</li> <li>- Exposure to impulse or impact noise should not exceed 140 dBA peak sound level.</li> <li>- Use engineering controls (i.e., guards, mufflers, distance) to reduce worker exposure.</li> </ul>

Heat Stress	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Cooling vests</li> <li>- Core control suits</li> <li>- Oral thermometers</li> <li>- Watch</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- At each break</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Heat stress Prevention, Symptoms, Treatment</li> <li>- NWT Policy Working in Hot Environments</li> </ul>	<ul style="list-style-type: none"> <li>- Heat rash</li> </ul>	<ul style="list-style-type: none"> <li>- Keep the skin clean and dry.</li> <li>- Change perspiration-soaked clothing, as necessary.</li> <li>- Bathe at end of work shift or day.</li> <li>- Apply powder to affected areas.</li> <li>- Wear clean/dry undergarments.</li> </ul>
	<ul style="list-style-type: none"> <li>- Heat cramps</li> </ul>	<ul style="list-style-type: none"> <li>- Drink plenty of cool fluids even when not thirsty.</li> <li>- Provide cool fluids for work crews.</li> <li>- Move victim to shaded, cool area.</li> <li>- Inform Supervisor of cramps even if occurring off the job.</li> </ul>
	<ul style="list-style-type: none"> <li>- Heat exhaustion</li> </ul>	<ul style="list-style-type: none"> <li>- Physiological worker monitoring as needed (i.e., heart rate, oral temperature).</li> <li>- Set up work/rest periods.</li> <li>- Use the buddy system.</li> <li>- Allow workers time to acclimate.</li> <li>- Have ice packs available for use on breaks.</li> </ul>
	<ul style="list-style-type: none"> <li>- Heat stroke</li> </ul>	<ul style="list-style-type: none"> <li>- Evaluate possibility of night work.</li> <li>- Perform physiological monitoring on workers during breaks.</li> <li>- Wear body cooling devices.</li> </ul>

Cold Stress	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Insulated clothing  <u>Inspection Requirements:</u> - On each break  <u>Training Requirements:</u> - Cold stress Prevention, Symptoms, Treatment - NWT Policy Cold Stress	- Frost nip - Frostbite - Hypothermia	- Wear insulating clothing when temperatures drop below 40EF. - Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. - Remove wet clothing promptly. - Take breaks in warm areas. - Reduce work periods as necessary. - Layer work clothing.

Confined Space Entry	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Portable lighting (Intrinsically Safe)</li> <li>- Air monitoring instruments</li> <li>- Extrinsic device (tripod/winch, etc.)</li> <li>- Body harness/lanyard/lifeline</li> <li>- Air horn, Radios</li> <li>- Stokes basket</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Prior to entry</li> <li>- Continuous throughout activities</li> <li>- Each shift</li> <li>- Entry permit, PRCS</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Confined Space (entrant, attendant, supervisor)</li> <li>- FA/CPR (American Red Cross)</li> <li>- Bloodborne Pathogen, as needed</li> <li>- NWT Policy Confined Spaces</li> </ul>	<ul style="list-style-type: none"> <li>- Chemical exposure</li> </ul>	<ul style="list-style-type: none"> <li>- Use PPE and respiratory equipment.</li> <li>- Conduct air monitoring prior to and during confined space activities.</li> <li>- Establish action levels based on anticipated hazards.</li> </ul>
	<ul style="list-style-type: none"> <li>- Poor ventilation</li> </ul>	<ul style="list-style-type: none"> <li>- Use a blower or negative air machine to circulate or introduce air into confined space.</li> </ul>
	<ul style="list-style-type: none"> <li>- Asphyxiation</li> </ul>	<ul style="list-style-type: none"> <li>- Work only in areas that contain 20-23.5% oxygen (regardless of level of protection).</li> </ul>
	<ul style="list-style-type: none"> <li>- Worker down</li> </ul>	<ul style="list-style-type: none"> <li>- Use the buddy system.</li> <li>- Have two standby personnel.</li> <li>- Set up extrication means prior to start of activities.</li> <li>- Set up means of communication among confined space entry team.</li> <li>- Assigned rescue personnel must have rescue training.</li> <li>- All moving parts and machinery in confined space will be lockout/tagout or isolated.</li> <li>- Rescue personnel shall only attempt a rescue in SCBAs.</li> </ul>
	<ul style="list-style-type: none"> <li>- Explosion</li> </ul>	<ul style="list-style-type: none"> <li>- Use explosion proof lighting/equipment in potentially flammable atmospheres.</li> <li>- Do not work in confined space where LEL is 10 percent or greater.</li> </ul>

