

N90845.AR.001370
NWIRP BETHPAGE
5090.3a

ACCIDENT PREVENTION PLAN FOR TIME CRITICAL REMOVAL ACTIONS AREA OF
CONCERN 32 (AOC32) PCE UNDERGROUND STORAGE TANKS NWIRP BETHPAGE NY
9/1/2012
H&S ENVIRONMENTAL, INC.

**ACCIDENT PREVENTION PLAN
FOR
TIME CRITICAL REMOVAL ACTIONS
AOC 32 – PCE UNDERGROUND STORAGE
TANKS
AT
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK**

**CONTRACT NUMBER: N40085-12-D-1717
TASK ORDER: 0002**

Prepared For:



**DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND MID-ATLANTIC
9742 Maryland Avenue
Norfolk, VA 23511**

Prepared By



**H&S Environmental, Inc.
160 East Main Street, Suite 2F
Westborough, MA 01581**

SEPTEMBER 2012

H&S PROJECT No: 2062-001

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS	iv
1.0 Signature Sheet	1
2.0 BACKGROUND INFORMATION	3
2.1 Contractor	4
2.2 Contract Number/Task Order Number	4
2.3 Project Name	4
2.4 Site Location and Background	4
2.5 Statement of Work	5
2.6 Project Work Activities	6
3.0 STATEMENT OF SAFETY AND HEALTH POLICY	7
3.1 Safety and Health Goals and Objectives	7
3.2 Measures for Accomplishing Safety and Health Goals and Objectives	8
4.0 RESPONSIBILITIES AND LINES OF AUTHORITIES	9
4.1 H&S Key Safety Personnel and Health and Safety Responsibilities	9
4.1.1 Safety and Health Manager	9
4.1.2 Project Manager	9
4.1.3 Site Safety and Health Officer	9
4.2 Competent and/or Qualified Person(s)	10
4.3 Performance Requirements	11
4.4 Pre-Task Safety and Health Analysis	11
4.5 Lines of Authority	11
4.6 Policies/Procedures for Non-Compliance with Safety Requirements	11
4.7 Accountability Procedures for Managers and Supervisors	11
4.8 Safety Compliance System	11
4.8.1 Disciplinary Action	11
4.8.2 Safety Recognition	12
4.9 Safety Communications System	12
4.10 Employee Reporting of Identified Hazards	12
4.11 Safety Information Posting and Written Communications	12
4.12 Personal Protective Equipment	12
5.0 SUBCONTRACTORS AND SUPPLIERS	14
6.0 TRAINING	16
6.1 Training and Safety Meetings	16
7.0 SAFETY AND HEALTH INSPECTIONS	18
7.1.1 Safety Inspections	18
8.0 ACCIDENT REPORTING	19
9.0 PLANS REQUIRED BY THE SAFETY MANUAL	21
9.1 Layout Plans for Temporary Structures	21
9.2 Emergency Response Plan: Procedures and Tests	21
9.3 Emergency Response Plan: Spill Plans	21
9.4 Emergency Response Plan: Firefighting Plan	21
9.5 Emergency Response Plan: Posting of Emergency Telephone Numbers	22
9.6 Emergency Response Plan: Man Overboard/Abandon Ship	22
9.7 Onsite Medical Support	22
9.8 Offsite Medical Support	22
9.9 Alcohol and Drug Abuse Prevention Plan	22
9.10 Site Sanitation Plan	22
9.11 Access and Haul Road Plan	22

TABLE OF CONTENTS

9.12	Respiratory Protection Plan	23
9.13	Health Hazard Control Program	23
9.14	Hazard Communication Program	23
9.15	Process Safety Management Plan	23
9.16	Lead Abatement Plan	23
9.17	Asbestos Abatement Plan	23
9.18	Radiation Safety Program	23
9.19	Abrasive Blasting	23
9.20	Heat/Cold Stress Monitoring Plan	23
9.21	Crystalline Silica Monitoring Plan	23
9.22	Night Operations Lighting Plan	24
9.23	Fire Prevention Plan	24
9.24	Emergency Response Plan: Wild Land Fire Prevention Plan	24
9.25	Hazardous Energy Control Plan	24
9.26	Critical Lift Plan	24
9.27	Contingency Plan for Severe Weather	24
9.28	Float Plan	24
9.29	Site Specific Fall Protection & Prevention Plan	24
9.30	Demolition Plan: Engineering and Asbestos Surveys	24
9.31	Excavation and Trenching Plan	24
9.32	Emergency Rescue: Tunneling	25
9.33	Underground Construction Fire Prevention and Protection Plan	25
9.34	Compressed Air Plan	25
9.35	Formwork and Shoring Erection and Removal Plan	25
9.36	Pre Cast Concrete Plan	25
9.37	Lift Slab Plans	25
9.38	Steel Erection Plan	25
9.39	Site Safety and Health Plan	25
9.40	Blasting Plan	25
9.41	Diving Plan	25
9.42	Confined Space Plan	25
9.43	Unexploded Ordnance Plan (UXO)	26
10.0	RISK MANAGEMENT	27
10.1	Hazard Identification and Evaluation System	27
10.1.1	Accident Prevention Plan	27
10.1.2	Activity Hazard Analyses	27
10.2	Hazard Correction System	27
11.0	CONTRACTOR INFORMATION AND SITE SPECIFIC HAZARDS AND CONTROLS	29
11.1	Chemical Hazards	29
11.2	Physical Hazards	29
11.3	Biological Hazards	29
11.4	Activity Hazard Analyses	30

TABLE OF CONTENTS

FIGURES

- 1-1 Health and Safety Acknowledgement Form
- 1-2 Location of NWIRP Bethpage Site 1

ATTACHMENTS

- A Site Safety and Health Plan
- B Resumes and Qualifications
- C Organizational Chart
- D Activity Hazard Analyses (AHAs)
- E Completed Checklist (EM 385-1-1)

LIST OF ABBREVIATIONS AND ACRONYMS

AHA	Activity Hazard Analysis
AOC	Area of Concern
APP	Accident Prevention Plan
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CHSM	Corporate Health and Safety Manager
COTR	Contracting Officer's Technical Representative
CPR	Cardiopulmonary Resuscitation
CSHP	Corporate Safety and Health Program
EM-385-1-1	USACE Safety and Health Requirements Manual
EMR	Experience Modification Rate
EPA	U.S. Environmental Protection Agency
FT	Field Technician
µg/L	micrograms per liter
mg/L	milligrams per liter
MIDLANT	Mid-Atlantic
MSDS	Material Safety Data Sheet
NAVFAC	Naval Facilities Engineering Command
NGC	Northrop Grumman Corporation
NWIRP	Naval Weapons Industrial Reserve Plant
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PCE	Tetrachloroethene
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
SHM	Safety and Health Manager
SOW	Statement of Work
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank

1.0 SIGNATURE SHEET

**Accident Prevention Plan
Site 1, AOC 32 Removal Actions
NWIRP Bethpage
Bethpage, New York
Contract No. N40085-12-D-1717**

I hereby certify that this Accident Prevention Plan is in accordance with contract documents and is submitted for Naval Facilities Engineering Command (NAVFAC) approval.

Plan Preparer: , H&S Environmental; (508) 366-7442
Gregory Birch, PMP, Project Manager

Plan Approver: , H&S Environmental; (508) 366-7442
Edward Kearney, CIH

Plan Concurrence: , H&S Environmental; (508) 366-7442
Ed King, PE, Vice President of Operations

Team personnel assigned to this project shall be familiar with the possible hazards involved, the safety procedures, and other information outlined in this plan. Prior to the commencement of work, the Team Leader/Site Safety and Health Officer will discuss additional procedures to be implemented, addressing any other site-specific conditions that may arise. All on-site personnel of H&S Environmental, Inc. and all subcontractors must sign the following Plan Acknowledgement Form (Figure 1-1).

By signing below, the undersigned certify they have had the opportunity to read and ask questions about this APP, and that they understand the procedures, equipment, and restrictions of this plan and agree to abide by them.

Figure 1-1
Health and Safety Acknowledgement Form
Site 1 AOC 32 Removal Actions
NWIRP Bethpage
Bethpage, New York
Contract No. N40085-12-D-1717

I have reviewed the H&S Accident Prevention Plan for the above indicated site and understand the hazards and control measures required on this project.

I agree to follow the procedures outlined in this plan and to inform the H&S Project Manager, Superintendent, and/or Site Safety and Health Officer should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this project.

No.	Name	Signature	Date	Company
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				

2.0 BACKGROUND INFORMATION

H&S recognizes a responsibility to provide employees with a safe and healthful workplace and to provide clients with safe and effective services. Through implementation of a project Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP), H&S seeks to take proactive measures to recognize, evaluate, and control workplace hazards and to implement preventive actions to minimize the potential for employee injuries and illnesses. The APP presents the contractor safety and health procedures to be implemented by H&S for services associated with the *Naval Facilities Engineering Command (NAVFAC)* under Contract No. N40085-12-D-1717 and in accordance with following the Statement of Work (SOW):

- *Statement of Work dated 7 May 2012 for Area of Concern – PCE Underground Storage Tanks, NWIRP Bethpage*

The APP contains accident prevention provisions established in Appendix A of the USACE Safety and Health Requirements Manual (EM-385-1-1), dated 15 September 2008, and effective 12 January 2009. The APP along with the SSHP establishes the written safety and health program for personnel involved in project fieldwork and applies and interfaces in conjunction with requirements of the H&S Corporate Safety and Health Program (CSHP). H&S' SSHP is provided in Attachment A.

The APP has been prepared to meet the requirements of: U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) standards, Title 29 Code of Federal Regulations (CFR) Part 1910 and 29 CFR Part 1926; USACE EM 385-1-1; and the NAVFAC MIDLANT project SOW as previously referenced.

The primary objective of the APP is to provide the field team with a safe working environment during fieldwork. The APP contains the following major categories of information:

- Signature Sheet
- Background Information
- Statement of Safety and Health Policy
- Responsibilities and Lines of Authority
- Subcontractors and Suppliers
- Training
- Safety and Health Inspections
- Safety and Health Expectations, Incentive Programs and Compliance
- Accident Reporting
- Medical Support
- Personal Protective Equipment (PPE)
- Plans Required by the Safety Manual
- Contractor Information
- Site-Specific Hazards and Controls.

The APP will be primarily implemented by the H&S Project Manager (PM), Project Site Superintendent (SS)/Site Safety and Health Officer (SSHO), and the Safety and Health Manager

(SHM) in coordination with the NAVFAC Contracting Officer's Technical Representative (COTR) and the individual site Points of Contact (POCs).

Compliance with the APP is required of all H&S personnel, subcontractors, and associated third parties on site. A copy of the APP will be maintained on site during work activities and will be available for inspection and review by site or agency personnel. Field personnel will review applicable aspects of the APP before site work and will sign an "APP Review" acknowledgment form (Figure 1-1, provided previously) indicating they have reviewed the pertinent aspects of the plan.

The content of the APP may be revised and/or amended should additional information become available regarding the hazards present at the site and/or should significant changes occur in the SOW, operational procedures, site hazards, and/or hazard control measures. The APP may be modified by the SSHO upon review and approval of the COTR, PM, and SHM. Field personnel are informed of changes to the APP and SSHP through safety meetings and written addendum or revision to the APP.

2.1 Contractor

H&S Environmental, Inc.

2.2 Contract Number/Task Order Number

N40085-12-D-1717, TASK ORDER NO. 0002

2.3 Project Name

Site 1 – Area of Concern (AOC) 32 PCE Underground Storage Tanks Removal Actions

2.4 Site Location and Background

NWIRP Bethpage was established in 1941 and was formerly a Government Owned Contractor-Operated facility that was operated by the Northrop Grumman Corporation (NGC) until September 1998. It is located in east central Nassau County, Long Island, New York, approximately 30 miles east of New York City. The site covers approximately 109.5 acres.

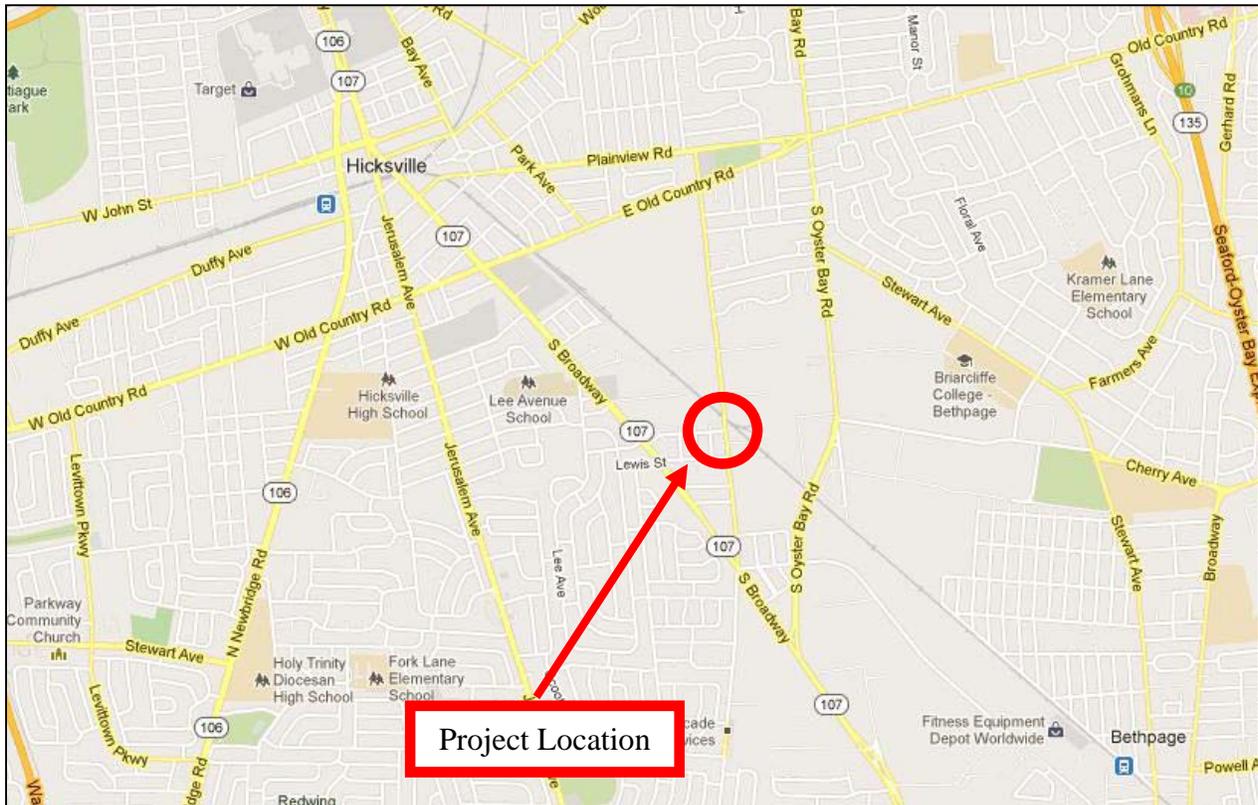
The site's historical uses included research, prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. Historical operations that resulted in hazardous material generation at the facility included metal finishing processes, maintenance operations, painting of aircraft and components, and other activities that involved aircraft manufacturing. Wastes generated by plant operations were disposed of directly into drainage sumps, dry wells, and/or on the ground surface, resulting in the detection of a number of hazardous wastes, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and inorganic analytes - chromium and cadmium - at the site.

Area of Concern (AOC) 32 was closed by NGC in the 1980s. According to NGC's *Phase I Environmental Site Assessment* dated April 1997, there were two 6,000 gallon steel below ground tetrachloroethylene (PCE) bulk storage tanks that were identified as Tanks 1090 and

1091 used at Plant 3. According to a NGC, in the mid-1980's an above ground tank was constructed to hold the PCE and the use of the two underground tanks was abandoned.

A general location of AOC 32, at the NWIRP Bethpage, Site 1 is shown in **Figure 1-2**.

Figure 1-2
Location of the NWIRP Bethpage Site 1 Project Site



2.5 Statement of Work

The scope of work includes performing the following tasks:

- 1) Development of a Work Plan (WP), Site Specific Safety and Health Plan (SSHP), Accident Prevention Plan (APP), and Waste Management Plan
- 2) Collection of four (4) water and two (2) solids samples from the tank for waste characterization.
- 3) Removal Action of two steel underground storage tanks (Dimensions: Tank 1: 6' diameter by 24' in length; Tank 2: 6' diameter by 16' in length) and enough soil to remove the tanks.
- 4) Collection of post removal action samples.

- 5) Site Restoration including backfilling excavations with clean fill and aggregates to subgrade for asphalt placement (by others).

All administrative tasks will be completed in an office environment while the remaining tasks will be completed onsite with the use of various heavy construction equipment.

2.6 Project Work Activities

For the purposes of this APP, H&S has organized project activities into the following primary field project work tasks:

- Mobilization and Site Preparation
- Underground Storage Tank Removal
- Soil Excavation, Transportation, and Disposal
- Post Excavation Sampling
- Site Restoration and Demobilization

3.0 STATEMENT OF SAFETY AND HEALTH POLICY

H&S has established this project APP to assist in providing a safe and healthful workplace. H&S recognizes a responsibility to provide employees with a safe and healthful workplace and to provide clients with safe and effective services. H&S considers safe operations and accident prevention to be a priority. One of H&S' goals for accident prevention is to maintain its excellent accident experience record. H&S accident experience history includes no lost time reportable incidents since our inception in 2003.

Through implementation of this APP, H&S seeks to take proactive measures to anticipate, recognize, evaluate, and control workplace hazards and to implement preventive actions to minimize the potential for employee injuries and illnesses. The safety of employees is considered to be of paramount concern in performance of company operations as employees are our most important asset and their well being our greatest responsibility. The safety and health of every worker must be a primary consideration in every business decision and plan. H&S management will maintain a safety and health program that conforms to the best practice of organizations of this type. To be successful, such a program must encourage proper attitudes toward accident prevention on the part of both supervisors and employees. It also requires cooperation in all safety and health program aspects, not only between supervisors and employees, but also between employees and their fellow workers. Only through such a cooperative effort can an effective safety and health program be maintained.

One of the primary objectives of the H&S Safety and Health Program is to prevent accident occurrence. There is no phase of company operations of greater importance than accident prevention. Accidents and injuries can be prevented. Our goal is zero accidents and injuries. A good safety record is evidence of effective managerial performance and preserves both human and economic resources of the company. It is H&S' policy to do everything reasonable to protect employees, subcontractors, clients, and the public from the results of accidents.

To establish and maintain an effective safety and health program, the following must be accomplished:

- Provide a safe work environment by having a safe workplace, equipment, and materials
- Establish safe work operations, safe work rules and procedures, and comply with accepted safe work practices and safety and health regulations
- Provide safety and health training to help personnel work safely and to promote an understanding that each individual has a duty and responsibility to protect themselves and others
- Everyone in this organization must actively support and participate in the H&S Corporate Safety and Health Program and accept the premise that "Accidents Can Be Prevented."

3.1 Safety and Health Goals and Objectives

Safety and health goals and objectives are to:

- Familiarize site personnel with the APP and seek their support in attaining safety and health goals.
- Provide a safety program that promotes safe working conditions and safe work practices.
- Prevent accidents, incidents, injuries, and illnesses.
- Create and reinforce safety conscious attitudes among employees.
- Provide a basis for continuing employee safety training.
- Identify persons with authority and responsibility for APP implementation.
- Establish a system for ensuring employee compliance with safe work practices.
- Establish procedures for identifying and evaluating workplace hazards.
- Implement procedures for reporting and investigating injuries and illnesses.
- Establish procedures for correcting unsafe workplace conditions and unsafe work practices.
- Provide safety and health training and instruction for employees.

3.2 Measures for Accomplishing Safety and Health Goals and Objectives

Measures for accomplishing safety and health goals and objectives are to:

- Anticipate, recognize, evaluate, and control potential accident-producing situations through preplanning of safety and health considerations into work activities.
- Implement a safety inspection program to identify and correct unsafe work conditions, work practices, and work procedures.
- Train employees to recognize hazards, implement safe work procedures, and use safe work practices.
- Develop and enforce safety and health rules and require employees to adhere to these rules as a condition of employment.
- Use engineering and administrative safety controls and supplement with necessary PPE for worker protection.
- Report and investigate accidents promptly to determine cause and take corrective action to prevent recurrence.

4.0 RESPONSIBILITIES AND LINES OF AUTHORITIES

Section 4.1 “*H&S Key Safety Personnel and Health and Safety Responsibilities*” provides the lines of authority, identifies the key project personnel, and provides a description of the H&S personnel safety & health responsibilities. Listed personnel include those individuals serving in the following functions: Safety and Health Manager (SHM), Project Manager (PM), and Site Safety and Health Officer (SSHO).

The SSHO has a direct reporting relationship to the SHM regarding all Safety & Health matters. The SHM has a direct reporting relationship to the H&S President. The resumes and qualifications for the H&S SHM and SSHO are located in Attachment B of this APP. An Organizational Chart providing the lines of authority is located in Attachment C of this APP. No work will be performed unless a designated competent person is present on the job site.

4.1 H&S Key Safety Personnel and Health and Safety Responsibilities

4.1.1 Safety and Health Manager

The Safety and Health Manager (SHM), Edward Kearney, CIH, is a Certified Industrial Hygienist (CIH) who’s Safety and Health responsibilities are to:

- Oversee the development and approve the APP & SSHP
- Conduct Safety and Health inspections and audits as scheduled with the PM
- Provide Safety and Health technical assistance to the PM and SSHO

4.1.2 Project Manager

The Project Manager, Gregory Birch, PMP® is responsible for overall direction, coordination, technical consistency, and review of the project contract. PM Safety & Health responsibilities are:

- Direct, coordinate, and implement the project contract
- Review and approve the APP and SSHP
- Emphasize safety and hold personnel accountable for safe work performance
- Enforce implementation and compliance with the APP and SSHP
- Provide support to the SSHO for effective completion of duties
- Monitor and evaluate Safety & Health performance of project operations
- Communicate with the COTR to evaluate and resolve Safety & Health issues.

4.1.3 Site Safety and Health Officer

The primary SSHO, John Hudacek, is the Site Safety and Health Officer (SSHO). The SSHO will be the OSHA competent person and will be present during all fieldwork activities. Mr. Hudacek has successfully completed the OSHA 40-Hour HazWOPER and 30-Hour Construction Safety training. Training records are included in Attachment B. If

the SSHO must be absent from the site, the Safety and Health duties will be delegated to the Alternate SSHO, Ms. Stacey Lee.

SSHO Safety and Health responsibilities are:

- Develop the APP & SSHP
- Maintain copies of the APP & SSHP on site during field activities
- Develop Activity Hazard Analysis (AHAs) and conduct pre-task AHA reviews with project personnel
- Implement provisions of the APP/SSHP and the H&S Corporate Safety and Health Program
- Require that site personnel meet training and medical surveillance requirements
- Conduct site orientation training, APP/SSHP review, and daily safety meetings
- Emphasize safety and hold personnel accountable for safe work performance
- Review site hazards and establish safety control measures
- Maintain a hazardous substance inventory list
- Maintain copies of material safety data sheets (MSDSs)
- Maintain safety equipment and supplies
- Perform inspections for safe work operations
- Enforce implementation and compliance with the APP/SSHP
- Establish site control work zones and boundaries
- Determine PPE requirements and monitor proper use
- Direct decontamination procedures to be used
- Perform and/or coordinate site exposure monitoring
- Report safety violations or Safety and Health concerns promptly to the PM
- Ensure correction of unsafe work conditions and/or unsafe work practices
- Monitor and evaluate Safety and Health performance of project operations
- Maintain Safety and Health records
- Report and investigate accidents and incidents
- Communicate with the COTR to evaluate and resolve Safety and Health issues

4.2 Competent and/or Qualified Person(s)

The Competent and/or Qualified Persons for this project will be the PM and the SSHO (Greg Birch and John Hudacek, respectively).

4.3 Performance Requirements

No project site work shall be performed unless one of the Competent and/or Qualified Person(s) or their designee is onsite.

4.4 Pre-Task Safety and Health Analysis

Pre-Task Safety and Health Analysis will be reviewed with project personnel during the initial APP/SSHP review, before starting each Definable Feature of Work (DFW), and periodically during daily tailgate Safety & Health meetings. The Pre-Task Safety and Health Analysis, also known as Activity Hazard Analyses (AHA), is located in Attachment D.

4.5 Lines of Authority

An Organizational Chart providing the lines of authority is located in Attachment C of this APP.

4.6 Policies/Procedures for Non-Compliance with Safety Requirements

Section 4.8 of the APP outlines the policy regarding non-compliance with Safety requirements.

4.7 Accountability Procedures for Managers and Supervisors

Under Section 4.8.1 of this APP, disciplinary action is taken for managers and supervisors who fail to follow safety requirements. Additionally, negative ratings for employee performance reviews that affect merit pay increases are also implemented for managers and supervisors.

4.8 Safety Compliance System

A safety compliance system is established to make sure that employees comply with safe work practices and safety and health policies and procedures. The system's effectiveness is highly dependent upon the involvement, direct supervision, and enforcement of safety requirements by supervisory personnel. The system includes:

- Safety and health standard operating procedures (SOPs)
- Safety inspection program
- Recognition for employees who follow safe work practices
- Disciplinary actions for unsafe work performance

4.8.1 Disciplinary Action

H&S policy requires that employees strictly adhere to established safe work practices and procedures. If employees violate safety procedures or rules, they will be disciplined in accordance with the severity of the infraction. Employees who exhibit unsafe work performance will receive disciplinary action from the PM and SSHO in consultation with the SHM. Disciplinary action can include the following, depending upon the severity of the safety infraction:

- Verbal warning
- Written warning notice

- Termination of employment
- Other disciplinary action

Similar disciplinary action is taken for managers and supervisors who fail to follow safety requirements. Additionally, negative ratings for employee performance reviews that affect merit pay increases are also implemented for managers and supervisors.

4.8.2 Safety Recognition

Safety recognition and safety incentive programs are initiated for specific projects to promote improvement in safety compliance and/or safety performance. Such programs are established by the PM and SSHO in consultation with the SHM.

H&S implements a safety incentive program for field employees to help emphasize, promote, encourage, and reinforce safe work performance. The primary objectives of the program are to: help communicate the corporate commitment to safety and health, focus attention on safety and health at the field level, and to recognize, reward, and extend appreciation to those employees who have demonstrated safety consciousness and achieved incident-free work performance. The program is established for selected categories of field employees (hourly operators, laborers, technicians, and operations and maintenance staff).

4.9 Safety Communications System

A system for communication with employees regarding matters related to safety and health will be established and will include employee reporting of identified hazards, safety training, daily safety meetings, safety information postings, and written communications.

4.10 Employee Reporting of Identified Hazards

Employees are encouraged and required to inform the SS and SSHO of unsafe or hazardous conditions that are identified. Additionally, employees are encouraged to report observed unsafe work practices by employees, supervisors, or other individuals. Employees may communicate directly with the PM, SSHO, and/or SHM regarding any safety matter. No employee will be disciplined or otherwise discriminated against for reporting or correcting an unsafe condition. Employees may make anonymous reports of unsafe conditions or violations of safety rules to the SSHO or SHM for follow-up action.

4.11 Safety Information Posting and Written Communications

Safety posters, articles, notices, and other safety-related information will be posted in an area designated for employee review. These postings may include: safety posters; safety memorandums; safety inspections; incident investigation reports; safety notices and articles; safety training information; and posting of OSHA and labor law postings.

4.12 Personal Protective Equipment

PPE will be required for certain field operations based on the potential for site hazards. The SSHO and SHM will establish appropriate levels of protection for each work activity based on

review of site information, existing contaminant data, and evaluation of the potential for exposure. The SSHO and SHM will establish action levels for upgrade or downgrade in the initial minimum levels of protection.

It is anticipated that use of Level D protection will be the maximum level of protection required for project activities. If unexpected chemical contamination is encountered, work will stop and the SHM and PM will be consulted.

5.0 SUBCONTRACTORS AND SUPPLIERS

Subcontractors will be used to provide selected services associated with performance of project work. Subcontractors who come on site to perform fieldwork and/or enter controlled areas of the site are subject to SSHP requirements. H&S requirements for controlling and coordinating subcontractor compliance with safety and health requirements are detailed below.

- Subcontractors are required to follow applicable Federal, State, and local governmental regulations, applicable requirements of the H&S APP/SSHP, and customer requirements for work at their facilities.
- Subcontractor workers are required to obey directives from the SSHO
- Subcontractor personnel who do not comply with safety and health requirements may be immediately dismissed from the site by the PM, SS and/or SSHO.
- Subcontractor personnel (or subcontractor representative) will attend daily safety meetings conducted by the SSHO prior to starting work to review work operations and to discuss pertinent site safety topics.
- Provide copies of required safety and health training and certification documents to the SSHO, as applicable (i.e., licenses, training certifications, medical clearance [fitness for duty] certification, first-aid/cardiopulmonary resuscitation [CPR] training, respirator fit testing).
- Provide, before site work, a hazardous substances inventory list and copies of applicable Material Safety Data Sheets (MSDSs) to the SSHO for hazardous substances to be brought on site by the subcontractor.
- Provide an Activity Hazard Analysis (AHA) for subcontractor work activities. A detailed AHA is required for every phase of operations from all participants. The detailed AHA will ensure that every phase and the tasks involved in those phases are considered to identify the associated hazards and risks during the operation. These task and hazard risk analyses must be modified as needed to address a changing work environment.
- Enforce applicable SSHP requirements with subcontractor employees.
- Review, understand, and comply with the SSHP and safety instructions from the SSHO or other competent authority.
- Observe the buddy system during work activities.
- Promptly report unsafe work conditions or unsafe work practices to the subcontractor supervisor and the SSHO.
- Immediately report all injuries or illnesses to the subcontractor supervisor and the SSHO.

The anticipated subcontractors on this project include:

- Environmental Quality Company Northeast (EQNE) will be providing the labor, equipment, and materials for the excavation work and will perform the transportation and disposal of non-hazardous soils.
- A 3rd party utility locating service will be utilized to confirm the locations of any underground utilities within the work areas. Line locating services such as GPR will be utilized in finding the utility lines.
- A certified laboratory will be subcontracted to provide the soil analysis for post excavation sampling

H&S does not anticipate working in close proximity with other contractors who are not directly related to this project as no other known projects are underway at the planned project location.

6.0 TRAINING

Mandatory site-specific training is required for this project and a description of Safety and Health training procedures and requirements are included below. Copies of safety and health training certificates will be reviewed and maintained by the SSHO. Personnel will not be allowed to perform fieldwork until the SSHO has determined this documentation to be complete and sufficient. Workers assigned to fieldwork on this project are required to have completed the following training:

SSHO

- OSHA 40-Hour HazWOPER Training
- OSHA 8-Hour HazWOPER Supervisor Training
- OSHA 8-Hour HazWOPER Refresher Training
- OSHA 30-Hour Construction safety training (certificate in Attachment B)
- Bloodborne Pathogen training
- First-Aid/CPR training (certificate in Attachment B)

Site Personnel

- Safety Indoctrination Training – All employees involved in removal action activities must be 40-hour HazWOPER trained and be trained on the potential hazards of the project including accident prevention awareness, general construction safety requirements including those contained in this APP/SSHP, a discussion of AHAs, location of medical facilities, location of fire extinguishers and first aid kits, accident reporting procedures, and any other training deemed to be pertinent. Daily safety tailgate attendance is also required.

6.1 Training and Safety Meetings

Employees receive safety training regarding potential hazards associated with their work assignments. Copies of certificates of safety and health training for site personnel is reviewed and maintained by the SSHO. First Aid and CPR training certificates for the SSHO and Alternate SSHO are provided in Attachment B. Personnel are not allowed to complete fieldwork requiring specific training until such documentation has been presented to the SSHO.

Site orientation safety meetings, that involve review of pertinent aspects of the APP, are completed for personnel before project fieldwork. Daily safety meetings are conducted for field operations and attendance is documented. Daily safety meetings held by the SSHO at the job site are designed to:

- Provide instruction regarding hazards specific to each employee's job assignment.
- Act as safety and health training program to instill safe and healthful work practices.
- Remind employees that compliance with safe work practices is required.

- Instill a constant sense of safety-consciousness among supervisors and employees.
- Provide opportunity for employees to bring forward concerns and ideas about safety issues.
- Reassure employees to inform supervisors of work site hazards without fear of reprisal.

7.0 SAFETY AND HEALTH INSPECTIONS

H&S will conduct safety inspections of its work operations. H&S anticipates conducting daily jobsite safety inspections and daily equipment inspections during the project. Inspections will be conducted and/or coordinated by the SSHO. No external safety inspections are planned for this scope of work.

7.1.1 Safety Inspections

The SHM, SSHO, and SS complete safety inspections of project sites and work areas periodically. The SSHO will complete daily safety inspections of work sites to identify and correct hazards. Contractor quality control personnel, as part of their quality control responsibilities, conduct and document daily safety inspections.

The SSHO records identified safety and health issues and deficiencies and will indicate the actions, timetable, and responsibility for correction of deficiencies. The SSHO conducts follow-up inspections to correct identified deficiencies and documents these inspections in a like manner.

Safety inspections include work areas, equipment, work practices, and work procedures. Noncompliance items with APP requirements are to be corrected immediately or in a timely manner based on the classification of the hazard as imminent or non-imminent. In the case of unsafe or hazardous machinery, the equipment or area will be “red-tagged” (shut down or evacuated) until the hazard has been corrected. Employees are responsible for inspecting their work areas and equipment for unsafe or hazardous conditions. Employees should correct all unsafe conditions and report them immediately to their supervisor. Maintenance employees must periodically inspect and/or test field equipment for safe and hazard-free operation.

The SHM may also conduct field safety inspections/audits of projects upon the request of the PM. The frequency of these inspections will be at the evaluation of the SHM and PM based on the type of job activities and potential hazards to be encountered on the project.

8.0 ACCIDENT REPORTING

The COTR must receive immediate verbal notification and written notification within 24 hours for incidents involving a serious injury, explosion, fire, or a spill/release of toxic materials. Important requirements for incident reporting and follow up are described below.

- Employees must immediately report all incidents, injuries and illnesses, property damage, liability exposure cases, spills, fires, and serious near miss incidents to their supervisor or the SSHO.
- Employees must also notify Greg Pearman, PWD FEAD site representative and Chris Shukis, PWD FEAD New London.
- In the event of a serious incident, site personnel are responsible for notifying the SS and SSHO, who in turn are responsible for notifying the H&S PM and the SHM. The SHM should be contacted immediately in injury or illness cases to assist with coordination of required medical assistance and related workers' compensation case management follow up.
- If a serious injury occurs during the project, the SSHO will immediately report the incident to the PM, SHM, COTR, and the appropriate government agencies. H&S will give the COTR verbal notification and a follow-up email immediately following events such as, but not limited to, a lost workday injury, followed by a written notification within 24 hours using ENG FORM 3394, USACE Accident Investigation Report. The SSHO, SHM, and PM shall follow the instructions for preparing ENG Form 3394.
- The SSHO and the supervisor(s) responsible for an activity involved in an incident will participate in a complete investigation, and will inspect the area or equipment involved (as applicable). This includes completion and filing of ENG FORM 3394, USACE Accident Investigation Report with the COTR, and completion and filing of an "Incident Report by Supervisor," "Incident Statement by Employee," "Incident Statement by Witness," "Injury and Illness Report," "Property Damage, Loss, and General Liability Report," and "Vehicle Accident Report," as applicable, with the SHM within 24 hours of the injury (immediately to all incidents including minor and serious injuries or fatalities).
- In addition to those notified for a serious injury, the SHM must be notified immediately of any incident involving hospitalization of three employees or more or a fatality. The SHM will conduct an immediate investigation. The SHM is responsible for notifying the jurisdictional OSHA office as soon as possible and no later than 8 hours of the accident (Note: This notification includes weekend days as 24-hour emergency reporting access is available). The SHM will act as the agency interface upon their investigation. The report to OSHA must include: time and date of accident; employer's name, address, and telephone number; name and job title of person reporting the accident; address of the site of the accident; name of person to contact at the site of the accident; name and address of any injured employee(s); nature of injury; location where the injured employee was moved to; list and identity of other law enforcement agencies present at the site of the accident; and description of the accident and whether the accident scene has been altered.

- The SSHO will obtain a doctor's first report of injury for every injury or illness requiring medical treatment and will immediately forward to the SHM.
- An injured worker is not allowed back to work until a return-to-work notice issued by the treating physician and negative drug and alcohol test documentation (as applicable) are presented to the SSHO. Any injured worker issued a work restriction shall be under the direct supervision of the SSHO and shall be assigned work activities within the restriction until a full duty status clearance has been received.
- The SHM will make a telephone report for all claims covered under the H&S Workers' Compensation Policy. Reports are made to the workers' compensation insurance claim-reporting center where an employer's first report of injury or illness form is completed over the phone. After reporting a claim to the reporting center, the information is faxed by the reporting center to the claims service office to handle the claim. Any subsequent medical bills and reports received for the claim are forwarded to the SHM who will subsequently mail them to the claims service office.
- When a worker returns to work after an injury or illness, the SHM will contact the claims servicing office to advise them of the actual date of return to work. Questions or inquiries are to be directed to the CHSM who will contact the claims service office or the H&S insurance company, as needed
- The SHM records each injury or illness on the OSHA Form No. 300 "Log of Work Related Injuries and Illnesses" and the OSHA Form 300A "Summary of Work-Related Injuries and Illnesses." The OSHA 300 form is posted annually no later than February 1 (of the following year) and is kept posted for three months (until April 30).
- During the project, H&S will provide project hours worked and project incidence rates to the COTR on a monthly basis. Accident investigation reports and an updated project OSHA 300 log will be provided to the COTR should an injury occur.

9.0 PLANS REQUIRED BY THE SAFETY MANUAL

The plans (i.e., programs, procedures) that are required by EM 385-1-1 Appendix A (as applicable) are listed below with the reference to the corresponding section of EM 385-1-1 indicated. Plans that are applicable to project work are reviewed below.

- Emergency response plan: Procedures and tests (01.E.01)
- Emergency response plan: Spill plans (01.E.01, 06.A.02)
- Emergency response plan: Firefighting plan (01.E.01, 19.A.04)
- Emergency response plan: Posting of emergency telephone numbers (01.E.05)
- Hazard communication program (01.B.06)
- Respiratory protection program (05.E.03)
- Health hazard control program (06.A.02)
- Contingency plan for severe weather (19.A.03)
- SSHP (28.A.02)
- Alcohol and drug abuse prevention plan (DFARS Subpart 252.223-7004)
- Crystalline Silica Monitoring Plan
- Site sanitation plan (Section 02)
- Fire prevention plan (09.A.01)
- Excavation and Trenching Plan
- Unexploded Ordnance Plan

9.1 Layout Plans for Temporary Structures

Not applicable. NAVFAC has indicated that they will provide space for onsite personnel. The only temporary structures will consist of portable toilets that will be placed and sized according to applicable OSHA standards.

9.2 Emergency Response Plan: Procedures and Tests

SSHP Section 18 “Emergency Response Plan” details H&S project emergency response plans. Emergency procedures and tests including: emergency services and personnel, emergency supplies, site and emergency communications, emergency hospital and route information, medical emergency incident response, fire or explosion incident response, chemical spill incident response, and incident reporting to the COTR are reviewed.

9.3 Emergency Response Plan: Spill Plans

SSHP Section 18 “Hazardous Material Spill: Immediate Response” reviews H&S plans to respond to chemical spill emergencies. However, it is not anticipated that there will be any chemical hazards onsite.

9.4 Emergency Response Plan: Firefighting Plan

SSHP Section 18 “Fires and Explosions: Immediate Response Actions” reviews H&S plans to respond to fire emergencies.

9.5 Emergency Response Plan: Posting of Emergency Telephone Numbers

SSHP Section 18 “Personal Roles, Lines of Authority, and Communication” reviews H&S requirements for posting of emergency telephone numbers, emergency hospital information, and the emergency hospital route. An Emergency Contact List, including Emergency Hospital and Route information, is included in this section.

9.6 Emergency Response Plan: Man Overboard/Abandon Ship

Not applicable. Project does not require working over water.

9.7 Onsite Medical Support

A minimum of two first aid/CPR-trained workers are required to be present on site during work, unless the work only calls for one person onsite. The names of the qualified first-aid/CPR personnel will be reviewed with site personnel and posted in the project office.

9.8 Offsite Medical Support

For emergency medical care the 911 system will be utilized. In the event the injury is more serious than Concentra can handle but non- life threatening the injured employee will be brought to St Joseph’s Hospital 4295 Hempstead Turnpike Bethpage NY 11714 (516) 579-6000

H&S uses Concentra to provide occupational physician support services. Concentra physicians are Board-Certified (or Board-Eligible) and provide medical director services to H&S. The closest Concentra location to Bethpage NWIRP is located at 6701 Bergenline Ave. West New York, NJ 07093 and can be reached at (201) 758-9100.

9.9 Alcohol and Drug Abuse Prevention Plan

H&S has a substance abuse policy that establishes requirements for a drug-free workplace. H&S requires that post-accident drug and/or alcohol testing be conducted when employees have caused or contributed to an on-the-job injury resulting in loss of work time or damage to property. A copy of H&S’ policy is included in Section 19.0 of the SSHP.

9.10 Site Sanitation Plan

SSHP Section 7.0 “General Health and Safety Policies” reviews H&S sanitation procedures. Proper facilities, including temporary toilet facilities and potable water will be provided that meets or exceeds EM 385-1-1 standards in accordance with the SSHP.

9.11 Access and Haul Road Plan

Access and or haul roads are not deemed necessary due to the close proximity of existing roadways and access points at the project site. Should the need arise to construct an access and haul road, proper protocols will be followed and approvals sought prior to the construction of any such facilities.

9.12 Respiratory Protection Plan

SSHP Section 13.0 “Air Monitoring Program” reviews H&S’ air monitoring requirements. The H&S “Respiratory Protection Program” in Section 14 shall be referred to for respiratory protection guidance and requirements. It is anticipated that respiratory protection will not be required during excavation activities. Engineering controls including wetting of soil and surrounding and other dust control measures during construction will be utilized to minimize the potential for dust exposure.

9.13 Health Hazard Control Program

Health hazard controls are integrated in the AHAs for the project, which are included in Attachment D.

9.14 Hazard Communication Program

SSHP Section 10.0 “Hazard Communication & Chemical Safety” reviews H&S hazard communication procedures. The SSHO will maintain a hazardous substance inventory list and copies of MSDSs for hazardous substances to be used during project work. Site personnel will be informed of the hazardous substances they will be working with through APP review and attendance at daily safety meetings.

9.15 Process Safety Management Plan

Not applicable. Storage or handling of highly hazardous materials is not required for this project.

9.16 Lead Abatement Plan

Not applicable. Lead exposure or abatement is not anticipated for this project.

9.17 Asbestos Abatement Plan

Not applicable. Asbestos exposure or abatement is not anticipated for this project.

9.18 Radiation Safety Program

Not applicable. Radiation exposure is not anticipated for this project.

9.19 Abrasive Blasting

Not applicable. Abrasive blasting is not anticipated for this project.

9.20 Heat/Cold Stress Monitoring Plan

SSHP Section 3.2 “Physical Hazards” reviews H&S heat/cold stress monitoring plan.

9.21 Crystalline Silica Monitoring Plan

Not applicable. Crystalline silica is not anticipated to be encountered during the course of work.

9.22 Night Operations Lighting Plan

Not applicable.

9.23 Fire Prevention Plan

SSHP Section 18.0 “Emergency Response Plan” reviews H&S fire prevention procedures. Procedures for fire hazards, fire protection, and hot work are reviewed. Emergency fire procedures are also reviewed in the emergency response plan section of the SSHP.

9.24 Emergency Response Plan: Wild Land Fire Prevention Plan

Not applicable.

9.25 Hazardous Energy Control Plan

SSHP Section 12 “Lockout - Tagout Program” reviews H&S electrical equipment safety and lockout/tagout procedures for control of hazardous energy. The H&S “Lockout - Tagout Program” SOP shall be referred to for guidance and requirements.

9.26 Critical Lift Plan

Not applicable.