Underground/Overhead Utilities	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Magnetometer (as needed)</li> <li>- Nonconducting probe</li> <li>- Hand shovels</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Utilities inspection</li> <li>- Excavation Permit (as needed)</li> <li>- Underground/overhead utility checklist</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Use of magnetometer (as needed)</li> </ul>	<ul style="list-style-type: none"> <li>- Electrocutation</li> <li>- Explosion</li> </ul>	<ul style="list-style-type: none"> <li>- Before beginning intrusive activities, the Project Manager shall ensure that underground utilities (i.e., electrical, phone, gas, water lines) are located.</li> <li>- Review blueprints and as-built drawings of facility layout.</li> <li>- Field work shall maintain a 20 feet clearance whenever possible.</li> <li>- When underground utilities are exposed, they shall be protected to avoid damage.</li> <li>- All uncovered lines shall be identified before work proceeds.</li> <li>- Personnel on the ground will assist in probing the soils to find the exact location of the lines and will use hand shovels to carefully remove the soil adjacent to the lines.</li> <li>- Identify work area to be cleared.</li> <li>- Look at underground drawings.</li> <li>- Contact owner of work area.</li> <li>- Receive approval for excavation/trenching or relocate activities</li> <li>- Complete the Underground/Overhead Utilities Checklist.</li> <li>- Use surface geophysical methods to locate underground lines if blueprints or as-built drawings are deemed insufficient to accurately locate underground lines.</li> </ul>

Hazardous Energy and Hazardous Material Sources	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Ground Fault Circuit Interrupter (GFCI)</li> <li>- Double-insulated tools</li> <li>- Generator</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Prior to start-up</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Electrical safety awareness</li> <li>- NWT Policy Use of Portable Electrical Equipment</li> <li>- NWT Policy Hot Work</li> </ul>	<ul style="list-style-type: none"> <li>- Electrocution</li> <li>- Electrical burns</li> <li>- Fire</li> </ul>	<ul style="list-style-type: none"> <li>- Maintain a minimum distance of 20 feet between electrical lines and any part of equipment.</li> <li>- Portable electrical tools and equipment will be double-insulated.</li> <li>- Portable fire extinguishers rated 10A:20BC will be kept on site.</li> <li>- Workers will not handle electrical equipment or wires if their hands are wet or they are standing on wet surfaces.</li> <li>- Electrical cords shall be pulled from the outlet by the plug, not the electrical cord.</li> <li>- Identify the location of underground/overhead electrical lines in the work area, as appropriate.</li> <li>- Power tools shall be tagged and removed from service when not functioning properly.</li> <li>- Lockout/tagout procedures shall be implemented when employees need to perform repair or maintenance on electrical equipment where the unexpected energization, or start-up of stored energy could cause injury.</li> <li>- Worn or frayed extension cords shall be replaced.</li> <li>- All electrical wiring and equipment shall be a type listed by Underwriters Laboratories or another recognized listing agent for the specific application.</li> <li>- Before work begins, the Project Manager shall ensure by inquiry, observation, or instruments that any part of an electric power circuit will not bring any person, tool, or machine into contact with it.</li> <li>- Extension cords shall not be fastened with staples, hung from nails, or suspended by bare wire.</li> </ul>