9.27 Contingency Plan for Severe Weather

SSHP Section 16.0 “Severe Weather Protection Program” reviews H&S contingency plans for severe weather. Safety procedures for cases of inclement weather or other adverse environmental conditions (i.e., strong winds, rain, freezing, lightning, hurricane, tornado, and earthquake) are reviewed.

9.28 Float Plan

Not applicable.

9.29 Site Specific Fall Protection & Prevention Plan

Not applicable.

9.30 Demolition Plan: Engineering and Asbestos Surveys

Not applicable.

9.31 Excavation and Trenching Plan

SSHP Section 17.0 “Excavation and Trenching Safety” reviews H&S Trenching and Excavation program requirements.

9.32 Emergency Rescue: Tunneling

Not applicable.

9.33 Underground Construction Fire Prevention and Protection Plan

Not applicable.

9.34 Compressed Air Plan

Not applicable.

9.35 Formwork and Shoring Erection and Removal Plan

Not applicable.

9.36 Pre Cast Concrete Plan

Not applicable.

9.37 Lift Slab Plans

Not applicable.

9.38 Steel Erection Plan

Not applicable.

9.39 Site Safety and Health Plan

A detailed SSHP has been prepared and is included as Attachment A.

9.40 Blasting Plan

Not applicable.

9.41 Diving Plan

Not applicable.

9.42 Confined Space Plan

H&S does not anticipate the need to enter into any confined space as part of completing removal of underground storage tanks. The plan for removal involves digging trenches to expose and remove the underground storage tanks. The tanks will be cut and material removed from above the trench, not requiring any personnel to enter the tanks or the trenches. Two bottom samples will be taken from the bottom of each trench after the tanks have been removed. H&S plans to obtain these samples using equipment from above the trench, eliminating the need to enter the trench, which is a permit-required confined space. Should a reason arise for personnel to enter

the trench, personnel will follow the H&S confined space program, which is reviewed in Section 9 of Attachment A of this APP 'SSHP'.

The H&S "Confined Space Program" SOP will be referred to for guidance and requirements.

9.43 Unexploded Ordnance Plan (UXO)

Not applicable.

10.0 RISK MANAGEMENT

10.1 Hazard Identification and Evaluation System

For the project, the SHM and SSHO are responsible for establishing a system for identification and evaluation of workplace hazards. This system includes development of the APP, preparation of AHAs for work activities, and periodic safety inspections of job sites.

10.1.1 Accident Prevention Plan

Hazard identification and evaluation requirements are primarily accomplished through preparation and implementation of the APP. Project management personnel, SSHO, and the SHM review information relating to project work tasks to be completed; methods to be used; working conditions to be encountered; and chemical, physical and/or biological hazards present. A written site-specific APP is prepared that contains AHAs for primary project work tasks. The APP establishes site-specific safety protocols and contains information to protect employees from potential hazards. The APP is revised whenever additional information becomes available concerning the hazards present at the site and/or should significant changes occur in the scope of work, operational procedures, site hazards, and hazard control measures. This information is reviewed with site personnel at the jobsite before work operations begin. Additional hazards associated with project operations are also identified and evaluated through periodic safety inspections, accident investigations and follow-up, and employee reporting of unsafe or hazardous conditions.

10.1.2 Activity Hazard Analyses

AHAs are prepared before beginning each major phase of work (operations involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform). The AHA reviews hazards and control measures for primary site tasks. The AHA defines the activities to be performed and identify the sequence of work, specific hazards anticipated, and control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work does not proceed on that phase of work until the AHA has been accepted by the COTR and the AHA has been reviewed with all personnel involved with the activity. The AHA is continuously reviewed and modified when appropriate to address changing site conditions or operations. AHA modification occurs only with the concurrence of the SHM and COTR. AHAs are included in Attachment D.

10.2 Hazard Correction System

An effective hazard correction system must be established for correction of unsafe or unhealthful work conditions, work practices, and work procedures. These corrective measures are required to be completed in a timely manner.

If an imminent hazard is identified, the PM and SSHO are notified immediately. Corrective measures are then taken on an immediate basis to eliminate the hazard. If the imminent hazard cannot be immediately eliminated, personnel are to be removed from the work area and the SSHO will evaluate what safety procedures and corrective actions are to be implemented.

If a non-imminent hazard is identified, the SSHO is notified and corrective actions implemented in a timely manner. Evaluation of the time period allowed for correction of the hazard is at the professional judgment of the SSHO in conjunction with the PM and SHM.

11.0 CONTRACTOR INFORMATION AND SITE SPECIFIC HAZARDS AND CONTROLS

SSHP Section 3.0 “Potential Hazards” reviews anticipated site hazards and safety control measures for chemical, physical, and biological hazards.

11.1 Chemical Hazards

SSHP Section 3.1 “Chemical Hazards” reviews chemical hazards anticipated for project fieldwork.

Chemical substances with anticipated use or presence during site work include:

- Fuels: Diesel and gasoline fuel for vehicles and equipment
- Lubricants: Oil, grease, and other lubricants for vehicles
- Fire extinguishing agent: Dry chemical for fire extinguishers
- Non-Hazardous contamination in the underground storage tanks includes: cis-1,2-Dichloroethene, Tetrachloroethylene (PCE), Trichloroethylene (TCE), and Vinyl Chloride.

11.2 Physical Hazards

SSHP Section 3.2 “Physical Hazards” lists and reviews the primary physical hazards anticipated for site work:

- Fire/explosion protection
- Vehicle and pedestrian hazards
- Equipment hazards
- Tools, machinery, and equipment use
- Electrical hazards
- Noise hazards
- Heat/cold stress
- Biological hazards
- Inclement weather and other adverse environmental conditions
- Utilities
- Trenching and excavation
- Entry into excavations
- Slips, trips, and falls.

11.3 Biological Hazards

SSHP Section 3.2 “Physical Hazards; Biological Hazards” lists and reviews biological hazards that may potentially be encountered during site work:

- Poisonous plants
- Poisonous snakes

- Poisonous spiders
- Rodents
- Insects
- Ticks
- Mosquitoes

11.4 Activity Hazard Analyses

Activity Hazard Analyses have been prepared for the following primary site tasks and are provided Attachment D of this APP.

- Mobilization and Site Preparation
- Underground Storage Tank Removal
- Soil Excavation, Transportation, and Disposal
- Post Excavation Sampling
- Site Restoration and Demobilization

ATTACHMENT A
SITE SAFETY AND HEALTH PLAN

**SITE SAFETY AND HEALTH PLAN
FOR
TIME CRITICAL REMOVAL ACTIONS
AOC 32 – PCE UNDERGROUND STORAGE TANKS
AT
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT**

BETHPAGE, NEW YORK

CONTRACT NUMBER: N40085-12-D-1717

TASK ORDER: 0002

Prepared For:



**DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND MID-ATLANTIC
9742 Maryland Avenue
Norfolk, VA 23511**

Prepared By



**H&S Environmental, Inc.
160 East Main Street, Suite 2F
Westborough, MA 01581**

SEPTEMBER 2012

SITE SAFETY AND HEALTH PLAN

**Site 1, AOC 32, Removal Actions
NWIRP Bethpage – Bethpage, New York**

PLAN IDENTIFICATION AND APPROVALS

Project Title: Site 1, AOC 32 Removal Actions, NWIRP Bethpage, Bethpage, NY

Project Location: Bethpage, New York

Contract No.: N40085-12-D-1717, TASK ORDER NO. 0002

H&S Project No.: 2062-001

Prepared By: Gregory Birch, PMP

Date Prepared: 30 September 2012

Revision No.: 1

APPROVALS:

 _____ Edward Kearney, CIH	<u>30 September 2012</u> Date
 _____ Gregory Birch, PMP	<u>30 September 2012</u> Date

SITE SPECIFIC HEALTH AND SAFETY PLAN

Site 1, AOC 32, Removal Actions

NWIRP Bethpage

Bethpage, New York

Table of Contents

1.0	SITE LOCATION.....	1
2.0	SCOPE OF WORK.....	3
3.0	POTENTIAL HAZARDS.....	4
3.1	Chemical hazards	4
3.2	Physical Hazards	4
3.2.1	Fire/Explosion Hazards.....	5
3.2.2	Heat Stress and Heat-Related Illness	6
3.3.3	Effects of Cold Exposure	7
3.3.4	Biological Hazards.....	8
3.3.5	Heavy Equipment Hazards	13
3.3.6	Vehicle/Traffic Hazards.....	14
3.3.7	Noise Hazards	14
3.3.8	Electrical Hazards	14
3.3.9	Utilities.....	15
3.3.10	Confined Space Hazards	15
3.3.11	Excavation and Trenching	16
4.0	ACTION LEVELS.....	19
5.0	LEVEL OF PROTECTION.....	20
5.1	Equipment Contamination.....	21
6.0	ACTIVITY HAZARD ANALYSIS	22
7.0	GENERAL HEALTH AND SAFETY POLICIES.....	23
7.1	Purpose.....	23
7.2	Responsibilities	23
7.3	Hazard Control Substitution.....	23
7.4	Isolation.....	23
7.5	Ventilation.....	23
7.6	Administrative Control.....	24
7.7	Personal Protective Equipment	24
7.8	Hazard Control Principles	24
7.9	Design Reviews.....	24
7.10	Operating Procedures	25
7.11	Purchasing Procedures	25
7.12	Interim Hazard Abatement Measures.....	25
7.13	Permanent Hazard Abatement.....	25
7.14	Hazard Control Development.....	25

7.15	Hazard Reporting	26
7.16	Signs and Tags	26
7.17	Hazard Communication.....	27
7.18	Noise.....	27
7.19	Housekeeping.....	28
7.20	Emergency Eyewash Facilities.....	28
7.21	Sanitary Facilities.....	28
8.0	PERSONAL PROTECTIVE EQUIPMENT	29
8.1	Purpose/General Rules	29
8.2	Personal Protective Equipment Selection	30
8.3	Eye and Face Protection.....	31
8.4	Head Protection.....	32
8.5	Foot Protection.....	33
8.6	Hand Protection.....	33
9.0	CONFINED SPACE PROGRAM.....	35
9.1	Purpose.....	35
9.2	Definitions.....	35
9.3	Confined Space Entry – Procedures.....	36
9.3.1	Permit Required Confined Space.....	36
9.4	Confined Space Responsibilities.....	37
9.5	Hazard Control.....	40
9.6	Entry Standard Operating Procedures.....	40
9.6.1	Contractor Entry.....	40
9.7	Training.....	41
9.8	Confined Space Hazards	41
9.8.1	Flammable Atmospheres	41
9.8.2	Toxic Atmospheres.....	42
9.8.3	Irritant (Corrosive) Atmospheres.....	43
9.8.4	Asphyxiating Atmospheres.....	44
9.8.5	Mechanical Hazards.....	45
9.8.6	Thermal Effects.....	45
9.8.7	Noise.....	46
9.8.8	Vibration.....	46
9.8.9	Other Hazards	46
10.0	HAZARD COMMUNICATION & CHEMICAL SAFETY.....	48
10.1	Purpose.....	48
10.2	Responsibilities	48
10.3	General Program Information	49
10.4	Employee Training.....	50
10.5	General Chemical Safety.....	51
10.5	Task Evaluation.....	52
10.6	Chemical Storage	52

10.7	Container Labels	52
10.8	Emergencies and Spills	53
10.9	Housekeeping	53
10.10	Contractors.....	54
10.11	Definitions	54
10.12	MSDS Information	56
11.0	ACCIDENT REPORTING & RECORD KEEPING	58
11.1	Purpose	58
11.2	Policy.....	58
11.3	Responsibilities	59
11.4	Incident Reporting Procedures	60
11.5	Incidents (Injuries and Illnesses).....	60
11.6	Events	60
11.7	Record keeping.....	61
11.8	Training	61
11.9	Program Audits	61
11.10	Recording Injuries & Illnesses	62
11.11	First aid treatment.....	63
12.0	LOCKOUT - TAG OUT PROGRAM.....	65
12.1	Purpose	65
12.2	Definitions	65
12.3	Training	65
12.4	Preparation for Lock and Tag Out Procedures.....	66
12.4.1	Routine Maintenance & Machine Adjustments.....	66
12.4.2	Locks, Hasps and Tags	67
12.5	SOP: General Lock and Tag Out Procedures.....	67
12.5.1	Preparation for Shutdown	67
12.5.2	Machine or Equipment Shutdown	67
12.5.3	Machine or Equipment Isolation.....	67
12.5.4	Lockout or Tag Out Device Application	68
12.5.5	Discharge of Energy	68
12.5.6	Verification of Isolation.....	68
12.5.7	Extended Lockout - Tag Out.....	68
12.6	SOP: Release from LOCKOUT/TAG OUT.....	69
12.7	SOP: LOTO Procedure for Electrical Plug-Type Equipment	69
12.8	SOP: LOTO Procedures Involving More Than One Employee.....	70
12.9	SOP: Management's Removal of Lock and Tag Out	70
12.10	Contractors.....	70
13.0	AIR MONITORING PROGRAM.....	71
14.0	RESPIRATORY PROTECTION	73
14.1	General	73
14.2	Responsibilities	73

14.3	SSHO.....	74
14.4	Program Evaluation.....	74
14.5	Record Keeping.....	74
14.6	Training and Information.....	75
14.7	Basic Respiratory Protection Safety Procedures.....	76
14.7.1	Selection of Respirators.....	77
14.7.2	Respirators for IDLH atmospheres.....	78
14.7.3	Respirators for atmospheres that are not IDLH.....	78
14.7.4	Identification of Filters & Cartridges.....	78
14.7.5	Respirator Filter & Canister Replacement.....	78
14.8	Physical and Medical Qualifications.....	80
14.9	Medical Evaluations.....	80
14.9.1	Medical evaluation procedures.....	80
14.9.2	Follow-up medical examination.....	80
14.9.3	Medical determination.....	81
14.10	Respirator Fit Testing.....	82
14.10.1	Types of Fit Tests.....	83
14.11	Respirator Operation and Use.....	84
14.12	Continuing Effectiveness of Respirators.....	84
14.13	Procedures for IDLH atmospheres.....	85
14.14	Cleaning and Disinfecting.....	85
14.15	Respirator Inspection.....	86
14.16	Respirator Storage.....	87
14.17	Repair of Respirators.....	87
14.18	Breathing Air Quality and Use.....	87
15.0	WATER SAFETY.....	89
15.1	Boating Procedures.....	89
16.0	SEVERE WEATHER PROTECTION PROGRAM.....	90
16.1	Lightning.....	90
17.0	EXCAVATION & TRENCHING SAFETY.....	92
17.1	Purpose.....	92
17.2	Scope.....	92
17.3	References.....	92
17.4	Responsibilities.....	92
17.5	Definitions.....	92
17.6	General Requirements.....	94
17.7	Competent Person Responsibilities.....	95
17.8	Excavation Safety Plan.....	95
17.9	Soil Classification System.....	96
17.10	Soil testing and Identification.....	97
17.11	Excavation Protection Systems.....	98
17.12	Sloping and Benching Systems.....	98

17.13	Shoring.....	99
17.14	Shield Systems (trench Boxes).....	99
17.15	Personal Protective Equipment.....	100
17.16	Inspections.....	100
17.17	Training.....	100
18.0	EMERGENCY RESPONSE PLAN.....	101
18.1	Pre-Emergency Planning.....	101
18.2	Personal Roles, Lines of Authority, and Communication.....	103
18.3	Emergency Recognition and Prevention.....	104
18.4	Safe Distances and Places of Refuge.....	104
18.5	Site Security and Control.....	104
18.6	Evacuation Routes and Procedures.....	105
18.7	Decontamination procedures.....	105
18.9	Emergency Medical Treatment and First Aid.....	105
18.10	Emergency Alerting and Response Procedures.....	106
18.11	Critique of Response and Follow-up.....	109
18.12	Follow-up Emergency Investigation.....	109
18.13	Personal Protective Equipment and Emergency Equipment Specifications.....	110
18.14	Basic Safety Guidelines.....	111
18.15	Hazardous Material Handling and Storage.....	112
19.0	DRUG AND ALCOHOL ABUSE PREVENTION.....	115
19.1	Corporate Policy.....	115
19.2	Procedures.....	115

FIGURES

- Figure 1-1 Site Location Map
- Figure 3-1 AOC 32 Excavation Areas

APPENDICES

- A Site Safety and Health Plan Acknowledgement Form
- B Partial List of MSDS Forms
- C Field Checklists and Forms
- D Hospital Route Map

1.0 SITE LOCATION

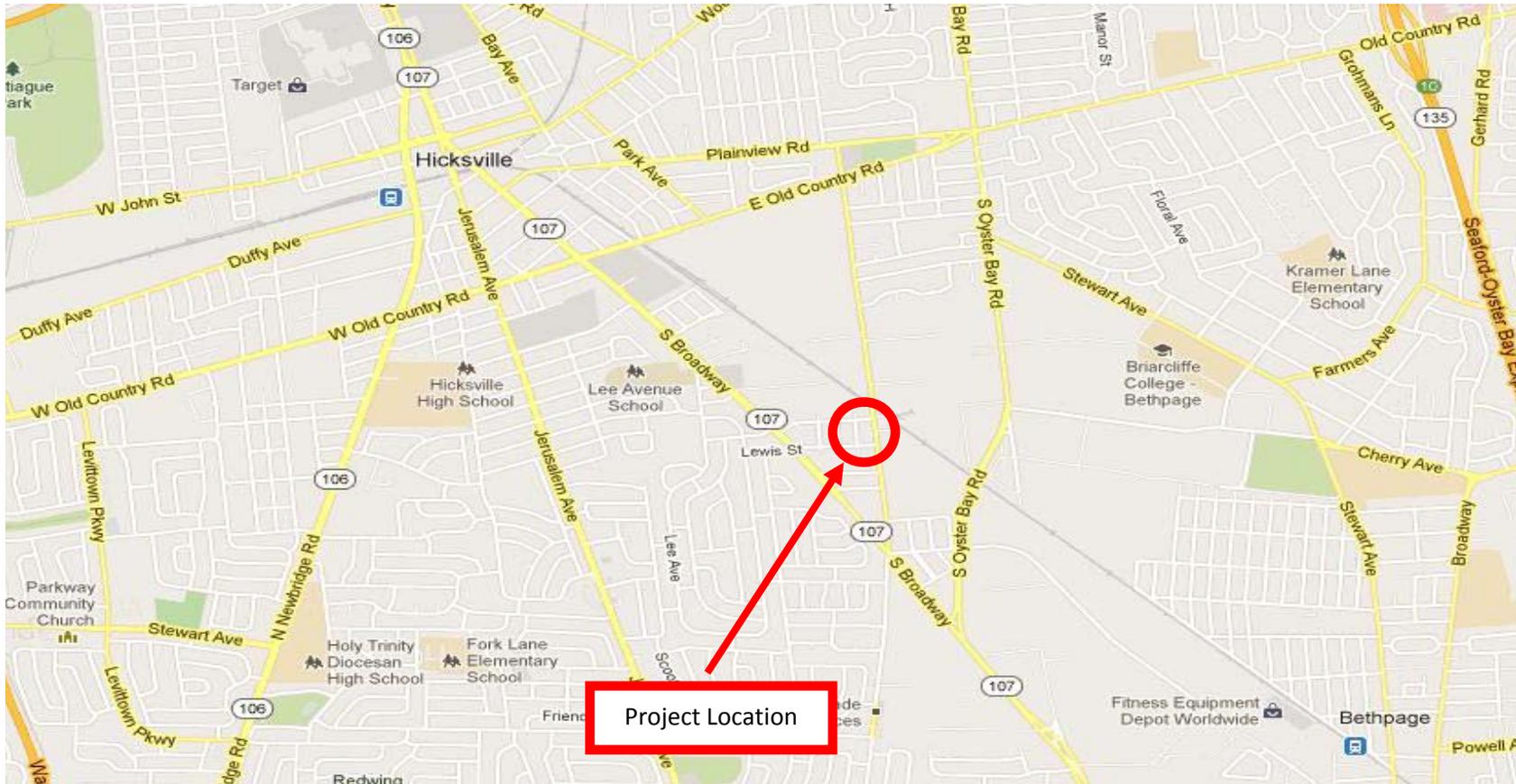
NWIRP Bethpage was established in 1941 and was formerly a Government Owned Contractor-Operated facility that was operated by the Northrop Grumman Corporation (NGC) until September 1998. It is located in east central Nassau County, Long Island, New York, approximately 30 miles east of New York City. The site covers approximately 109.5 acres.

The site's historical uses included research, prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. Historical operations that resulted in hazardous material generation at the facility included metal finishing processes, maintenance operations, painting of aircraft and components, and other activities that involved aircraft manufacturing. Wastes generated by plant operations were disposed of directly into drainage sumps, dry wells, and/or on the ground surface, resulting in the disposal of a number of hazardous wastes, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and inorganic analytes - chromium and cadmium - at the site.

Area of Concern (AOC) 32 was closed by NGC in the 1980s. According to NGC's Phase I Environmental Site Assessment dated April 1997, there were two 6,000 gallon steel below ground tetrachloroethylene (PCE) bulk storage tanks that were identified at 1090 and 1091 used at Plant 3. According to a NGC, in the mid-1980's, an above ground tank was constructed to hold the PCE and the use of the two underground tanks was abandoned.

A general location of AOC 32, at the NWIRP Bethpage, Site 1 is shown in Figure 1-1.

**Figure 1-1
Location Map**



2.0 SCOPE OF WORK

The scope of work includes performing the following tasks:

- 1) Development of a Remedial Action Work Plan (RAWP), Site Specific Safety and Health Plan (SSHP), Sampling and Analysis Plan (SAP) [Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP)], and Waste Management Plan
- 2) Collection of four (4) water and two (2) solids samples from the tank for waste characterization.
- 3) Removal Action of two steel underground storage tanks (Dimensions: Tank 1: 6' diameter by 24' in length; Tank 2: 6' diameter by 16' in length) and enough soil to remove the tanks.
- 4) Collection of post removal action samples
- 5) Site Restoration including backfilling excavations with clean fill

All administrative tasks will be completed in an office environment while the remaining tasks will be completed onsite with the use of various heavy construction equipment.

H&S employees will follow at a minimum, the standards established by the US Occupational Health & Safety Administration (OSHA), U.S. Army Corps of Engineers (USACE) Safety and Occupational Health Manual EM 385-1-1, and applicable H&S' Corporate Safety and Health Program provisions, whichever is more stringent.

Key Site Personnel

Gregory Birch, PMP®
Project Manager

Edward King, PE
Program Manager

Edward Kearney, CIH
Safety and Health Manager

John Hudacek
Site Safety and Health Officer

All persons entering the site must sign and acknowledge the Site Health and Safety Plan on the form included in Appendix A.

3.0 POTENTIAL HAZARDS

3.1 Chemical hazards

The chemical hazards associated with this project are associated with the contaminated soils and sediments. The Hazard Communication Plan, including chemicals used or stored on-site, is included in Section 10.0. Decontamination procedures for personnel and/or any equipment used on-site is discussed in Section 5.1.

Chemical Hazards - Contaminated Liquids, Sand and Soil

Table 3-1 lists the primary contaminants of concern. These contaminants may vary in concentration, but overall the contamination is considered to be non-hazardous. The primary contaminants could present a potential for exposure from air, water, or sediments while completing the scope of work. Health effects will also vary greatly depending on the concentration and duration of exposure. Primary chemical route of entry during normal site activities would be inhalation and absorption if proper safety procedures and use of Personal Protective Equipment are not followed. H&S will use perimeter air monitoring stations to monitor particulate concentrations in ambient air at the site.

Table 3-1 : Contaminants of Concern

Contaminant	Maximum Anticipated Contamination Level (µg/L)	Criteria (NYSDEC Standards) (µg/L)
Cis-1,2-Dichloroethene	22,000	5
PCE (Tetrachloroethylene)	1,300	5
TCE (Trichloroethylene)	1,400	5
Vinyl Chloride	19,000	2

Source: Tetra Tech NUS Sample Results collected on 17 April 2012.

3.2 Physical Hazards

Physical hazards can potentially be present during field activities. These physical hazards may include, but are not limited to:

- Fire/explosion hazards
- Heat Stress and Heat-Related Illness
- Effects of Cold Exposure
- Biological hazards
- Heavy Equipment hazards
- Vehicle and pedestrian hazards
- Noise hazards
- Electrical hazards
- Utilities
- Confined Space Hazards
- Weather hazardExcavation and Trenching

The site will be visually inspected for the presence of general safety hazards (e.g., trip/slip hazards, unstable surfaces or steep grades, and sharp objects) prior to beginning work. If hazards are present, these hazards will be recorded and precautionary measures taken to prevent injury.

3.2.1 Fire/Explosion Hazards

The potential for fire and/or explosion emergencies is always present and should be noted. Workers must continuously monitor any enclosed works areas where gasses may accumulate for combustible or explosive gases when operations have the potential to generate sparks. Employees should always be alert for unexpected events, such as ignition of chemicals or sudden release of materials under pressure, and be prepared to act in these emergencies.

Procedures for fire hazards and fire protection include:

- Smoking is not allowed in areas where flammable or combustible materials are present.
- Static electricity-generating equipment requires bonding and grounding whenever transferring flammable or combustible liquids or when working in areas where these materials are present.
- Any onsite temporary storage of fuel will be coordinated with the base fire department to make sure the requirements are met.

Field vehicles will be equipped with an ABC fire extinguisher, and additional fire extinguishers will be available at appropriate locations throughout the work site. Employees must be trained in the proper use of fire suppression equipment. However, professionals should handle large fires that cannot be controlled with a fire extinguisher. The on-base fire authorities should be notified in these instances.

3.2.2 Heat Stress and Heat-Related Illness

The effects of heat stress and illness are possible during the performance of field activities at the Site 1, NWIRP Bethpage. Injury from heat exposure may occur to persons working outdoors during a period of high temperature conditions and when personnel are working in PPE clothing. The body's principal means of cooling is through the evaporation of sweat. When personnel are working in PPE, sweat is trapped inside the clothing and cannot evaporate, thus raising the body's core temperature and resulting in a heat-related illness. Only Level D personal protective equipment (PPE) is anticipated for this project.

Illness resulting from exposure to extreme heat is possible during field operations. Personnel will be familiar with the signs and symptoms of heat stress, including:

- **Heat Cramps** - Muscle spasms in the abdomen or limbs.
- **Heat Exhaustion** - Dizziness, light-headedness, slurred speech, rapid pulse, confusion, fainting, fatigue, copious perspiration, cool skin that is sometimes pale and clammy, and nausea.
- **Heat Stroke** - Hot, dry, flushed skin, delirium, and coma (in some cases). Heat stroke is a life-threatening event and requires immediate medical attention.

Some preventive measures to avoid heat stress include:

- Frequent resting in cool or shaded areas
- Consumption of large quantities of fresh potable water or diluted electrolyte beverages

A suggested work-rest regimen is:

Ambient Temperature	Work	Rest
70°F	3 hours	15 minutes
75°F	2.5 hours	15 minutes
80°F	2 hours	15 minutes
85°F	1.5 hours	15 minutes
90°F	1 hour	15 minutes

Other factors, such as a worker's acclimatization, level of physical fitness, and age may increase or decrease a worker's susceptibility to heat stress. Before assigning a task to an individual

worker, these factors will be taken into account to ensure that the task will not endanger the worker's health.

If a heat-related illness is suspected or observed, the affected person must be moved to a cool or shaded area and given plenty of liquids to consume. If symptoms of a heat stroke are observed, the victim will be cooled immediately and transported to the hospital. Liquids will be readily available to ensure that workers stay hydrated.

3.3.3 Effects of Cold Exposure

The effects of cold exposure are possible during the performance of field activities. Injury from cold exposure may occur in persons working outdoors during a period when temperatures average below freezing. The extremities, such as fingers, toes, and ears, are the most susceptible to frostbite.

Personnel will be informed about the various forms of cold stress (e.g., hypothermia, frostbite) and the symptoms of exposure, which are:

- **Cold Stress**: Cold stress can occur upon exposure to cold environments where there is heat loss to the body, feet, hands, and/or head. Primary cold stress injuries are hypothermia and frostbite. Cold can also adversely affect mental capabilities resulting in accidents or injuries. The body's initial response to cold is shivering, vasoconstriction, increased oxygen consumption, accelerated respiration and pulse, and increased heart output and blood pressure.
- **Hypothermia**: Hypothermia occurs when the body core temperature falls below 96.8°F. Symptoms include intense uncontrollable shivering, sluggish thinking, difficulty speaking, muscular rigidity, blue puffy skin, poor coordination, cessation of shivering, dulled thinking, irrational stupor, unconsciousness, erratic heartbeat, slowed respiration, cardiac and/or respiratory failure, lung edema, and death. Treatment for hypothermia is to re-warm the body trunk, immerse in warm water (105°F) or use heat packs.
- **Frostbite**: Frostbite occurs due to freezing of fluid that surrounds tissues. It occurs at less than 30°F, and more rapidly with wind exposure. Frostbite affects the ears, chin, nose, fingers, and toes. Frostbite first appears as blanched skin or waxy or white skin that is firm to the touch with resilient tissue beneath. With deep frostbite, tissues are cold, pale, solid, and may turn black. Treatment for frostbite is to re-warm with warm water (105°F) (do not rub with snow), and prevent refreezing of affected body parts.

To prevent cold stress conditions and exposure symptoms, the use of personal protection by dressing for warmth, wind, and wet conditions is necessary. Wear layered clothing (i.e., wear

thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing). Stay active as activity generates heat. Provide a warm break area when working in cold environments. Have first-aid equipment available. At temperatures lower than 25°F, do not permit continuous cold exposure to exposed skin. At temperatures lower than 45°F, wear warm clothing to include, as needed: Boots; heavy socks (e.g., wool or polypropylene); mittens, insulated gloves; insulated head covers; thermal underwear; and insulated coveralls. Workers that get immersed in water or whose clothing becomes wet will be immediately provided with a change of clothing and be treated for hypothermia if symptoms become evident.

3.3.4 Biological Hazards

Biological hazards that may potentially be encountered during site work include:

- Poisonous plants
- Poisonous snakes
- Poisonous spiders
- Rodents
- Insects
- Ticks
- Mosquitoes

Poisonous Plants

Contact with poisonous plants such as poison oak, poison ivy, or poison sumac can result in dermatitis. Poison oak and poison ivy are a biological hazard that causes reaction in more than 50 percent of the population. Poison oak/ivy has green leaves in the spring and summer, and red and yellow leaves in the fall that are found in sets of three. This trait is easily remembered by an old rhyme “leaves of three, let them be.” Black dots of dried sap (resin) on the leaves are also characteristic of the plant. It is the resin called “urushiol,” derived from the Japanese word for “sap,” that poses a threat to sensitive individuals. The skin reacts to the resin upon contact causing dermatitis characterized by linear streaks and red bumps where the plant has brushed against the skin. Contact with the smoke from burning poison oak also causes severe reactions in the respiratory tract and exposed skin in sensitive individuals. Signs and symptoms of exposure are redness, swelling, blisters, and intense itching. Blisters form within 24 hours, weeping, crusting and scaling of the blisters within a few days, and complete healing occurs in about 10 days.

Poison oak/ivy first-aid procedures are: Washing, without scrubbing, of the affected area with mild soap and water, application of a paste of baking soda and water on the area several times a day, or application of an anti-cortical cream or lotion, such as Calamine or Caladryl, to help

soothe the area. Antihistamines, such as Benadryl, may also help dry up the sores. If the condition worsens or persists and affects large areas of the body or the face, see a doctor. It may be necessary to give anti-inflammatory drugs, such as corticosteroids, or other medications to relieve discomfort.

Poisonous Snakes

Poisonous snakes, primarily the copperhead, may be encountered during site work. The copperhead has a series of dark and light bands near the tail just before the rattles that are different from the rest of the body. Copperhead bite signs and symptoms of envenomation include: fang marks; metallic or rubbery taste in mouth; tingling of the tongue; numbness; swelling within 10 minutes of bite; nausea, weakness, temperature change; and discoloration within 3 hours to 6 hours.

Copperhead precautions include: Avoid walking in areas known to be populated with snakes; avoid traveling on foot at night; avoid traveling off trails or paths in grassy or brush-laden areas; do not climb into rocky areas without visual inspection for snakes; be alert when moving debris as snakes seek shelter in shaded areas; wear high-top boots and long pants when walking in grassy areas; clear brush from around buildings, check/repair leaky faucets, and keep trash in containers with secure lids. If a snake is encountered, look around, there may be others, then turn around and walk away on the same path traveled.

Copperhead bite first-aid procedures are: Summon emergency medical help immediately; have victim stay calm and remain motionless; position victim so that bite is kept below heart level; do not use ice, cold packs, sprays, alcohol, or any drugs; do not use a tight tourniquet but instead apply a light constricting band above the bite (be able to insert finger under band) and do not release the band unless it is too tight from swelling; do not make an incision across the bite to suck out the venom; and do not wait to see if symptoms develop, seek medical attention as soon as possible.

Poisonous Spiders

Poisonous spiders, such as the black widow spider or the brown recluse spider, may be encountered during site work. Spiders are usually found in dark, cool, protected areas and such areas should be inspected before placing hands or feet in these areas. Poisonous spiders are commonly found in woodpiles, sheds, basements, garages, and privies.

The primary species of black widow spider encountered has a glossy black appearance with an orange-red hourglass shape on the underside of the body. Black widow spider bite signs and symptoms are: Initial pain followed by dull, occasionally numbing pain in the affected extremity;

pain and cramps in one or several of the large body muscles; abdominal pain and cramping; sweating, increased salivation, anxiety, weakness, headache, and dizziness; and severe cases can result in uncontrollable muscle spasms, coma, and respiratory failure. Black widow spider bite first-aid procedures are: wash wound; apply a cold pack; and get medical care (e.g., muscle relaxants; antivenin).

The brown recluse spider is also known as the "violin or fiddle back" spider and is light brown in color with a darker brown violin-like marking on the top of the body. The brown recluse spider is non aggressive, and most bites occur when the spider is trapped in clothing being put on, stepped on, and when areas where the spider resides are disturbed. Brown recluse spider bite signs and symptoms are: Localized burning sensation within 2 hours to 8 hours with itching and redness; small blanched area around immediate bite area appears; reddened area enlarges and becomes purple during subsequent 1 hour to 8 hours; and fever, malaise, stomach cramps, nausea, vomiting, and some cases have resulted in death. Brown recluse spider bite first-aid procedures are: wash wound; apply a cold pack; and seek immediate medical care.

Rodents

Rodents include rats, mice, squirrels, and other related mammals and are characterized by gnawing and nibbling traits. Rodents can act as a vector for many diseases that may be transmitted directly or through other vectors such as fleas or ticks. Diseases that can be transmitted include plague, typhus, Leptospirosis, relapsing fever, and others including Hantavirus pulmonary syndrome. A discussion of Hantavirus pulmonary syndrome is presented below, as it is a relatively recent disease transmitted by rodents.

Hantavirus Pulmonary Syndrome: Hantavirus pulmonary syndrome is a serious, often deadly, respiratory disease that has been found mostly in rural areas of the western United States. The disease is caused by a Hantavirus that is carried by rodents and passed on to humans through infected rodent urine, saliva, or droppings. The deer mouse is the primary carrier of the virus that causes Hantavirus pulmonary syndrome. This type of rodent is found throughout the United States, except in the Southeast and East Coast. In the Southeast, the cotton rat is known to carry Hantavirus. A deer mouse is 4 inches to 9 inches long from head to tip of tail. It is pale gray to reddish brown; has white fur on its belly, feet, and underside of the tail; and has oversized ears. A mouse nest (burrow) is usually a pile of material under which the mouse lives. This pile can contain many different materials, such as twigs, insulation, Styrofoam, and grass.

Hantavirus is spread from wild rodents to people. The virus gets in the air as mist from urine and saliva or dust from feces. Breathing in the virus is the most common way of becoming infected; however, infection can also occur by touching the mouth or nose after handling contaminated materials. A rodent's bite can also spread the virus. Hantavirus is not spread from person to

person. Infection will not occur from being near a person who has Hantavirus pulmonary syndrome. The virus, which is able to survive in the environment (e.g., contaminated dirt and dust), can be killed by most household disinfectants, such as chlorine bleach or alcohol.

Symptoms of Hantavirus pulmonary syndrome usually appear within two weeks of infection but can appear as early as 3 days to as late as 6 weeks after infection. First symptoms are general and flu-like: Fever (101-104°F); headache; abdominal, joint, and lower back pain; sometimes nausea, and vomiting. However, the primary symptom of this disease is difficulty in breathing, which is caused by fluid build-up in the lungs and quickly progresses to an inability to breathe.

Precautionary measures to avoid exposure to Hantavirus include: avoid and/or be cautious when working near wood piles, inside sheds or other known deer mouse habitats; when evidence of deer mice is observed, stop work and notify supervisor immediately; establish specific work procedures, protective clothing, respiratory protection, and decontamination protocol for work in the area, and review hazards and control measures with workers; spray a concentrated solution of chlorine bleach (10 percent minimum) on areas where rodent feces or nesting materials are present and let the disinfectant sit for a period of time before working in the area; wear protective clothing (i.e., disposable coveralls, gloves, boots, or booties) and respirator (air-purifying respirator [APR] with high-efficiency particulate air [HEPA] filter); remove contaminated materials carefully; minimize dust generation; use HEPA filter vacuum equipment as needed; collect contaminated materials and place in plastic bags/seal for disposal as directed by the SSHO; upon exit from the work area; wash gloved hands in 1 percent chlorine bleach solution; remove clothing being careful not to contact potentially contaminated surfaces; and thoroughly wash with soap and water immediately following removal of PPE.

Insects

Ant bites and bee stings can be deadly to those who are hypersensitive. Anaphylactic shock can occur to sensitized individuals upon stinging. Signs and symptoms of envenomation are usually local pain, redness, itching, and swelling. Sensitive individuals may have more serious symptoms such as welts, itching palms and feet, headache, nausea, vomiting, labored breathing, and in severe cases respiratory paralysis or heart failure. Bee precautions include: Conduct a reconnaissance of areas where bee, hornet and wasp hives may be encountered (i.e., clearing and grubbing) before beginning work in an area; apply insecticide (where allowed) to rid the work area of bees; ensure that site personnel who have a recent history of bee, hornet and/or wasp stings have reported this to the SSHO; hypersensitive individuals should carry a bee sting injection kit prescribed by the physician with them in case of emergency; and over-the-counter antihistamine medication should be available in case of a bee sting.

Infected mosquitoes can act as a vector for many diseases including West Nile Virus. The increased spread of the West Nile virus in the United States is a major health concern. West Nile encephalitis is caused by the West Nile virus, a flavivirus commonly found in Africa, West Asia, and the Middle East. Encephalitis is an inflammation of the brain and can be caused by viruses and bacteria, including viruses transmitted by mosquito bites. Transmission is a vicious circle. Mosquitoes become infected when they feed on infected birds. The virus gets into the mosquito's salivary glands. Then the mosquito bites a human or an animal, injecting the virus, which can multiply and cause illness. Symptoms vary depending on the severity of the infection. Mild infections include flu-like symptoms: fever, headaches and body aches, skin rash, and swollen lymph glands. Severe infections include symptoms such as higher fever, neck stiffness, disorientation, coma, paralysis, convulsions and muscle weakness. The methods of reducing risks of transmission of West Nile Virus include staying indoors at dawn, dusk, and in the early evening, wearing long-sleeved shirts and long pants when outdoors, spraying clothing with repellents containing Permethrin or DEET, and applying insect repellent sparingly to exposed skin.

Ticks

Infected wood ticks and dog ticks can act as a vector for many diseases including Rocky Mountain spotted fever, Q fever, relapsing fever, Lyme disease, and tularemia. Adult ticks are reddish brown in color and may have white markings on the back. They are usually 1/4-inch long, are oblong or seed-shaped, and have eight legs. The adult wood tick appears during the spring and early summer months in the northwestern states, and the dog tick appears throughout the summer in the eastern and southern states. The disease-carrying organism is transmitted to humans through the bite of the tick or by contact with crushed tick blood or feces through a scratch or wound.

The early signs and symptoms of Lyme disease are a bull's eye rash, fever or chills, and fatigue or body aching. Later skin lesions may develop as well as heart, neurological or muscle complications. It is often difficult to diagnose since people often do not notice the tick bite, rashes may not appear, or symptoms imitate other diseases or infections.

To avoid contact with ticks, wear clothing that fully covers the legs, arms and hands. Avoid walking in wooded or brush-laden areas whenever possible. Inspect the body and clothing during rest periods and immediately remove any ticks found, being careful not to crush them. Have someone else help to inspect the neck, back, head, and other hard-to-see areas of the body. If ticks are found on the body, try to remove the tick without crushing or leaving any part of the tick in the wound. Use fine-pointed tweezers for tick removal by insertion under the tick. Do not crush the tick on your body or between the fingers. Apply gentle but firm traction on the tick, being careful not to leave the mouthparts in the skin. Do not use force; a slow steady pull is

required. Wash hands thoroughly with soap and warm water after handling ticks, apply antiseptic to the wound with iodine, Mercurochrome, or Merthiolate and apply a corticosteroid lotion.

Mosquitoes

Mosquitoes present health hazards primarily due to their potential for transmitting diseases, including Dengue fever and several forms of encephalitis, including St. Louis Encephalitis and West Nile Encephalitis. Recently, mosquitoes have posed an increased risk due to their transmittal of West Nile Virus.

All of the mosquito-borne diseases can cause flu-like symptoms, including fever, headache, and fatigue. Dengue fever can also cause blood hemorrhaging. Encephalitis (including the West Nile, St. Louis, Eastern Equine, and LaCross-California varieties) is an infection of the brain, causing inflammation, swelling, and destruction of nerve cells. Symptoms include high fever, headache, neck stiffness, stupor, disorientation, and tremors; and can lead to convulsions, coma, paralysis, and death. Anyone experiencing several of these symptoms after being bitten by mosquitoes should seek medical attention immediately. There is no vaccine for West Nile Virus.

The best protection from mosquito-borne diseases includes wearing long-sleeved shirts and pants, applying a mosquito repellent containing 20 percent to 30 percent DEET (n,n-diethyl-m-toluamide), and avoiding perfumes and colognes when outdoors for any prolonged time.

3.3.5 Heavy Equipment Hazards

Heavy equipment is expected to be utilized extensively during the removal of the USTs, contaminated soil, and the restoration of the site. These tasks may include installation of erosion and sedimentation controls, UST Removal, excavation, back-filling, and grading. Heavy equipment work must be conducted only by trained, experienced, and licensed/certified personnel. If possible, personnel must remain outside the turning radius of large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator. No guards, safety appliances, or other devices may be removed or made ineffective unless repairs or maintenance are required, and then only after power has been shut off, tagged, and locked out. Safety devices must be replaced once repair or maintenance is complete. Exhaust from equipment must be directed so that it does not endanger workers or obstruct the view of the operator. When not operational, equipment must be set and locked so that it cannot be activated, released, dropped, etc.

3.3.6 Vehicle/Traffic Hazards

Since the work locations will be accessed through existing roadways, it will be essential to cordon off work locations with reflective safety barriers (construction fencing/cones) to protect workers from the surrounding traffic hazards and also to protect pedestrians from coming too close to construction activities. It is anticipated that the use of temporary fencing will be the primary means to limiting access to the site. Dust control will be needed during removal actions to protect against contamination spread and in order to avoid any potential damage to any nearby vehicles. Appropriate signage will also be posted clearly indicating a constriction area and that access to the site is restricted. Although work along main roadways is not planned, in the event it becomes required, the appropriate permit applications and traffic control plans will be submitted and adhered to. Secured staging areas and construction entrances will be marked and situated in an area to minimize impact to the surrounding base.

3.3.7 Noise Hazards

Noise hazards will consist mostly from the use of heavy equipment. Work around large equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; can cause physical damage to the ear, pain, and temporary and/or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 dBA (decibels on the A-weighted scale), hearing protection will be selected with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and to reduce noise levels to or below the permissible values. Therefore, during the field activities where workers are using heavy equipment, such as drill rigs and backhoes, etc., hearing protection will be utilized at these times.