Welding, Cutting and Other Hot Work	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Welder</li> <li>- Cutter</li> <li>- Gas cylinders (acetylene and oxygen)</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Prior to each use check equipment</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Qualified welder</li> <li>- Hot Work Permit</li> <li>- NWT Policy Hot Work</li> </ul>	<ul style="list-style-type: none"> <li>- Welding flash</li> <li>- Welding burns</li> <li>- Fire</li> </ul>	<ul style="list-style-type: none"> <li>- Cutting, welding, or other operations that produce excessive heat, open sparks, or flames shall not be permitted within 50 feet of a potential liquid fuel source.</li> <li>- One 10A:20BC multipurpose dry chemical fire extinguisher shall be readily available in the hot works area.</li> <li>- Complete a Hot Work Permit prior to initiation of hot works.</li> <li>- The area shall be monitored with a combustible gas meter to ensure &lt;10% LEL. Work will not be permitted in atmospheres &gt;10% LEL.</li> <li>- The worker shall be protected from sparks or flame by wearing leather guards (Tyvek is not protective against heat sources).</li> <li>- Welders shall wear welding goggles or hood.</li> <li>- Complete a Hot Work Permit for each shift and when conditions change.</li> <li>- Compressed gas cylinders shall be secure in an upright position.</li> <li>- Gas regulators shall be in proper working order.</li> <li>- Cylinders shall be marked or stenciled to identify the type of gas in the cylinder.</li> <li>- Oil and oily rags shall be kept away from oxygen equipment.</li> <li>- Cylinder valves shall be closed when work is finished and when cylinders are empty or moved.</li> <li>- Objects to be welded, cut, or heated shall be moved to a safe location when possible.</li> <li>- Remove all potential fire hazards in the vicinity.</li> <li>- Review possibility of chemical coating on item(s) to be welded, cut, or heated; provide appropriate respirators protection, if needed, to operator.</li> <li>- Acetylene regulators shall not be adjusted to permit a discharge &gt;15 psig.</li> <li>- Fuel/oxygen combination used for cutting, welding, or heating shall have reverse-flow check valves between torch and regulator.</li> </ul>

Poisonous Plants	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Topical ointment - Clothing for barrier  <u>Inspection Requirements:</u> - Daily  <u>Training Requirements:</u> - Identification of poisonous plants	- Dermatitis - Allergic Reaction	- Post areas that have been identified with poisonous plants. - Avoid contact with these plants to the extent possible. - Wear clothing or coveralls with long sleeves. - Promptly wash clothing that has contacted poisonous plants. - Wash affected areas immediately with soap and water. - Apply ointment to affected areas. - Inform HS and Project Manager if hypersensitivity allergic reactions to a certain plant is known.

Poisonous Snakes and Animals	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - 9-1-1  <u>Inspection Requirements:</u> - Daily - Prior to entry - During work activities  <u>Training Requirements:</u> - Identification of poisonous snakes/animals.	- Rabies - Bites - Allergic Reaction	- Keep work areas clear of vegetation and small brush. - Avoid placing hands or feet into obscure areas (i.e., beneath rocks, well pads, brush piles). - Wear rubber or PVC boots into vegetated areas where poisonous snakes or animals inhabit. - Use the buddy system. - Postpone work in areas where poisonous snakes or animals are nested. - Inspect protected areas before entering. - Inform HS and Project Manager if allergic to bites, and carry emergency kit as required.

Insect Hazards	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Insect repellent  <u>Inspection Requirements:</u> - Daily - Prior to entry - During work activities  <u>Training Requirements:</u> - General awareness	- Ticks	- Wear light colored clothing (can see ticks better). - Mow vegetated and small brush areas. - Wear insect repellent. - Wear long sleeves and long pants. - Visually check oneself promptly and frequently after exiting the work area.
	- Bees, wasps, ants	- Identify infested areas to the Site Supervisor. - Workers who are allergic or capable of allergic reactions to bee, wasp, or ant stings or bites shall notify their Supervisor(s). - Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.

Radiological Hazards	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Moisture/Density Gauge - Radiation Dosimeter  <u>Inspection Requirements:</u> - General work areas.  <u>Training Requirements:</u> - Moisture/Density Gauge user course. - HazComm: Radiation	- Radiation exposure. - Accidental release  - Loss of radiation	- Operators of moisture/density gauges must be authorized by the Radiation Safety Officer. - Operators will wear their assigned radiation dosimeter while working with, carrying, and/or transporting a gauge. - ALARA (as low as reasonably achievable) principle to govern use of gauges. - Operators are to maintain maximum allowable distance at all times. - Unauthorized users will maintain a distance of 5 feet when gauge is outside of its case. - Maintain visual contact with gauge while in the field to prevent equipment from running over it. - Gauge is to be secured and locked at all times while not in the field.