3.3.8 Electrical Hazards

Overhead power lines, electrical wiring, electrical equipment (electrical generators), and buried cables pose risks to workers of electric shock, burns, muscle twitches, heart fibrillation, and other physical injuries, as well as fire and explosion hazards. Workers will take appropriate protective measures when working near live electrical parts, including inspection of the work area, to identify potential spark sources, maintenance of a safe distance, proper illumination of the work areas, provision of barriers to prevent inadvertent contact, and use of nonconductive equipment. An underground utility survey will be conducted and the appropriate permits secured prior to site mobilization in order to identify any potential underground electrical hazards. If overhead lines cannot be de-energized prior to the start of work, a 10-ft distance must be maintained between

overhead energized power lines with a voltage of 50 kV and elevated equipment parts. This distance will be increased 4 in. for every 10 kV greater than 50 kV. For example, workers must maintain a distance of 11.7 ft from energized power lines with a voltage of 100 kV.

3.3.9 Utilities

Underground utilities pose hazards to workers involved in excavation and other invasive operations. These hazards include electrical hazards, explosion, and asphyxiation, as well as costly hazards associated with damaging communication, sewer, and water lines. NAVFAC and surrounding building personnel will be given at least three days' notice prior to intrusive activities on the Site in order to provide appropriate advanced notice. In addition, a utility locating service will be retained to better delineate any underground utilities that may be encountered during the course of construction.

Personnel should be aware that although an area may be cleared, it does not mean that unanticipated hazards will not appear. Workers should always be alert for unanticipated events such as snapping cables, excavating into unmarked underground utilities, and excavating into a heavily contaminated zone, etc. Such occurrences should prompt involved individuals to halt work immediately and take appropriate corrective measures to gain control of the situation.

3.3.10 Confined Space Hazards

Although confined space entry is not anticipated throughout the duration of this project, it is included as a precaution. Should a confined space hazard be identified, all personnel will abide by the policies and procedures outlined in Section 9.0 of this SSHP. Identification of a confined space will be the responsibility of all personnel on-site during the duration of the project. The SSHO will be notified of a confined space hazard as soon as it is identified. Upon notification of a potential confined space hazard, H&S personnel will ensure that the necessary permits, etc. are filed and followed. Potential hazards include:

- Explosive / Flammable Atmospheres
- Toxic Atmospheres
- Engulfment
- Asphyxiation
- Entrapment
- Slips & falls
- Chemical Exposure
- Electric Shock

- Thermal / Chemical Burns
- Noise & Vibration

3.3.11 Excavation and Trenching

All personnel involved in excavation or trenching work will be trained in the requirements of this program. All employees, including contractor personnel, who work in or around excavations must comply with the requirements of this program. Employees are responsible for reporting hazardous practices or situations to H&S management, as well as reporting incidents that cause injury to themselves or other employees.

Soil evaluation will be performed by a qualified individual. Excavations will be kept clear of any standing water. A Competent Person will inspect any trenches or excavations on a continual basis, or at a minimum as required by OSHA or USACE.

Prior to excavation, the site will be thoroughly inspected to determine if special safety measures must be taken. All equipment, materials, supplies, permanent installations (i.e., buildings or roadways), trees, brush, boulders, and other objects at the surface that could present a hazard to employees working in the excavation will be removed or supported as necessary to protect employees.

The location of sewer, telecommunications, fuel, electric, water, or any other underground installations or wires that may be encountered during excavation work will be determined and marked prior to opening an excavation. Arrangements shall be made as necessary with the appropriate utility entity for the protection, removal, shutdown, or relocation of underground installations. Utility shut-offs will be located prior to the start of any excavating. Any existing structures that are not intended to be disturbed during excavation

Barricades, walkways, lighting, and posting will be provided as necessary for the protection of the workers and other site personnel prior to the start of excavation operations. Stairs, ladders, or ramps will be provided at excavation sites where employees are required to enter trench excavations over four (4) feet deep. The maximum distance of lateral travel (along the length of the trench) necessary to reach the means of egress will not exceed 25 feet. Soil types will be verified by the competent person prior to any workers entering excavations in order to assure that all necessary shoring is in place.

Traffic control measures are not anticipated to be required at the site, but proper hazard mitigation devices will be utilized if required. These would consist of barricades to cordon off the entrance loop during construction. All traffic control measures will follow all applicable OSHA regulations, EM 385-1-1 standards, and proceed in such a way so as to minimize any disturbances to the surrounding buildings/pedestrians.

No employee is permitted underneath loads being handled by lifting or digging equipment. Employees are required to stand away from any vehicle being loaded or unloaded to avoid being

struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles provide adequate protection for the operator during loading and unloading operations.

A warning system will be used when mobile equipment is operated adjacent to the edge of an excavation if the operator does not have a clear and direct view of the edge of the excavation. The warning system will consist of barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

The atmosphere in excavations over four (4) feet deep will be tested if a hazardous atmosphere exists or could reasonably be expected to exist, although these conditions are not anticipated to be encountered during construction.

Walkways will be provided where employees or equipment are permitted to cross over excavations. Guardrails will be provided where walkways, accessible only to on-site project personnel, are six (6) feet or more above lower levels.

Employees are not permitted to work in excavations that contain or are accumulating water unless precautions have been taken to protect them from the hazards posed by water accumulation. Precautions may include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of safety harnesses and lifelines.

Support systems (such as shoring, bracing, or underpinning) will be used to assure the stability of structures and the protection of employees where excavation operations could affect the stability of adjoining buildings, walls, or other structures (not anticipated for this project).

Adequate protection will be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face.

Any excavated soil generated during excavation activities will be immediately loaded into trucks for transport to a predetermined disposal facility. Trucks may be lined, in order to contain the excavated soil. Any soil stored onsite, including clean fill used for site restoration, will be properly stabilized during and at the end of each day to prevent any unplanned migration of soil.

Any of the aforementioned stabilization methods will follow all OSHA and applicable USACE EM 385-1-1 standards.

Any available details of soil conditions will be available to workers prior to the start of any excavations.

The SSHO will conduct daily inspections of excavations, adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection will be conducted prior to the start of work and as needed throughout the shift. Inspections will also be made after every

rainstorm or other hazard-increasing occurrence. These inspections are only required when the trench will be or is occupied by employees.

4.0 ACTION LEVELS

Monitoring with a multi-gas meter will be completed prior to and during confined space entry activities. The multi-gas meter will be used to continuously monitor combustible gases (LEL), hydrogen sulfide (H₂S), carbon monoxide (CO), and oxygen (O₂) levels. Perimeter dust monitoring will be conducted during intrusive activities to ensure particulates do not pose a threat to nearby workers using a portable dust meters in addition to visual observations of dust levels. In addition, the PID will be used to monitor for the presence of organic vapors within the work area. As this is closest to any potential source of organic vapors, monitoring vapors here will be protective of nearby populations. Monitoring requirements are included in Table 4-1.

Table 4-1

Action Levels Using Direct-Reading Air Monitoring Instruments and Visual Observations

	Instrument	Action Level
Explosive Atmosphere	Multi-Gas Meter	<10 % LEL: Continue work. >10% LEL (confined Space): Stop work and evacuate area until levels are <10% LEL*
Oxygen	Multi-Gas Meter	19.5% to 22.5%: Acceptable levels for confined space <19.5%: Stop work and evacuate area. >22.5% (confined space): Fire hazard potential. Stop work*
Organic vapors (Including PCE and TCE)	PID	0 to 5 ppm: Level D - Continue monitoring during work activities 5 to 25 ppm: Level C as appropriate - Notify SSHO >25 ppm: Halt work - Notify SSHO and NAVFAC, re-evaluate conditions
Hydrogen Sulfide	Multi-Gas Meter	>10 ppm: Stop Work. Institute engineering controls to ventilate. (OSHA PEL = 20 ppm)*
Carbon Monoxide	Multi-Gas Meter	>25 ppm: Stop Work. Institute engineering controls to ventilate. (OSHA PEL = 50 ppm)
Silica Particulates/ Dust	Dust Monitor/Visual Observation	In work area: No sustained dust cloud: Level D - continue work. Sustained dust cloud: stop work, initiate engineering controls such as wetting the work area. Perimeter of work area: Stop work if perimeter air monitors read greater than the OSHA PEL for arsenic, a site COC (OSHA PEL = 0.5 mg/m ³)

* Notify PM and SHM whenever Action Levels are exceeded so that appropriate engineering controls can be evaluated.

5.0 LEVEL OF PROTECTION

All personnel performing on-site will be required to use the appropriate level of Personal Protective Equipment (PPE) as defined below and in Section 4.0 Action Levels of this SSHP.

**Table 5-1
Minimum Level of Protection for Specific Tasks at NWIRP Bethpage, Site 1**

Activity	Level of Protection	PPE Required
Mobilization/Demobilization and Site Preparation	Level D	Hard hat, safety glasses, safety vests, ANSI approved boots, hearing protection around heavy equipment, long pants/sleeved shirts or coveralls
Underground Storage Tank Removal	Level D modified	Hard hat, safety glasses, safety vests, ANSI approved boots, inner gloves (Trilites) and outer gloves (Nitrile), chemical coveralls (Tyvek, Saranex or Chemrel), hearing protection around heavy equipment, long pants/sleeved shirts or coveralls
Soil Excavation	Level D modified modified	Hard hat, safety glasses, safety vests, ANSI approved boots, inner gloves (Trilites) and outer gloves (Nitrile), chemical coveralls (Tyvek, Saranex or Chemrel), hearing protection around heavy equipment, long pants/sleeved shirts or coveralls
Post-Excavation Sampling	Level D modified	Hard hat, safety glasses, safety vests, ANSI approved boots, inner gloves (Trilites) and outer gloves (Nitrile), chemical coveralls (Tyvek, Saranex or Chemrel), hearing protection around heavy equipment, long pants/sleeved shirts or coveralls
Site Restoration and Demobilization	Level D	Hard hat, safety glasses, safety vests, ANSI approved boots, hearing protection around heavy equipment, long pants/sleeved shirts or coveralls

Changing conditions may require an upgrade to the PPE normally used for tasks, the following table shows the appropriate upgrades.

**Table 5-2
PPE Upgrade Requirements**

All activities	Level C	Hard hat, safety glasses, ANSI approved boots, inner gloves(Trilites) and outer gloves (Nitrile or neoprene), chemical coveralls (Tyvek, Saranex or Chemrel), Full face APR with GMC-H cartridge or equivalent,
All activities	Level B	Hard hat, safety glasses, ANSI approved boots, inner gloves(Trilites) and outer gloves (Nitrile or neoprene), chemical coveralls (Tyvek, Saranex or Chemrel), positive pressure/pressure demand SCBA

NOTE: The decision to upgrade or downgrade the Level of PPE will be made as site conditions and air monitoring results are evaluated. Any changes in the Level of PPE must first be approved by the H&S SSHO and the NAVFAC.

5.1 Equipment Contamination

During the excavation activities associated with this scope of work, equipment will be in contact with non-hazardous contaminated soil. Through engineering controls and general site awareness, the amount and severity of contamination will be minimized during the removal activities. The number of equipment to have direct contact with the soil will be limited to an excavator that will directly load the soil into a tri-axle dump truck. The tri-axle truck will then be inspected for debris/decontamination, released from the site, and drive directly to the disposal site.

The use of liners in the tri-axle truck beds is not anticipated at this time, but may be utilized during transport of material if it is deemed necessary by NAVFAC, the PM, and/or the SSHO.

At the conclusion of the removal activities, or before leaving the site, all equipment will be properly decontaminated following all applicable OSHA and NAVFAC standards. Decontamination will occur at a central location within the boundaries of the project site in a contaminate reduction zone that is properly cordoned off and contains applicable signage. Either wet or dry decontamination methods will be utilized based on the extent of soil/sediment on the equipment.

If a dry decontamination method is utilized, brooms or other hand tools will be used to remove soil/sediment and any other residual materials from tires, undercarriages, etc. If dry decontamination proves to be ineffective, wet decontamination methods will be utilized.

If wet decontamination is utilized, all equipment will be washed under pressure, followed by a hand wash using a brush and detergent, and a potable water rinse. Any water and/or debris will be collected and containerized for proper disposal at a later date.

6.0 ACTIVITY HAZARD ANALYSIS

The activity hazard analysis is an ongoing process from the initiation of the SSHP preparation through the implementation and completion of the project. The activity hazard analyses detailed in this SSHP section is intended to meet the requirements of OSHA 29 CFR 1910.120, USACE EM 385-1-1. As new tasks or hazards are identified, the SSHO will prepare new activity hazard analysis for each additional task to be performed. H&S Health and Safety Programs that pertain to the activities included in the activity hazard analysis are included in later Sections.

General hazards, which are expected to be present, include working around heavy equipment, working around vehicles/traffic, stored energy, confined space entry, and inclement weather.. Site-specific Lockout/Tag Out procedures are included in this document as Section 12. Weather conditions will be monitored during all activities and appropriate actions taken to ensure the safety of on-site personnel. Activities involving working over water will follow Section 16.0 and the USACE EM 385-1-1. Attachment D of the APP contains the AHAs for the anticipated project tasks.

Training forms indicating that each employee has reviewed the AHAs pertaining to their scope of work are included in APP Attachment B.

7.0 GENERAL HEALTH AND SAFETY POLICIES

7.1 Purpose

Section 7.0 covers general policies that may not be covered under other safety programs. Our company's policy is that all H&S employees be provided with a safe and healthful place of employment. Identification of hazardous conditions may be accomplished at the planning and design stage, as a result of workplace inspections, or by employee reports. All recognized safety and health hazards will be eliminated or controlled as quickly as possible, subject to priorities based upon the degree of risk posed by the hazards. The preferred method of hazard abatement will be through application of engineering controls or substitution of less hazardous processes or materials. Reliance on personal protective equipment is acceptable only when all other methods are proven to be technically and/or economically infeasible.

7.2 Responsibilities

Management, supervisors and employees are responsible for following all safety program requirements and safety practices. If procedures or practices are identified as needing changes, these changes will be accomplished through normal management review practice.

7.3 Hazard Control Substitution

The risk of injury or illness may be reduced by replacement of an existing process, material, or equipment with a similar item having more limited hazard potential some examples include: brush painting instead of spray painting to reduce inhalation hazards; welding instead of riveting to reduce noise levels, use of safety cans instead of bottles to store flammable liquids, etc. Care must be exercised in any substitution to ensure that the substitute materials are technically acceptable and to avoid introducing new or unforeseen hazards.

7.4 Isolation

Hazards are controlled by isolation whenever an appropriate barrier or limiter is placed between the hazard and an individual who may be affected by the hazard. This isolation can be in the form of physical barriers, time separation, or distance. Examples include machine guards, electrical insulation, glove boxes, acoustical containment, and remote controlled equipment.

7.5 Ventilation

The control of a potentially hazardous airborne substance by ventilation can be accomplished by one or two methods: diluting the concentration of the substance by mixing with uncontaminated air or capturing and removing the substance at its source or point of generation. Local exhaust

ventilation is generally the preferred and more economical method of hazard control. However, dilution ventilation can be very effective for the removal of large volumes of heated air or for the removal of low concentrations of non-toxic or low toxicity contaminants from minor and decentralized sources.

7.6 Administrative Control

This method of hazard mitigation depends on effective operating practices that reduce the exposure of individuals to chemical or physical hazards. These practices may take the form of limited access to high hazard areas, preventive maintenance programs to reduce the potential for leakage of hazardous substances, or adjusted work schedules which involve a regimen of work in high hazard and low hazard areas. Adjusted work schedules are appropriate only when the hazard is recognized as having a limit below which nearly all workers may be repeatedly exposed without adverse effect.

7.7 Personal Protective Equipment

This method of hazard control is least preferred because personal protective devices may reduce a worker's productivity, while affording less effective protection against the recognized hazard than other methods of control. Nevertheless, there are instances where adequate levels of risk reduction cannot be achieved through other methods, and personal protective devices must be used, either alone or in conjunction with other protective measures.

7.8 Hazard Control Principles

Hazardous conditions in the workplace may be prevented through appropriate actions when facilities are designed, when operating procedures are developed, and when equipment is purchased. Once hazards are identified, whether through inspection or complaint, immediate action will be taken to avoid unreasonable danger.

7.9 Design Reviews

Safety and occupational health issues will be considered, designed, and engineered into all facilities. Projects that involve potential health hazards such as toxic material, radiation, noise, or other health hazard will be designed in accordance with established principles of good safety and industrial hygiene engineering.

7.10 Operating Procedures

Standard operating procedures or similar directives developed by the supervisor that are issued to direct the manner in which work is performed will include appropriate health and safety requirements. Supervisors are encouraged to submit standard operating procedures. Recommendations for changes/additions to the procedures for safety and health purposes will be submitted in writing to department managers.

7.11 Purchasing Procedures

Many hazards can be avoided by incorporating appropriate specifications for purchased equipment/material and contracted efforts that involve work at company facilities. Employees responsible for purchasing or developing specifications for purchases should coordinate with the safety office for all new material or equipment purchases to ensure safety and health considerations have been addressed. Contracts that require work to be performed by contract personnel at company facilities will follow the CSHP.

7.12 Interim Hazard Abatement Measures

During the time needed to design and implement permanent hazard control measures, immediate, temporary measures are needed. Where engineering controls are not immediately applicable, administrative controls and/or personal protective equipment are appropriate for use as interim hazard abatement measures.

7.13 Permanent Hazard Abatement

Engineering control methods are the preferred method of hazard control, followed by administrative control and personal protective equipment. Feasible engineering controls will be used to reduce hazardous exposure, even when only partial reduction of exposure is possible through engineering methods.

7.14 Hazard Control Development

The following possible actions will be considered when recommendations are developed for prevention or reduction of hazards:

- Avoiding, eliminating, or reducing deficiencies by engineering design, material selection or substitution.

- Isolating hazardous substances, components, and operations from other activities, areas, personnel, and incompatible materials.
- Incorporating "fail-safe" principles where failures would disable the system or cause a catastrophe through injury to personnel, damage to the equipment, or inadvertent operation of critical equipment.
- Relocating equipment/components so that personnel access during operation, maintenance, repair or adjustment will not result in exposure to hazards such as chemical burns, electrical shock, electromagnetic radiation, cutting edges, sharp points, or toxic atmospheres.
- Providing suitable warning and notes of caution concerning required personnel protection in operation, assembly, maintenance, and repair instructions.
- Providing distinctive markings on hazardous components, equipment, or facilities.
- Requiring use of personal protective equipment when other controls do not reduce the hazard to an acceptable level.
- Monitoring exposure to insure that engineering controls effectively reduce the hazard.
- Training employees to recognize hazards and take appropriate precautionary measures.

7.15 Hazard Reporting

Identification and reporting of potentially unsafe or unhealthful working conditions is the responsibility of all employees. All employees are encouraged to report unsafe or unhealthful working conditions to their immediate supervisor who will promptly investigate the situation and take appropriate corrective actions. Supervisors will contact the SHM for assistance as necessary. Supervisors will keep the reporting employee informed of all actions taken. Any employee may submit a written report of an unsafe or unhealthful working condition directly to the SHM.

7.16 Signs and Tags

Signs and tags are not intended as substitutes for preferred abatement methods such as engineering controls, substitution, isolation, or safe work practices. Rather, they are additional safety guidance and increase the employee's awareness of potentially hazardous situations. Tags are temporary means of warning all concerned of hazardous conditions, defective equipment, etc. Tags are not to be considered as a complete warning method, but should only be used until a positive means can be employed to eliminate the hazard; for example, a "Do Not Start" tag is

affixed to a machine and is used only until the machine can be locked out, de-energized, or inactivated.

- *Danger Signs* will be used where an immediate hazard exists and specific precautions are required to protect personnel or property. The sign will be of red, black, and white colors.
- *Danger Tags* will be placed on a damaged ladder or other damaged equipment, and immediate arrangements made for the ladder/equipment to be taken out of service and sent to be repaired.
- *Caution Signs* will be used to warn of a potential hazard or to caution against unsafe practices, and to prescribe the precaution that will be taken to protect personnel and property from mishap probability. The sign will be of yellow and black colors.
- *Radiation Signs* will be used to warn of radiation hazards and of special precautions that will be taken. "Radiation" signs will use the conventional radiation warning colors of magenta on a yellow background.
- *Exit Signs* will be utilized to clearly identify the means of egress from a building or facility. Where the exit is not apparent, signs will have an arrow indicating the direction of the exit.
- *Biological Hazard Warning Signs* will be used to signify the actual or potential presence of a biological hazard and to identify equipment, containers, rooms, experimental animals, etc., which contain or are contaminated with viable hazardous agents. The symbol on these signs will be the standard fluorescent orange or orange-red color.

7.17 Hazard Communication

Many company employees perform an operation which commonly requires the use of chemicals that have inherent chemical and physical hazards. General office activities may also involve working with products which contain regulated chemicals. The OSHA Hazard Communication Standard (29 CFR 1910.1200) requires employers to provide information to their employees concerning the hazardous chemicals in the workplace through a written program, training sessions, materials safety data sheets, labels and warnings, and other pertinent information. All employees and management will fully comply with H&S Hazard Communication Program requirements.

7.18 Noise

Employee exposure to noise of sufficient intensity and duration can result in hearing damage. Noise-induced hearing loss rarely results from just one exposure; it can progress unnoticed over a period of years. Initial noise-induced hearing loss occurs at the higher frequencies where the consonant portion of speech is found, making communications difficult. Engineering controls such as mufflers on heavy equipment exhausts or on air release valves are required where possible. If engineering solutions cannot reduce the noise, administrative controls such as increasing the distance between the noise source and the worker or rotation of jobs between workers in the high noise area should be used if possible. Employees will be given the opportunity to select hearing protective devices from a variety of suitable ones provided by H&S. Audiometric testing will be provided to all employees with exposure to noise levels of 80 dB(A) or greater.

7.19 Housekeeping

All places of employment including outside areas should be kept as clean as the nature of the work allows but must be kept free and clear of debris, trash, scrap, spills or other extraneous materials which could create a health hazard or cause an accident. Proper layout, spacing and arrangement of equipment, facilities, and machinery are essential to good housekeeping, allowing orderly operation and avoiding congestion.

Maintain the floor of every work area so far as practicable, in a dry condition. Where wet processes are used, maintain drainage and provide removable false floors, platforms, mats, or other dry standing places. When necessary or appropriate, provide waterproof footgear. To facilitate cleaning, every floor, working place, and passageway will be as smooth as feasible but allowing for the need to provide non-skid flooring where appropriate. Floors will not be cleaned with flammable materials or materials creating significant toxic hazards.

7.20 Emergency Eyewash Facilities

Emergency eyewash facilities meeting the requirements of ANSI Z358.1 will be provided in all areas where the eyes of any employee may be exposed to corrosive materials. All such emergency facilities will be located where they are easily accessible to those in need.

7.21 Sanitary Facilities

At site locations, proper facilities, including toilet facilities and potable water will be provided that meets or exceeds EM 385-1-1 requirements. Temporary portable toilets will be staged near each work area sufficient in number to accommodate the field crew. Potable water will also be made available in work areas and/or break locations.

8.0 PERSONAL PROTECTIVE EQUIPMENT

8.1 Purpose/General Rules

H&S provides all Employees with required PPE to suit the task and known hazards. This section covers the requirements for Personal Protective Equipment with the exception of PPE used for respiratory protection or PPE required for hazardous material response to spills or releases. Applicable OSHA Standards are 1910 Subpart 1 App B and 1910.120 App B, 132, 133, 136, and 138. General Rule for design, hazard assessment and equipment selection, defective and damaged equipment, and training are outlined below.

Design – All personal protective equipment will be of safe design and construction for the work to be performed.

Hazard Assessment and Equipment Selection – Hazard analysis procedures will be used to assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the following actions will be taken:

- Select, and have each affected Employee use, the proper PPE
- Communicate selection decisions to each affected Employee
- Select PPE that properly fits each affected employee.

Defective and Damaged Equipment – Defective or damaged personal protective equipment will not be used.

Training – All Employees who are required to use PPE will be trained to know at least the following:

- When PPE is necessary
- What PPE is necessary
- How to properly don, remove, adjust, and wear PPE
- The limitations of the PPE
- The proper care, maintenance, useful life and disposal of the PPE.

Each affected Employee will demonstrate an understanding of the training and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE. Certification of training for PPE is required by OSHA and will be accomplished by using the *Job Safety Checklist* to verify that each affected Employee has received and understood the required PPE training.

8.2 Personal Protective Equipment Selection

PPE Selection will be based on the following criteria as outlined below.

Controlling hazards – PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.

Selection guidelines – The general procedure for selection of protective equipment is to:

- a) Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc;
- b) Compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment;
- c) Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards
- d) Fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

Fitting the Device – Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

Devices with adjustable features – Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases a chinstrap may be necessary to keep the helmet on an employee's head. (Chinstraps should break at a reasonably low force, however, to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.

8.3 Eye and Face Protection

Each affected employee will use appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. Each affected employee will use eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors are acceptable. Each affected employee who wears prescription lenses while engaged in operations that involve eye hazards will wear eye protection that incorporates the prescription in its design, or will wear eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses. Eye and face PPE will be distinctly marked to facilitate identification of the manufacturer. Each affected employee will use equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation. The following is a listing of appropriate shade numbers for various operations.

**Table 8-1
Filter Lenses for Protection Against Radiant Energy**

Operations	Electrode Size 1/32 in	Arc Current	Protective Shade
Shielded metal arc welding	Less than 3	Less than 60	7
	3-5	60-160	8
	5-8	160-250	10
	More than 8	250-550	11
Torch brazing			3
Torch soldering			2

Note: as a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxy/fuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

Selection chart guidelines for eye and face protection:

The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard “source” operations.

**Table 8-2
Selection Chart for Eye and Face Protection**

<i>Source</i>	<i>Hazard</i>	<i>Protection</i>
IMPACT - Chipping, grinding, machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shield. For severe exposure, use face shield
HEAT-Furnace operation and arc Welding	Hot sparks	Face shields, spectacles with side. For severe exposure use face shields.
CHEMICALS-Acid and chemical handling, degreasing, plating	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield.
DUST - Woodworking, buffing, general dusty conditions.	Nuisance dust	Goggles, eye cup and cover type

8.4 Head Protection

All head protection is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors.

8.5 Foot Protection

General requirements - Safety shoes and boots provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate. Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee's feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

8.6 Hand Protection

General requirements - Hand protection is required when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

Selection guidelines for hand protection - Selection of hand PPE will be based on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified. Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. There is no glove that provides protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused. It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. Before purchasing gloves, request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated.

Other factors to be considered for glove selection in general include:

- (a) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types.

(b) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

Selection of gloves for protection against chemical hazards:

- (a) The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects.
- (b) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials.
- (d) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

9.0 CONFINED SPACE PROGRAM

9.1 Purpose

The plans for tank removal and trench sampling allow for all work to be completed from above the trench. Though H&S does not anticipate the need to enter into any confined space during removal process of underground storage tanks, the H&S Confined Space Entry Program is provided to protect authorized H&S employees that may enter confined spaces and may be exposed to hazardous atmospheres, engulfment in materials, conditions which may trap or asphyxiate due to converging or sloping walls, or contains any other safety or health hazards should removal or sampling plans change. Reference: OSHA-Permit-Required Confined Spaces (29 CFR 1910.146).

9.2 Definitions

Confined space:

1. Is large enough or so configured that an employee can bodily enter and perform work.
2. Has limited or restricted means for entry or exit (i.e. tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
3. Is not designed for continuous employee occupancy.

Permit required confined space (permit space) is a confined space that has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere.
2. Contains a material that has the potential for engulfing an entrant.
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly covering walls or by a floor which slopes downward and tapers to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

Each Permit-Required Confined Space will be marked "Confined Space - Entry Permit Required".

9.3 Confined Space Entry – Procedures

Each employee who enters or is involved in a Confined Space entry must:

1. Understand the procedures for Confined Space Entry. (Permit & Non-Permit)
2. Know the Hazards of the specific space.
3. Review and follow the specific procedures for each confined space entry.
4. Understand how to use appropriate entry and rescue equipment.

9.3.1 Permit Required Confined Space

Confined Space Entry – Permits

Confined Space Entry Permits must be completed before any Employee enters a **Permit-Required Confined Space**. The Permit must be completed and signed by an Authorized Member of Management before entry. Permits will expire before the completion of the shift or if any pre-entry conditions change. Permits will be maintained on file for a minimum of 12 months.

Permit Required Confined Space Entry - General Rules

During all Confined Space Entries, the following Safety Rules must be strictly enforced:

1. Only Authorized and Trained Employees may enter a Confined Space or may act as Safety Watchmen. Appropriate personal protective equipment (PPE) will be utilized.
2. No Smoking is permitted in a Confined Space or near entrance/exit area.
3. During Confined Space Entries, a Watchman must be present at all times.
4. Constant visual or voice communication will be maintained between the Safety Watchman and Employees entering a Confined Space.
5. No bottom or side entry will be made or work conducted below the level any hanging material or material which could cause engulfment.
6. Air and Oxygen Monitoring is required before entering any Permit-Required Confined Space. Oxygen levels in a Confined Space must be between 19.5 and 22.5 percent. Additional ventilation and Oxygen Level Monitoring is required when welding is

performed. The monitoring will check Oxygen Levels, Explosive Gas Levels, Hydrogen Sulfide Levels, and Carbon Monoxide Levels. Entry will not be permitted if explosive gas is detected above 10% of the Lower Explosive Limit (LEL) CO Levels cannot exceed 20 ppm and H₂S levels cannot exceed 10 ppm (Refer to Table 4-1 for action levels). Any LEL reading should be evaluated for toxicity concerns and LEL concerns.

7. To prevent injuries to others, a barricade will protect all openings to Confined Spaces when covers are removed.

9.4 Confined Space Responsibilities

Management:

- Ensure proper training for entry & rescue teams
- Provide proper equipment for entry & rescue teams
- Ensure confined space assessments have been conducted
- Ensure all permit required confined spaces are posted
- Annually review this program and all Entry Permits
- Evaluate Rescue Teams/Service to ensure they are adequately trained and prepared
- Ensure rescue team at access during entry into spaces with IDLH atmospheres

Employees:

- Follow program requirements
- Report any previously un-identified hazards associated with confined spaces

Entrants:

- All entrants must be authorized by the entry supervisor to enter permit spaces, have received the required training, used the proper equipment, and observes the entry procedures and permit. The following entrant duties are required:
 - Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
 - Properly use the equipment required for safe entry.
 - Communicate with the attendant as necessary to enable the attendant to monitor the status of the entrants and to enable the attendant to alert the entrants of the need to evacuate the space if necessary.

- Alert the attendant whenever, the entrant recognizes any warning signs or symptoms of exposure to a dangerous situation, or any prohibited condition is detected.
- Exit the permit space as quickly as possible whenever; the attendant or entry supervisor gives an order to evacuate the permit space, the entrant recognized any warning signs or symptoms of exposure to a dangerous situation, the entrant detects a prohibited condition, or an evacuation alarm activated.

Entry Supervisor:

- Entry supervisors are responsible for the overall permit space entry and must coordinate all entry procedures, tests, permits, equipment and other relevant activities. The following entry supervisor duties are required:
- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Verifies, by checking that the appropriate entries have been made on the permit, all test specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- Terminate the entry and cancel the permit when the entry is complete or there is a need for terminating the permit.
- Verify that rescue services are available and that the means for summoning them are operable.
- Remove unauthorized persons who enter or attempt to enter the space during entry operations.
- Determine whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space that entry operations remain consistent with the permit terms and that acceptable entry conditions are maintained.

Entry Attendants:

- At least one attendant is required outside the permit space into which entry is authorized for the duration of the entry operation. Responsibilities include:

- To know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- *To be aware of possible behavioral effects of hazard exposure on entrants.*
- To continuously maintain an accurate count of entrants in the permit space and ensure a means to accurately identify authorized entrants.
- To remain outside the permit space during entry operations until relieved by another attendant (once properly relieved, they may participate in other permit space activities, including rescue if they are properly trained and equipped).
- To communicate with entrants as necessary to monitor entrant status and alert entrants of the need to evacuate.
- To monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the entrants to immediately evacuate if the attendant detects a prohibited condition, detects entrant behavioral effects of hazard exposure, detects a situation outside the space that could endanger the entrants; or if the attendant cannot effectively and safely perform all the attendant duties.
- To summon rescue and other emergency services as soon as the attendant determines the entrants need assistance to escape the permit space hazards.
- To perform non-entry rescues as specified by that rescue procedure and entry supervisor.
- Not to perform duties that might interfere with the attendants' primary duty to monitor and protect the entrants.
- To take the following action when unauthorized persons approach or enter a permit space while entry is under way.
- Warn the unauthorized persons that they must stay away from the permit space.
- Advise unauthorized persons that they must exit immediately if they have entered the space.
- Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.

9.5 Hazard Control

Engineering Controls

- Locked entry points
- Temporary ventilation
- Temporary Lighting

Administrative Controls

- Signs
- Employee training
- Entry procedures
- Atmospheric Monitoring
- Rescue procedures
- Use of prescribed PPE

9.6 Entry Standard Operating Procedures

A Standard Operating Procedure (SOP) has been developed for each space to standardize the entry procedure. Standardized SOPs should be reviewed periodically to ensure that they are still applicable and that conditions haven't changed. The SOP outlines:

- Hazards
- Hazard Control & Abatement
- Acceptable Entry Conditions
- Means of Entry
- Entry Equipment Required
- Emergency Procedures

9.6.1 Contractor Entry

All work by non-company employees that involves the entry into confined spaces will follow the procedures of this program. The information of this program and specific hazards of the confined spaces to be entered will be provided to Contractor Management prior to commencing entry or work.

9.7 Training

Training for Confined Space Entry includes:

1. Duties of Entry Supervisor, Entrant and Attendants
2. Confined Space Entry permits
3. Hazards of Confined Spaces
4. Use of Air Monitoring Equipment
5. First Aid and CPR Training
6. Emergency Action & Rescue Procedures
7. Confined Space Entry & Rescue Equipment
8. Rescue training, including entry and removal from representative spaces

9.8 Confined Space Hazards

The following are confined space hazards and are discussed below:

- Explosive / Flammable Atmospheres
- Toxic Atmospheres
- Engulfment
- Asphyxiation
- Entrapment
- Slips & falls
- Chemical Exposure
- Electric Shock
- Thermal / Chemical Burns
- Noise & Vibration

9.8.1 Flammable Atmospheres

A flammable atmosphere generally arises from enriched oxygen atmospheres, vaporization of flammable liquids, byproducts of work, chemical reactions, concentrations of combustible dusts, and desorption of chemical from inner surfaces of the confined space.

An atmosphere becomes flammable when the ratio of oxygen to combustible material in the air is neither too rich nor too lean for combustion to occur. Combustible gases or vapors will accumulate when there is inadequate ventilation in areas such as a confined space. Flammable gases such as acetylene, butane, propane, hydrogen, methane, natural or manufactured gases or

vapors from liquid hydrocarbons can be trapped in confined spaces, and since many gases are heavier than air, they will seek lower levels as in pits, sewers, and various types of storage tanks and vessels. In a closed top tank, it should also be noted that lighter than air gases may rise and develop a flammable concentration if trapped above the opening.

The byproducts of work procedures can generate flammable or explosive conditions within a confined space. Specific kinds of work such as spray painting can result in the release of explosive gases or vapors. Welding in a confined space is a major cause of explosions in areas that contain combustible gas.

Chemical reactions forming flammable atmospheres occur when surfaces are initially exposed to the atmosphere, or when chemicals combine to form flammable gases. This condition arises when dilute sulfuric acid reacts with iron to form hydrogen or when calcium carbide makes contact with water to form acetylene. Other examples of spontaneous chemical reactions that may produce explosions from small amounts of unstable compounds are acetylene-metal compounds, peroxides, and nitrates. In a dry state, these compounds have the potential to explode upon percussion or exposure to increased temperature. Another class of chemical reactions that form flammable atmospheres arise from deposits of pyrophoric substances (carbon, ferrous oxide, ferrous sulfate, iron, etc.) that can be found in tanks used by the chemical and petroleum industry. These tanks containing flammable deposits will spontaneously ignite upon exposure to air.

Combustible dust concentrations are usually found during the process of loading, unloading, and conveying grain products, nitrated fertilizers, finely ground chemical products, and any other combustible material. High charges of static electricity, which rapidly accumulate during periods of relatively low humidity (below 50%), can cause certain substances to accumulate electrostatic charges of sufficient energy to produce sparks and ignite a flammable atmosphere. These sparks may also cause explosions when the right air or oxygen to dust or gas mixture is present.

9.8.2 Toxic Atmospheres

The substances to be regarded as toxic in a confined space can cover the entire spectrum of gases, vapors, and finely-divided airborne dust in industry. The sources of toxic atmospheres encountered may arise from the following:

The manufacturing process (for example, in producing polyvinyl chloride, hydrogen chloride is used as well as vinyl chloride monomer, which is carcinogenic).

The product stored [removing decomposed organic material from a tank can liberate toxic substances, such as hydrogen sulfide (H₂S)].

The operation performed in the confined space (for example, welding or brazing with metals capable of producing toxic fumes).

During loading, unloading, formulation, and production, mechanical and/or human error may also produce toxic gases which are not part of the planned operation.

Carbon monoxide (CO) is a hazardous gas that may build up in a confined space. This odorless, colorless gas that has approximately the same density as air is formed from incomplete combustion of organic materials such as wood, coal, gas, oil, and gasoline; it can be formed from microbial decomposition of organic matter in sewers, silos, and fermentation tanks. Carbon monoxide is an insidious toxic gas because of its poor warning properties. Early stages of CO intoxication are nausea and headache. Carbon monoxide may be fatal at 1000 ppm in air, and is considered dangerous at 200 ppm, because it forms carboxyhemoglobin in the blood which prevents the distribution of oxygen in the body.

Carbon monoxide is a relatively abundant colorless, odorless gas; therefore, any untested atmosphere must be suspect. It must also be noted that a safe reading on a combustible gas indicator does not ensure that CO is not present. Carbon monoxide must be tested for specifically. The formation of CO may result from chemical reactions or work activities; therefore fatalities due to CO poisoning are not confined to any particular industry. There have been fatal accidents in sewage treatment plants due to decomposition products and lack of ventilation in confined spaces. Another area where CO results as a product of decomposition is in the formation of silo gas in grain storage elevators. In another area, the paint industry, varnish is manufactured by introducing the various ingredients into a kettle, and heating them in an inert atmosphere, usually town gas, which is a mixture of carbon dioxide and nitrogen.

In welding operations, oxides of nitrogen and ozone are gases of major toxicological importance, and incomplete oxidation may occur and carbon monoxide can form as a byproduct.

Another poor work practice, which has led to fatalities, is the recirculation of diesel exhaust emissions. Increased CO levels can be prevented by strict control of the ventilation and the use of catalytic converters.

9.8.3 Irritant (Corrosive) Atmospheres

Irritant or corrosive atmospheres can be divided into primary and secondary groups. The primary irritants exert no systemic toxic effects (effects on the entire body). Examples of primary irritants are chlorine, ozone, hydrochloric acid, hydrofluoric acid, sulfuric acid, nitrogen dioxide,

ammonia, and sulfur dioxide. A secondary irritant is one that may produce systemic toxic effects in addition to surface irritation. Examples of secondary irritants include benzene, carbon tetrachloride, ethyl chloride, trichloroethane, trichloroethylene, and chloropropene. Irritant gases vary widely among all areas of industrial activity. They can be found in plastics plants, chemical plants, the petroleum industry, tanneries, refrigeration industries, paint manufacturing, and mining operations.

Prolonged exposure at irritant or corrosive concentrations in a confined space may produce little or no evidence of irritation. This may result in a general weakening of the defense reflexes from changes in sensitivity. The danger in this situation is that the worker is usually not aware of any increase in his/her exposure to toxic substances.

9.8.4 Asphyxiating Atmospheres

The normal atmosphere is composed approximately of 20.9% oxygen and 78.1% nitrogen, and 1% argon with small amounts of various other gases. Reduction of oxygen in a confined space may be the result of either consumption or displacement. The consumption of oxygen takes place during combustion of flammable substances, as in welding, heating, cutting, and brazing. A more subtle consumption of oxygen occurs during bacterial action, as in the fermentation process. Oxygen may also be consumed during chemical reactions as in the formation of rust on the exposed surface of the confined space (iron oxide). The number of people working in a confined space and the amount of their physical activity will also influence the oxygen consumption rate.

A second factor in oxygen deficiency is displacement by another gas. Examples of gases that are used to displace air, and therefore reduce the oxygen level are helium, argon, and nitrogen. Carbon dioxide may also be used to displace air and can occur naturally in sewers, storage bins, wells, tunnels, wine vats, and grain elevators. Aside from the natural development of these gases, or their use in the chemical process, certain gases are also used as inerting agents to displace flammable substances and retard pyrophoric reactions. Gases such as nitrogen, argon, helium, and carbon dioxide, are frequently referred to as non-toxic inert gases but have claimed many lives. The use of nitrogen to inert a confined space has claimed more lives than carbon dioxide. The total displacement of oxygen by nitrogen will cause immediate collapse and death. Carbon dioxide and argon, with specific gravities greater than air, may lie in a tank or manhole for hours or days after opening. Since these gases are colorless and odorless, they pose an immediate hazard to health unless appropriate oxygen measurements and ventilation are adequately carried out.

Oxygen deprivation is one form of asphyxiation. While it is desirable to maintain the atmospheric oxygen level at 21% by volume, the body can tolerate deviation from this ideal.

When the oxygen level falls to 17%, the first sign of hypoxia is a deterioration to night vision which is not noticeable until a normal oxygen concentration is restored. Physiologic effects are increased breathing volume and accelerated heartbeat. Between 14-16% physiologic effects are increased breathing volume, accelerated heartbeat, very poor muscular coordination, rapid fatigue, and intermittent respiration. Between 6-10% the effects are nausea, vomiting, inability to perform, and unconsciousness. Less than 6%, spasmodic breathing, convulsive movements, and death in minutes.

9.8.5 Mechanical Hazards

If activation of electrical or mechanical equipment would cause injury, each piece of equipment should be manually isolated to prevent inadvertent activation before workers enter or while they work in a confined space. The interplay of hazards associated with a confined space, such as the potential of flammable vapors or gases being present, and the build-up of static charge due to mechanical cleaning, such as abrasive blasting, all influence the precautions which must be taken.

To prevent vapor leaks, flashbacks, and other hazards, workers should completely isolate the space. To completely isolate a confined space, the closing of valves is not sufficient. All pipes must be physically disconnected or isolation blanks bolted in place. Other special precautions must be taken in cases where flammable liquids or vapors may re-contaminate the confined space. The pipes blanked or disconnected should be inspected and tested for leakage to check the effectiveness of the procedure. Other areas of concern are steam valves, pressure lines, and chemical transfer pipes. A less apparent hazard is the space referred to as a void, such as double walled vessels, which must be given special consideration in blanking off and inerting.

9.8.6 Thermal Effects

Four factors influence the interchange of heat between people and their environment. They are (1) air temperature, (2) air velocity, (3) moisture contained in the air, and (4) radiant heat. Because of the nature and design of most confined spaces, moisture content and radiant heat are difficult to control. As the body temperature rises progressively, workers will continue to function until the body temperature reaches approximately 102°F. When this body temperature is exceeded, the workers are less efficient, and are prone to heat exhaustion, heat cramps, or heat stroke. In a cold environment, certain physiologic mechanisms come into play, which tend to limit heat loss and increase heat production. The most severe strain in cold conditions is chilling of the extremities so that activity is restricted. Special precautions must be taken in cold environments to prevent frostbite, trench foot, and general hypothermia.

Protective insulated clothing for both hot and cold environments will add additional bulk to the worker and must be considered in allowing for movement in the confined space and exit time. Therefore, air temperature of the environment becomes an important consideration when evaluating working conditions in confined spaces.

9.8.7 Noise

Noise problems are usually intensified in confined spaces because the interior tends to cause sound to reverberate and thus expose the worker to higher sound levels than those found in an open environment. This intensified noise increases the risk of hearing damage to workers which could result in temporary or permanent loss of hearing. Noise in a confined space which may not be intense enough to cause hearing damage may still disrupt verbal communication with the emergency standby person on the exterior of the confined space. If the workers inside are not able to hear commands or danger signals due to excessive noise, the probability of severe accidents can increase.