Extended Work Shifts/Multiple Crews	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Multiple Crews</li> <li>- Portable lights</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Employee fatigue</li> <li>- Availability of work space</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- General safety awareness</li> </ul>	<ul style="list-style-type: none"> <li>- Fatigue</li> <li>- Reduced productivity.</li> <li>- Increased incident potential.</li> <li>- Increased hazard exposure potential.</li> <li>- Inattention due to familiarity/relaxing of precautions.</li> </ul>	<ul style="list-style-type: none"> <li>- No employee or contractor is authorized to work when they are overly fatigued.</li> <li>- If driving a motor vehicle is part of their assignment, then workers will not work more than 14 hours in a 24 hour period.</li> <li>- Heavy equipment will not be operated by one individual for more than 10 hours in any 24 hour period without a minimum of 8 hours off duty.</li> <li>- Employees experiencing negative effects of extended work shifts shall be instructed to rest off duty for a sufficient time period to eliminate the negative effects.</li> <li>- Operators which may extend shifts beyond 10 hours per day, six days a week or which will have multiple shifts operating shall be reviewed by the Site HS Officer.</li> </ul>

Adverse Weather	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Radios - Shelter  <u>Inspection Requirements:</u> - Throughout work activities  <u>Training Requirements:</u> - General awareness - FA/CPR (American Red Cross)	- Lightning Strikes	- Whenever possible, halt activities and take cover. - If outdoors, stay low to the ground, but limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). - Seek shelter in a building if possible. - Stay away from windows - If available, crouch under a group of trees instead of one single tree. - Keep 6 feet away from tree trunk if seeking shelter beneath tree(s). - If in a group, keep 6 feet of distance between people. - Suspend drill rig/crane operations if thunderstorm/lightning is in immediate vicinity.
	- Thunderstorms - Tornadoes	- Listen to the radio or TV announcements for pending weather information. - Cease field activities during thunderstorm or tornado warnings, as directed by the Project Manager. - Seek shelter. Do not try to outrun a tornado. - Do not stand near windows or door glass.
	- Earthquakes	- Seek immediate shelter (e.g., door jambs, desks, etc). - Do not stand near windows or door glass.

Sanitation and Housekeeping	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Trash containers</li> <li>- Hand tools</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Daily</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- General awareness</li> </ul>	<ul style="list-style-type: none"> <li>- Slip, trip, fall</li> </ul>	<ul style="list-style-type: none"> <li>- Personnel will clean-up the work site daily and dispose of trash.</li> <li>- Refuse containers or bins will be readily available on site.</li> <li>- Provide adequate storage for tools and equipment.</li> <li>- Provide adequate lighting in all work areas.</li> <li>- Provide adequate ventilation in all work areas.</li> <li>- Work areas and floors shall be kept clear of debris.</li> <li>- Materials shall not be stacked higher than 6 feet.</li> <li>- Provide stools, ladder where workers need to access elevated storage areas.</li> <li>- Protruding nails in scrap boards, planks, and lumber shall be removed, hammered in, or bent over flush with the wood.</li> <li>- Weeds and grass shall be kept down.</li> <li>- Flammable materials shall be placed in approved flammable storage containers.</li> </ul>

Illumination	Potential Hazards	Control Measures
<u>Equipment to be Used:</u> - Portable lights/light towers  <u>Inspection Requirements:</u> - General HazComm  <u>Training Requirements:</u> - General safety awareness	- Eye strain/fatigue. - Increased injury/ incident potential due to lowered visual acuity.	- Minimum of 5 foot-candles required.

Water Safety	Potential Hazards	Control Measures
<p><u>Equipment to be Used:</u></p> <ul style="list-style-type: none"> <li>- Personal flotation devices (PFDs)</li> </ul> <p><u>Inspection Requirements:</u></p> <ul style="list-style-type: none"> <li>- Prior to and after each use</li> </ul> <p><u>Training Requirements:</u></p> <ul style="list-style-type: none"> <li>- Water rescue training</li> </ul>	<ul style="list-style-type: none"> <li>- Drowning</li> </ul>	<ul style="list-style-type: none"> <li>- PFDs will be provided and worn by workers working over or near water where the danger of drowning exists.</li> <li>- PFDs shall be inspected prior to and after each use.</li> <li>- Defective PFDs will be tagged and removed from service.</li> <li>- Ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue.</li> <li>- At least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water.</li> <li>- Use the buddy system.</li> <li>- Personnel trained in launching and operating the skiff shall be readily available during work hours.</li> </ul>