9.8.8 Vibration

Whole body vibration may affect multiple body parts and organs depending upon the vibration characteristics. Segmental vibration, unlike whole body vibration, appears to be more localized in creating injury to the fingers and hands of workers using tools, such as pneumatic hammers, rotary grinders or other hand tools which cause vibration.

9.8.9 Other Hazards

Some physical hazards cannot be eliminated because of the nature of the confined space or the work to be performed. These hazards include such items as scaffolding, surface residues, and structural hazards. The use of scaffolding in confined spaces has contributed to many accidents caused by workers or materials falling, improper use of guard rails, and lack of maintenance to insure worker safety. The choice of material used for scaffolding depends upon the type of work to be performed, the calculated weight to be supported, and the surface on which the scaffolding is placed, and the substance previously stored in the confined space.

Surface residues in confined spaces can increase the already hazardous conditions of electrical shock, reaction of incompatible materials, liberation of toxic substances, and bodily injury due to

slips and falls. Without protective clothing, additional hazards to health may arise due to surface residues.

Structural hazards within a confined space such as baffles in horizontal tanks, trays in vertical towers, bends in tunnels, overhead structural members, or scaffolding installed for maintenance constitute physical hazards, which are exacerbated by the physical surroundings. In dealing with structural hazards, workers must review and enforce safety precautions to assure safety.

10.0 HAZARD COMMUNICATION & CHEMICAL SAFETY

10.1 Purpose

This document serves as H&S's Hazard Communication Program. It provides detailed safety guidelines and instructions for receipt, use and storage of chemicals at our facility by employees and contractors. Reference: OSHA Standard 1910.1200

10.2 Responsibilities

Management

- Ensure compliance with this program.
- Conduct immediate corrective action for deficiencies found in the program.
- Maintain an effective Hazard Communication training program.
- Make this plan available to employees or their designated representative.

Shipping & Receiving Manager:

- Ensure all containers are properly labeled and that labels are not removed or defaced.
- Ensure all shipped containers are properly labeled.
- Ensure shipping department employees are properly trained in spill response.
- Ensure received Material Safety Data Sheets (MSDS) are properly distributed.

Purchasing Agent:

- Obtain manufacturer's MSDS for chemicals purchased from retail sources.

Safety Manager:

- Maintain a list of hazardous chemicals using the identity that is referenced on the MSDS.
- Monitor the effectiveness of the program.
- Conduct annual audit of the program.
- Monitor employee training to ensure effectiveness.
- Keep management informed of necessary changes.
- Ensure MSDSs are available as required.
- Monitor facility for proper use, storage and labeling of chemicals.

- Ensure MSDS are available for emergency medical personnel when treating exposed employees.
- Provide information, as requested, concerning health effects and exposure symptoms listed on MSDSs.

Supervisors:

- Comply with all specific requirements of the program.
- Provide specific chemical safety training for assigned employees.
- Ensure chemicals are properly used stored & labeled.
- Ensure only the minimum amount necessary is kept at work stations.
- Ensure up to date MSDS are readily accessible to all employees on all shifts.

Employees:

- Comply with chemical safety requirements of this program.
- Report any problems with storage or use of chemicals.
- Immediately report spills of suspected spills of chemicals.
- Use only those chemicals for which they have been trained.
- Use chemicals only for specific assigned tasks in the proper manner.

Contractors:

- Comply will all aspects of this program.
- Coordinate information with the Safety Manager.
- Ensure Contractor employees are properly trained.
- Notify the Safety Manager before bringing any chemicals onto facilities.
- Monitor and ensure proper storage and use of chemicals by Contractor employees.

10.3 General Program Information

This written Hazard Communication Plan (HAZCOM) has been developed based on OSHA Hazard Communication Standard and consists of the following elements:

- Identification of Hazardous Materials
- Product Warning Labels
- Material Safety Data Sheets (MSDS)
- Written Hazard Communication Program
- Effective Employee Training

Some chemicals are explosive, corrosive, flammable, or toxic. Other chemicals are relatively safe to use and store but may become dangerous when they interact with other substances. To avoid injury and/or property damage, persons who handle chemicals in any area of H&S must understand the hazardous properties of the chemicals. Before using a specific chemical, safe handling methods and health hazards must always be reviewed. Supervisors are responsible for ensuring that the equipment needed to work safely with chemicals is accessible and maintained for all employees on all shifts.

10.4 Employee Training

Initial Orientation Training - All new employees will receive safety orientation training covering the elements of the HAZCOM and Right to Know Program. This training will consist of general training covering:

- Location and availability of the written Hazard Communication Program.
- Location and availability of the List of Chemicals used in the workplace.
- Methods used to detect the presence or release of a hazardous chemical in the workplace.
- The specific physical and health hazard of all chemicals in the workplace.
- Specific control measures for protection from physical or health hazards.
- Explanation of the chemical labeling system.
- Location and use of MSDS.

Job Specific Training - Employees will receive on the job training from their supervisor. This training will cover the proper use, inspection and storage of necessary personal protective equipment and chemical safety training for the specific chemicals they will be using or will be working around.

Annual Refresher Training - Annual Hazard Communication refresher training will be conducted as part of H&S's continuing safety training program.

Immediate On-the-Spot Training - This training will be conducted by supervisors for any employee that requests additional information or exhibits a lack of understanding of the safety requirements.

Non-Routine Tasks - Non-routine tasks are defined as working on, near, or with unlabeled piping, unlabeled containers of an unknown substance, confined space entry where a hazardous substance may be present and/or a one-time task using a hazardous substance differently than intended (example: using a solvent to remove stains from tile floors). Steps for Steps for Non-Routine Tasks include:

- Step 1: Hazard Determination
- Step 2: Determine Precautions
- Step 3: Specific Training & Documentation
- Step 4: Perform Task

All non-routine tasks will be evaluated by the SSHO before the task commences, to determine all hazards present. This determination will be conducted with quantitative/qualitative analysis (air sampling, substance identification/analysis, etc., as applicable).

Once the hazard determination is made, the SSHO will determine the necessary precautions needed to either remove the hazard, change to a non-hazard, or protect from the hazard (use of personal protective equipment) to safeguard the Employees present. In addition, the SSHO will provide specific safety training for Employees present or affected and will document the training using the *Chemical Safety Training Checklist* form which will be marked "Non Routine Task Training".

Off-site use or transportation of chemicals - An MSDS will be provided to employees for each chemical and each occurrence of use or transport away from H&S facilities. All State and Federal DOT Regulations will be followed including use of certified containers, labeling & marking, securing of containers and employee training.

10.5 General Chemical Safety

Assume all chemicals are hazardous - The number of hazardous chemicals and the number of reactions between them is so large that prior knowledge of all potential hazards cannot be assumed. Use chemicals in as small quantities as possible to minimize exposure and reduce possible harmful effects. The following general safety rules will be observed when working with chemicals:

- Read and understand the Material Safety Data Sheets.
- Keep the work area clean and orderly.
- Use the necessary safety equipment.
- Carefully label every container with the identity of its contents and hazard warnings.
- Store incompatible chemicals in separate areas.
- Substitute less toxic materials whenever possible.
- Limit the volume of flammable material to the minimum needed for operation periods.
- Provide means of containing the material if containers should break or spill contents.

10.5 Task Evaluation

Each task that requires the use of chemicals should be evaluated to determine the potential hazards associated with the work. This hazard evaluation must include the chemical or combination of chemicals that will be used in the work, as well as other materials that will be used near the work. If a malfunction during the operation has the potential to cause serious injury or property damage, a Safe Operational Procedure (SOP) should be prepared and followed. Operations must be planned to minimize the generation of hazardous wastes.

10.6 Chemical Storage

The separation of chemicals (solids or liquids) during storage is necessary to reduce the possibility of unwanted chemical reactions caused by accidental mixing. Explosives should be stored separately outdoors. Use either distance or barriers (e.g., trays) to isolate chemicals into the following groups:

- Flammable Liquids: Store in approved flammable storage lockers.
- Acids: Store separately from bases, oxidizers, and flammable liquids.
- Bases: Do not store bases with acids or any other material.
- Other liquids: Ensure liquids are not incompatible with other chemical in the same area.

In addition, lips, strips, or bars are to be installed across the width of storage shelves to restrain the chemicals in case of earthquake. Chemicals are not to be stored in the same refrigerator used for food storage. Incompatible chemical should not be stored together. A label on the door must appropriately identify refrigerators used for storing chemicals. Flammable liquids are not allowed to be stored in any electrical refrigeration device.

10.7 Container Labels

It is extremely important that all containers of chemicals are properly labeled and the following requirements apply:

- All containers will have the appropriate label, tag or marking prominently displayed that indicates the identity, safety and health hazards.
- Portable containers which contain a small amount of chemical need not be labeled if they are used immediately that shift, but must be under the strict control of the employee using the product.

- All warning labels, tags, etc., must be maintained in a legible condition and not be defaced. Facility weekly supervisor inspections will check for compliance of this rule.
- Incoming chemicals are to be checked for proper labeling.

10.8 Emergencies and Spills

In case of an emergency, implement the proper Emergency Action Plan:

- Evacuate people from the area.
- Isolate the area.
- If the material is flammable, turn off ignition and heat sources.
- Only personnel specifically trained in emergency response are permitted to participate in chemical emergency procedures beyond those required to evacuate the area.
- Call for Emergency Response Team assistance if required.

10.9 Housekeeping

- Maintain the smallest inventory of chemicals to meet immediate needs.
- Periodically review stock of chemicals on hand.
- Ensure that storage areas, or equipment containing large quantities of chemicals, are secure from accidental spills.
- Rinse emptied bottles that contain acids or inflammable solvents before disposal.
- Recycle unused laboratory chemicals wherever possible.
- *DO NOT* Place hazardous chemicals in salvage or garbage receptacles.
- *DO NOT* Pour chemicals onto the ground.
- *DO NOT* Dispose of chemicals through the storm drain system.
- *DO NOT* Dispose of highly toxic, malodorous chemicals down sinks or sewer drains.

10.10 Contractors

All outside contractors working inside H&S work areas are required to follow the requirements of this program. H&S will provide Contractors information on:

- Location of MSDS.
- Precautions to be taken to protect contractor employees.
- Potential exposure to hazardous substances.
- Chemicals used in or stored in areas where they will be working.
- Location and availability of Material Safety Data Sheets.
- Recommended Personal Protective Equipment.
- Labeling system for chemicals.

10.11 Definitions

- **Chemical:** any element, chemical compound or mixture of elements and/or compounds.
- **Combustible liquid:** means any liquid having a flash point at or above 100 deg. F (37.8 deg. C), but below 200 deg. F (93.3 deg. C), except any mixture having components with flash points of 200 deg. F (93.3 deg. C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.
- **Compressed gas:** any compound that exhibits: (i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F; (ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F. regardless of the pressure at 70 deg. F; (iii) A liquid having a vapor pressure exceeding 40 psi at 100 deg. F.
- **Container:** any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this section, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.
- **Designated representative:** any individual or organization to whom an employee gives written authorization to exercise such employee's rights under this section. A recognized or certified collective bargaining agent will be treated automatically as a designated representative without regard to written employee authorization.
- **Employee:** a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.
- **Employer:** a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

- **Explosive:** a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.
- **Exposure or exposed:** an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. Subjected in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)
- **Flammable:** a chemical that falls into one of the following categories: (i) "Aerosol, flammable" means an aerosol that yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening; (ii) "Gas, flammable" means: (A) A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent by volume or less; or (B) A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the lower limit; (iii) "Liquid, flammable" means any liquid having a flash point below 100 deg. F., except any mixture having components with flash points of 100 deg. F. or higher, the total of which make up 99 percent or more of the total volume of the mixture; (iv) "Solid, flammable" means a solid, other than a blasting agent or explosive as defined in 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical will be considered to be a flammable solid if it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.
- **Flash point:** the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite.
- **Hazardous chemical:** any chemical which is a physical hazard or a health hazard.
- **Hazard warning:** any words, pictures, symbols, or combination appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s), including target organ effects, of the chemical(S) in the container(s). (See the definitions for "physical hazard" and "health hazard" to determine the hazards which must be covered.)
- **Health hazard:** a chemical for which there is evidence that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitzers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.
- **Identity:** any chemical or common name which is indicated on the material safety data sheet (MSDS) for the chemical. The identity used will permit cross-references to be made among the required list of hazardous chemicals, the label and the MSDS.

- **Immediate use:** the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
- **Label:** any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.
- **Material safety data sheet (MSDS):** written or printed material concerning a hazardous chemical which is prepared in accordance with OSHA Standard 1910.1200 requirements.
- **Mixture:** any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.
- **Oxidizer:** means a chemical other than a blasting agent or explosive as defined in 1910.109(a) that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.
- **Physical hazard:** a chemical that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.
- **Pyrophoric:** a chemical that will ignite spontaneously in air at a temperature of 130 deg. F. or below.
- **Specific chemical identity:** the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.
- **Unstable (reactive):** a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose; condense, or will become self-reactive under conditions of shocks, pressure or temperature.
- **Use:** to package, handle, react, emit, extract, generate as a byproduct, or transfer.
- **Water-reactive:** a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.
- **Work area:** a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.
- **Workplace:** an establishment, job site, or project, at one geographical location containing one or more work areas.

10.12 MSDS Information

Material Safety Data Sheets are provided by the chemical manufacturer to provide additional information concerning safe use of the product. Each MSDS provides:

- Common Name and Chemical Name of the material.
- Name, address and phone number of the manufacturer.
- Emergency phone numbers for immediate hazard information.
- Date the MSDS was last updated.

- Listing of hazardous ingredients.
- Chemical hazards of the material.
- Information for identification of chemical and physical properties.
- Information Chemical Users must know.
- Fire and/or Explosion Information.
- Material Flash Point, auto-ignition temperature and upper/lower flammability limits.
- Proper fire extinguishing agents to be used.
- Fire fighting techniques.
- Any unusual fire or explosive hazards.

Chemical Reaction Information

- *Stability of Chemical*
- Conditions and other materials which can cause reactions with the chemical
- Dangerous substances that can be produced when the chemical reacts

Control Measures

- Engineering Controls required for safe product use
- Personal protective equipment required for use of product
- Safe storage requirements and guidelines
- Safe handling procedures

Health Hazards

- Permissible Exposure Limit (PEL) and Threshold Limit Value (TLV)
- Acute or Chronic symptoms of exposure
- Main routes of entry into the body
- Medical conditions that can be made worse by exposure
- Cancer causing properties if any
- Emergency and First Aid treatments

Spill & Leak Procedures

- Clean up techniques
- Personal Protective Equipment to be used during cleanup
- Disposal of waste & cleanup material

Employee Use of MSDS

- Know the location of the MSDS
- Understand the major points for each chemical
- Check MSDS when more information is needed or questions arise
- Be able to quickly locate the emergency information on the MSDS
- Follow the safety practices provided on the MSDS

11.0 ACCIDENT REPORTING & RECORD KEEPING

11.1 Purpose

Various Federal and State laws require accident, injury and illness reports. Company insurance carriers also require accident reports. NAVFAC has specific requirements for any reportable incident.

11.2 Policy

It is the policy of H&S to create, maintain and file accident reports as required by law. Accident reports submitted to outside agencies and agents of the company will be submitted in the required format. Example: OSHA 300 log and OSHA 300A form (or equivalent). All incidents and accidents resulting in injury or causing illness to employees and events (near-miss accidents) will be reported in order to:

- Establish a written record of factors that cause injuries and illnesses and occurrences (near-misses) that might have resulted in injury or illness but did not, as well as property and vehicle damage.
- Maintain a capability to promptly investigate incidents and events in order to initiate and support corrective and/or preventive action.
- Provide statistical information for use in analyzing all phases of incidents and events.
- Provide the means for complying with the reporting requirements for occupational injuries and illness.
- The Incident Reporting System requirements apply to all incidences involving company employees, on-site vendors, contractor employees and visitors, which result in (or might have resulted in) personal injury, illness, and/or property and vehicle damage.
- The Project Manager will be responsible for reporting exposure data to the NAVFAC on a monthly basis detailing man-hours worked and any reportable incidents for the month.

THE CO/COTR must be notified verbally within 24 hours of any reportable incident and ENG Form 3394, Accident Investigation Report; must be completed and submitted to the CO/COTR within 5 working days. Incidents resulting in fatality, permanent or partial disability,

hospitalization of three or more people resulting from a single incident, or property damage of \$200,000 or more require immediate notification of the CO/COTR. Reportable incidents are (1) any lost time, (2) fatalities and multiple hospitalization, (3) any fire, (4) property damage involving loss in excess of \$2000, (5) any incident involving the public, (6) any occupational illness.

Injuries and illnesses that require reporting include those injuries and illnesses occurring on the job which result in any of the following: lost work time, restrictions in performing job duties, requirement for first aid or outside medical attention, permanent physical bodily damages, or death. Examples of "reportable injuries and illnesses include, but are not limited to, heat exhaustion from working in hot environments, strained back muscles from moving equipment, acid burns on fingers, etc.

Other incidents requiring reporting include those incidents occurring on the job which result in any of the following: injury or illness, damage to a vehicle, fire/explosion, property damage of more than \$100, or chemical releases requiring evacuation of at least that immediate spill area. Examples of "non-reportable" injuries and illnesses include small paper cuts, common colds, and small bruises not resulting in work restrictions or requiring first aid or medical attention.

Events (Near Misses) that, strictly by chance, do not result in actual or observable injury, illness, death, or property damage are required to be reported. The information obtained from such reporting can be extremely useful in identifying and mitigating problems before they result in actual personal or property damage. Examples of near miss incidences required to be reported include the falling of a compressed gas cylinder, overexposures to chemical, biological, or physical agents (not resulting in an immediately observable manifestation of illness or injury), and slipping and falling on a wet surface without injury.

11.3 Responsibilities

Management Responsibilities:

- Establish and maintain an effective accident reporting program.
- Establish and maintain an effective record keeping program.
- Establish security controls over sensitive employee medical and exposure records.
- Train all employees in the accident reporting procedures.
- Train record custodians in proper record entry, maintenance and release procedures.
- Conduct annual program audit.

Supervisor Responsibilities:

- Comply with the requirements of this program

Employee Responsibilities:

- Comply with the accident reporting procedures
- Incidents (Occupational injuries and illnesses)

11.4 Incident Reporting Procedures

The following procedures are to be followed by all employees in order to effectively report occupational injuries and illnesses and other incidents or events. All reports to outside agencies, except for those to local emergency response units (police, fire, and ambulance), will be made by the H&S SHM.

11.5 Incidents (Injuries and Illnesses)

Serious injury or illness posing a life-threatening situation will be reported immediately to the local emergency response medical services (Call 911). Injuries and illnesses will be reported, by the injured employee, to his or her supervisor in person or by telephone as soon after any life-threatening situation has been addressed. If the injured employee is unable to report immediately, then the incident should be reported as soon as possible.

Upon notification of an occupational injury or illness, the supervisor should complete the Incident/Accident Report and, if possible, send it with the injured employee to the nearest medical facility. The Incident/Accident Report Form must be completed and forwarded to H&S Main Office even if the employee receives medical treatment at the hospital and/or from a private physician.

11.6 Events

Incidents not involving injury or illness, but resulting in property damage, must also be reported within 24 hours of the incident. In cases of a fire or explosion that cannot be controlled by one person, vehicular accident resulting in injury or more than \$500 worth of damage, or a chemical release involving a reportable quantity or requiring a building evacuation, the involved party must immediately report the incident to the emergency response services in the area (911 - police, fire, etc.).

All near miss incidences also must be reported on the Incident/Accident Report Form within 24 hours of occurrence. In place of indicating the result of the incident (i.e., actual personal or property damage), the reporting person will indicate the avoided injury or damage. Events, hazardous working conditions or situations, and incidents involving contractor personnel must be reported to the on-site supervisor or the H&S SHM immediately.

11.7 Record keeping

H&S Environmental Health & Safety Officer will complete and maintain the required OSHA 300 Log of Work-Related Injuries and Illnesses (recordable), OSHA 300A Summary of Work-Related Injuries and Illnesses, and OSHA 301 Injury and Illness Incident Report for each calendar year. H&S will also complete and maintain the Prime Contractor Monthly Record of Work-Related Injuries/Illnesses & Exposure form. This form is provided in Appendix C.

The required OSHA 300A Summary of Work-Related Injuries and Illnesses will be posted annually from February 1 to April 30 of the year following the year covered by the form. (Previous calendar year)

11.8 Training

To ensure that all employees understand the incident reporting requirements and are aware of their own and other's responsibilities, annual training sessions will be held with all employees to review procedures and responsibilities. New Employee Orientation training will include information on incident reporting and procedures. Employees involved in record entry and record keeping will be trained in the company and statutory requirements.

11.9 Program Audits

The effectiveness, of a program can only be accomplished if the program is implemented and maintained. Periodic reviews and audits will be conducted to confirm that all employees are familiar with the incident reporting requirements and that the program is managed properly. These audits will consist of:

- Annual review of reports to ensure all records have been maintained and are complete.
- Annual review of the program with company insurance carriers.
- Annual review with workers compensation third party provider.
- Annual refresher training for employees involved in record entry and record keeping.
- Annual refresher training for all employees detailing the accident reporting procedures.

11.10 Recording Injuries & Illnesses

Basic record keeping concepts and guidelines are included with instructions on the back of form OSHA No. 200. The following summarizes the major recordkeeping concepts and provides additional information to aid in keeping records accurately.

General concepts of recordability

1. An injury or illness is considered work related if it results from an event of exposure in the work environment. The work environment is primarily composed of: (1) The employer's premises, and (2) other locations where employees are engaged in work-related activities or are present as a condition of their employment. When an employee is off the employer's premises, work relationship must be established, when on the premises, this relationship is presumed. The employer's premises encompass the total establishment. This includes not only the primary facility, but also such areas as company storage facilities, cafeterias, and rest rooms. In addition to physical locations, equipment or materials used in the course of an employee's work are also considered part of the employee's work environment.
2. All work-related fatalities are recordable.
3. All recognized or diagnosed work-related illnesses are recordable.
4. All work-related injuries requiring medical treatment or involving loss of consciousness, restriction of work or motion, or transfer to another job are recordable.

Analysis of injuries

Recordable and nonrecordable injuries. Each case is distinguished by the treatment provided; i.e., if the injury was such that medical treatment was provided or should have been provided, it is recordable; if only first aid was required, it is not recordable. However, medical treatment is only one of several criteria for determining recordability. Regardless of treatment, if the injury involved loss of consciousness, restriction of work or motion, or transfer to another job, the injury is recordable.

Medical treatment

The following procedures are generally considered medical treatment. Injuries for which this type of treatment was provided or should have been provided are almost always recordable if the injury is work related:

- Treatment of infection.

- Application of antiseptics during second or subsequent visit to medical personnel.
- Treatment of second or third degree burn(s).
- Application of sutures (stitches).
- Application of butterfly adhesive dressing(s) or steri strip(s) in lieu of sutures.
- Removal of foreign bodies embedded in eye.
- Removal of foreign bodies from wound; if procedure is complicated because of depth of embedment, size, or location.
- Use of prescription medications (except a single dose administered on first visit for minor injury or discomfort).
- Use of hot or cold soaking therapy during second or subsequent visit to medical personnel.
- Application of hot or cold compress(es) during second or subsequent visit to medical personnel.
- cutting away dead skin (surgical debridement).
- Application of heat therapy during second or subsequent visit to medical personnel.
- Use of whirlpool bath therapy during second or subsequent visit to medical personnel.
- Positive x-ray diagnosis (fractures, broken bones, etc.).
- Admission to a hospital or equivalent medical facility for treatment.

11.11 First aid treatment

The following procedures are generally considered first aid treatment (e.g., one-time treatment and subsequent observation of minor injuries) and should not be recorded if the work-related injury does not involve loss of consciousness, restriction of work or motion, or transfer to another job:

- Application of antiseptics during first visit to medical personnel.
- Treatment of first degree burn(s)
- Application of bandage(s) during a visit to medical personnel.
- Use of elastic bandage(s) during first visit to medical personnel.
- Removal of foreign bodies not embedded in eye if only irrigation is required
- Removal of foreign bodies from wound; if procedure is uncomplicated.
- Use of nonprescription medications.
- Administration of single dose of prescription medication on first visit for minor injury or discomfort.
- Soaking therapy on initial visit to medical.
- Application of hot or cold compress(es) during first visit to medical personnel
- Application of ointments to abrasions to prevent drying or cracking
- Application of heat therapy during first visit to medical personnel
- Use of whirlpool bath therapy during first visit to medical personnel
- Negative x-ray diagnosis

- Observation of injury during visit to medical personnel.

Administration of tetanus shot(s) or booster(s), by itself, is not considered medical treatment. However, these shots are often given in conjunction with more serious injuries; consequently, injuries requiring these, shots may be recordable for other reasons.

12.0 LOCKOUT - TAG OUT PROGRAM

12.1 Purpose

Control of Hazardous energy is the purpose of the Lockout- Tag Out Program (LOTO). This program establishes the requirements for isolation of both kinetic and potential electrical, chemical, thermal, hydraulic and pneumatic and gravitational energy prior to equipment repair, adjustment or removal. Reference: *OSHA Standard 29 CFR 1910. 147, The Control of Hazardous Energy.*

12.2 Definitions

Authorized (Qualified) Employees are the only ones certified to lock and Tag Out equipment or machinery. Whether an employee is considered to be qualified will depend upon various circumstances in the workplace. It is likely for an individual to be considered "qualified" with regard to certain equipment in the workplace, but "unqualified" as to other equipment. An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person, is considered to be "qualified" for the performance of those duties.

Affected Employees are those employees who operate machinery or equipment upon which lockout or tagging out is required under this program. Training of these individuals will be less stringent in that it will include the purpose and use of the lockout procedures.

Other Employees are identified as those that do not fall into the authorized, affected or qualified employee category. Essentially, it will include all other employees. These employees will be provided instruction in what the program is and not to touch any machine or equipment when they see that it has been locked or tagged out.

12.3 Training

Authorized Employees Training

Employees who will work directly at the site will be trained to use the Lock and Tag Out Procedures. The training will be conducted by H&S' SSHO or outside services qualified to perform such training at time of initial hire and at least annually. The training will consist of the following:

- *Review of General Procedures*
- Review of Specific Procedures for machinery, equipment and processes
- Location and use of Specific Procedures
- Procedures when questions arise

Affected Employee Training

Only trained and authorized Employees will repair, replace or adjust machinery, equipment or processes. Affected Employees may not remove locks, locking devices, or tags from machinery, equipment or circuits.

Other Employee Training

Only trained and authorized employees will repair, replace or adjust machinery or equipment. Employees may not remove locks, locking devices or tags from machinery, equipment or circuits.

12.4 Preparation for Lock and Tag Out Procedures

A Lock Out – Tag Out survey has been conducted to locate and identify all energy sources to verify which switches or valves supply energy to machinery and equipment. Dual or redundant controls have been removed. A Tag Out Schedule has been developed for each piece of equipment and machinery. This schedule describes the energy sources, location of disconnects, type of disconnects, special hazards and special safety procedures. The schedule will be reviewed each time to ensure employees properly lock and tag out equipment and machinery. If a Tag Out Schedule does not exist for a particular piece of equipment, machinery and process, one must be developed prior to conducting a Lock Out – Tag Out. As repairs and/or renovations of existing electrical systems are made, standardized controls will be used.

12.4.1 Routine Maintenance & Machine Adjustments

Lock and Tag Out procedures are not required if equipment must be operating for proper adjustment. This rare exception may be used only by trained and authorized employees when specific procedures have been developed to safely avoid hazards with proper training. All consideration will be made to prevent the need for an employee to break the plane of a normally guarded area of the equipment by use of tools and other devices.

12.4.2 Locks, Hasps and Tags

All designated Personnel will be assigned a lock with one key, hasp and tag. All locks will be keyed differently, except when a specific individual issues a series of locks for complex Lock Out-Tag Out tasks. In some cases, more than one lock, hasp and tag are needed to completely de-energize equipment and machinery. Additional locks may be checked out from the SS on a shift-by-shift basis. All locks and hasps will be uniquely identifiable to a specific employee.

12.5 SOP: General Lock and Tag Out Procedures

Before working on, repairing, adjusting or replacing machinery and equipment, the following procedures will be utilized to place the machinery and equipment in a neutral or zero mechanical state.

12.5.1 Preparation for Shutdown

Before authorized or affected employees turn off a machine or piece of equipment, the authorized employee will have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the means to control the energy.

Notify all affected Employees that the machinery, equipment or process will be out of service.

12.5.2 Machine or Equipment Shutdown

The machine or equipment will be turned or shut down using the specific procedures for that specific machine. An orderly shutdown will be utilized to avoid any additional or increased hazards to employees as a result of equipment de-energization. If the machinery, equipment or process is in operation, follow normal stopping procedures (depress stop button, open toggle switch, etc.). Move switch or panel arms to "Off" or "Open" positions and close all valves or other energy isolating devices so that the energy source(s) is disconnected or isolated from the machinery or equipment.

12.5.3 Machine or Equipment Isolation

All energy control devices that are needed to control the energy to the machine or equipment will be physically located and operated in such a manner as to isolate the machine or equipment from the energy source.

12.5.4 Lockout or Tag Out Device Application

Authorized employees will affix lockout or Tag Out devices to energy isolating devices. Lockout devices will be affixed in a manner that will hold the energy isolating devices from the "safe" or "off" position. Where Tag Out devices are used they will be affixed in such a manner that will clearly state that the operation or the movement of energy isolating devices from the "safe" or "off" positions is prohibited. The Tag Out devices will be attached to the same point a lock would be attached. If the tag cannot be affixed at that point, the tag will be located as close as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device. Lock and tag out all energy devices by use of hasps, chains and valve covers with an assigned individual locks.

12.5.5 Discharge of Energy

Following the application of the lockout or Tag Out devices to the energy isolating devices, all potential or residual energy will be relieved, disconnected, restrained, and otherwise rendered safe. Where the re-accumulation of stored energy to a hazardous energy level is possible, verification of isolation will be continued until the maintenance or servicing is complete. Release stored energy (capacitors, springs, elevated members, rotating fly wheels, and hydraulic/air/gas/steam systems) must be relieved or restrained by grounding, repositioning, blocking and/or bleeding the system.

12.5.6 Verification of Isolation

Prior to starting work on machines or equipment that have been locked or tagged out, the authorized employees will verify that isolation or de-energization of the machine or equipment have been accomplished. After assuring that no Employee will be placed in danger, test all lock and tag outs by following the normal start up procedures (depress start button, etc.).

Caution: After Test, place controls in neutral position.

12.5.7 Extended Lockout - Tag Out

Should the shift change before the machinery or equipment can be restored to service, the lock and tag out must remain. If the task is reassigned to the next shift, those Employees must lock and tag. out before the previous shift may remove their lock and tag.

12.6 SOP: Release from LOCKOUT/TAG OUT

Before lockout or Tag Out devices are removed and the energy restored to the machine or equipment, the following actions will be taken:

1. The work area will be thoroughly inspected to ensure that nonessential items have been removed and that machine or equipment components are operational.
2. The work area will be checked to ensure that all employees have been safely positioned or removed. Before the lockout or Tag Out devices are removed, the affected employees will be notified that the lockout or Tag Out devices are being removed.
3. Each Lock Out or Tag Out device will be removed from each energy isolating device by the employee who applied the device.

12.7 SOP: LOTO Procedure for Electrical Plug-Type Equipment

This procedure covers all Electrical Plug-Type Equipment such as Battery Chargers, some Product Pumps, Office Equipment, Powered Hand Tools, Powered Bench Tools, Lathes, Fans, etc. When working on, repairing, or adjusting the above equipment, the following procedures must be utilized to prevent accidental or sudden startup:

1. Unplug Electrical Equipment from wall socket or in-line socket.
2. Attach "Do Not Operate" Tag and Plug Box & Lock on end of power cord. An exception is granted to not lock & tag the plug if the cord & plug remain in the exclusive control of the Employee working on, adjusting or inspecting the equipment.
3. Test Equipment to assure power source has been removed by depressing the "Start" or "On" Switch.
4. Perform required operations.
5. Replace all guards removed.
6. Remove Lock & Plug Box and Tag.
7. Inspect power cord and socket before plugging equipment into power source. Any defects must be repaired before placing the equipment back in service.

NOTE: Occasionally used equipment may be unplugged from power source when not in use.

12.8 SOP: LOTO Procedures Involving More Than One Employee

In the preceding SOPs, if more than one Employee is assigned to a task requiring a lock and tag out, each must also place his or her own lock and tag on the energy isolating device(s).

12.9 SOP: Management's Removal of Lock and Tag Out

Only the employee that locks and tags out machinery, equipment or processes may remove his/her lock and tag. However, should the Employee leave the site before removing his/her lock and tag, the SSHO may remove the lock and tag. The SSHO must be assured that all tools have been removed, all guards have been replaced and all employees are free from any hazard before the lock and tag are removed and the machinery, equipment or process are returned to service. Notification of the employee who placed the lock is required prior to lock removal.

12.10 Contractors

Contractors, working on company property and equipment must use this Lockout - Tag Out procedure while servicing or maintaining equipment, machinery or processes.

13.0 AIR MONITORING PROGRAM

H&S has taken steps to provide for the safety of our employees, as part of our overall protection program we have implemented an "Air Monitoring Program". During any activities in which H&S employees may be exposed to air-borne hazards at or above the action levels set by OSHA, H&S will sample the air for the suspected or known contaminant(s) prior to commencing the activity.

For activities where the potential exists to be exposed to hazardous levels of contaminants, H&S will implement the following air monitoring procedures:

Step 1 — Monitor the area for oxygen levels, combustible gases, hydrogen sulfide and carbon monoxide using a confined space multi-gas detector. Ventilation equipment will be used to reduce hazardous atmospheres and retesting will be performed until the area is safe to enter. If the hazardous atmospheres cannot be reduced through ventilation, the SHM and PJN will be consulted to determine the proper course of action.

Step 2— Monitor the areas for toxic organic vapors with a photo ionization detector (PID) or other appropriate instrument assess vapor concentrations as compared with site specific action levels.

Step 3— If benzene is a contaminant of concern, benzene Detector Tubes will be used to monitor when PID readings exceed background levels. If benzene readings are from background to 1 ppm, continue Level C respiratory protection. If benzene readings exceed 1 ppm, employees are to leave the area and an investigation into the cause of the vapors will be conducted.

Step 4 — Contaminant Specific Monitoring will be initiated when engineering controls, such as ventilation, can adequately reduce airborne contaminants to background levels. In addition, investigation into the cause of the contaminants will be performed. To provide an additional safety factor in working in atmospheres where contaminants can be identified, H&S will require respiratory protection when contaminant levels reach 50% of the PEL.

If the levels of the contaminants approach the action level the sampling program will be increased in frequency from initial sampling to monitoring hourly and all H&S employees will be informed of the hazards and if they are not medically cleared or appropriately trained for donning respiratory protection, they will be removed from the proximity to the activity that is posing the risk. Engineering and Administrative controls will be implemented to reduce the airborne levels. If the levels are not reduced below the action level, monitoring will continue on an hourly basis. Also, please refer to section 4.0 for further detailed information.

When the levels approach 1/2 (50%) the PEL/TLV in the work area, all H&S employees will don appropriate respiratory protection to protect them from the air-borne contaminant. Once airborne levels reach the PEL/TLV for any contaminant, the monitoring will increase to continuous monitoring until the levels have been reduced below the action level. Respiratory protection will be worn until the air-borne levels are measured to be less than (50%) the PEL/TLV.

In Confined Space Entry situations, all monitoring will be on a continuous basis and will check for O₂, LEL and any suspected contaminant in the space (i.e. H₂S in areas containing organic waste materials). Monitoring equipment used will include a multi-gas monitor, which will detect at a minimum O₂, CO, LEL and H₂S.

14.0 RESPIRATORY PROTECTION

14.1 General

In the Respiratory Protection program, hazard assessment and selection of proper respiratory PPE is conducted in the same manner as for other types of PPE. In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be used. References: *OSHA Standards Respiratory Protection (29 CFR 1910.134)*.

14.2 Responsibilities

All Employees will follow the requirements of the Respiratory Protection Program.

Management

- Implement the requirements of this program.
- Provide a selection of respirators as required.
- Enforce all provisions of this program.
- Appoint a specific designated individual to conduct the respiratory protection program.

SSHO

- Review sanitation/storage procedures.
- Ensure respirators are properly, stored, inspected and maintained
- Monitor compliance for this program
- Provide training for affected employees
- Review compliance and ensure monthly inspection of all respirators
- Provide respirator fit testing

Designated Occupational Health Care Provider

- Conduct medical aspects of program.

14.3 SSHO

Each site will have a SSHO who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

Voluntary Use of Respirators is prohibited.

OSHA requires that voluntary use of respirators, when not required by H&S, must be controlled as strictly as under required circumstances. To prevent violations of the Respiratory Protection Standard Employees are not allowed voluntary use of their own or company supplied respirators of any type. Exception: Employees whose only use of respirators involves the voluntary use of filtering (non-sealing) face pieces (dust masks).

14.4 Program Evaluation

Evaluations of the workplace are necessary to ensure that the written respiratory protection program is being properly implemented; this includes consulting with employees to ensure that they are using the respirators properly. Evaluations will be conducted as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

Program evaluation will include discussions with employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment will be corrected. Factors to be assessed include, but are not limited to:

- Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
- Appropriate respirator selection for the hazards to which the employee is exposed;
- Proper respirator use under the workplace conditions the employee encounters; and
- Proper respirator maintenance.

14.5 Record Keeping

H&S will retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist

H&S in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

14.6 Training and Information

Effective training for employees who are required to use respirators is essential. The training must be comprehensive, understandable, and recur annually, and more often if necessary. Training will be provided prior to requiring the employee to use a respirator in the workplace. The training will ensure that each employee can demonstrate knowledge of at least the following:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator
- *Limitations and capabilities of the respirator.*
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
- How to inspect, put on and remove, use, and check the seals of the respirator.
- What the procedures are for maintenance and storage of the respirator.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
- The general requirements of this program.

Retraining will be conducted annually and when:

- Changes in the workplace or the type of respirator render previous training obsolete.
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill.
- Other situation arises in which retraining appears necessary to ensure safe respirator use.

Instructors with experience and knowledge in respiratory protection will conduct training. Training is divided into the following sections:

- Overview of H&S Respiratory Protection Program & OSHA Standard.
- Respiratory Protection Safety Procedures.
- Respirator Selection.
- Respirator Operation and Use.
- Why the respirator is necessary.
- How improper fit, usage, or maintenance can compromise the protective effect.
- Limitations and capabilities of the respirator.
- How to use the respirator effectively in emergency situations, including respirator malfunctions.
- How to inspect, put on and remove, use, and check the seals of the respirator.
- What the procedures are for maintenance and storage of the respirator.

- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
- Change out schedule and procedure for air purifying respirators.
- Fit Testing.
- Hands-on respirator Training.
- Respirator Inspection.
- Respirator cleaning and sanitizing.
- Record Keeping.
- Respirator Storage.
- Respirator Fit Check.
- Emergencies.

14.7 Basic Respiratory Protection Safety Procedures

Only authorized and trained Employees may use Respirators. Those Employees may use only the Respirator that they have been trained on and properly fitted to use. Only Physically Qualified Employees may be trained and authorized to use Respirators. A pre-authorization and annual certification by a qualified physician will be required and maintained. Any changes in an Employees health or physical characteristics will be reported to the Occupational Health Department and will be evaluated by a qualified physician.

Only the proper prescribed respirator or SCBA may be used for the job or work environment. Air cleansing respirators may be worn in work environments when oxygen levels are between 19.5 percent to 22.5 percent and when the appropriate air cleansing canister, as determined by the Manufacturer and approved by NIOSH, for the known hazardous substance is used. SCBAs will be worn in oxygen deficient and oxygen rich environments (below 19.5 percent or above 22.5 percent oxygen).

Employees working in environments where a sudden release of a hazardous substance is likely will wear an appropriate respirator for that hazardous substance (example: Employees working in an ammonia compressor room will have an ammonia APR respirator on their person.).

Only SCBAs will be used in oxygen deficient environments, environments with an unknown hazardous substance or unknown quantity of a known hazardous substance or any environment that is determined "Immediately Dangerous to Life or Health" (IDLH).

Employees with respirators loaned on "permanent check out" will be responsible for the sanitation, proper storage and security. Respirators damaged by normal wear will be repaired or replaced by H&S when returned.

The last Employee using a respirator and/or SCBA that are available for general use will be responsible for proper storage and sanitation. Monthly and after each use, all respirators will be inspected with documentation to assure its availability for use.

All respirators will be located in a clean, convenient and sanitary location.

In the event that Employees must enter a confined space, work in environments with hazardous substances that would be dangerous to life or health should an RPE fail (a SCBA is required in this environment), and/or conduct a HAZMAT entry, a "buddy system" detail will be used with a Safety Watchman with constant voice, visual or signal line communication. Employees will follow the established Emergency Response Program and/or Confined Space Entry Program when applicable.

Management will establish and maintain surveillance of jobs and work place conditions and degree of Employee exposure or stress to maintain the proper procedures and to provide the necessary RPE.

Management will establish and maintain safe operation procedures for the safe use of RPE with strict enforcement and disciplinary action for failure to follow all general and specific safety rules. Standard Operation Procedures for General RPE use will be maintained as an attachment to the Respiratory Protection Program and Standard Operation Procedures for RPE use under emergency response situations will be maintained as an attachment to the Emergency Response Program.

14.7.1 Selection of Respirators

H&S evaluates the respiratory hazard(s) at each work site, identifies relevant work site and user factors, and bases the respirator selection on these factors. Also included are estimates of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. This selection has included appropriate protective respirators for use in IDLH atmospheres, and has limited the selection and use of air-purifying respirators. All selected respirators are NIOSH-certified.

Filter Classifications - These classifications are marked on the filter or filter package:

N-Series: Not Oil Resistant

Approved for non-oil particulate contaminants

Examples: dust, fumes, mists not containing oil

R Series: Oil Resistant

Approved for all particulate contaminants, including those containing oil

Examples: dusts, mists, fumes

Time restriction of 8 hours when oils are present

P-Series: OR Proof

Approved for all particulate contaminants including those containing oil

Examples: dust, fumes, mists

See Manufacturer's time use restrictions on packaging.

14.7.2 Respirators for IDLH atmospheres

The following respirators will be used in IDLH atmospheres:

A full face piece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or A combination full-face piece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres will be NIOSH-certified for escape from the atmosphere in which they will be used.

14.7.3 Respirators for atmospheres that are not IDLH

The respirators selected will be adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations. The respirator selected will be appropriate for the chemical state and physical form of the contaminant.

14.7.4 Identification of Filters & Cartridges

All filters and cartridges will be labeled and color-coded with the NIOSH approval label and that the label is not removed and remains legible. A change out schedule for filters and canisters has been developed to ensure these elements of the respirators remain effective.

14.7.5 Respirator Filter & Canister Replacement

An important part of the Respiratory Protection Program includes identifying the useful life of canisters and filters used on air-purifying respirators. Each filter and canister will be equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or If there

is no ESLI appropriate for conditions a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life.

Filter & Cartridge Change Schedule - Stock of spare filers and cartridges will be maintained to allow immediate change when required or desired by the employee.

Cartridges will be changed based on the most limiting factor below:

- Prior to expiration date.
- Manufactures recommendations for the specific use and environment.
- After each use.
- When requested by employee.
- When contaminate odor is detected.
- When restriction to air flow has occurred as evidenced by increase effort by user to breathe normally.
- Cartridges will remain in their original sealed packages until needed for immediate use.

Filters will be changed on the most limiting factor below:

- *Prior to expiration date.*
- Manufactures recommendations for the specific use and environment.
- When requested by employee.
- When contaminate odor is detected.
- When restriction to air flow has occurred as evidenced by increase effort by user to breathe normally.
- *When discoloring of the filter media is evident.*
- Filters will remain in their original sealed package until needed for immediate use.

Respiratory Protection Schedule by Job and Working Condition

H&S maintains a Respiratory Protection Schedule by Job and Working Condition. This schedule is provided to each authorized and trained Employee. The Schedule provides the following information:

- Job/Working Conditions
- Work Location
- Hazards Present
- Type of Respirator or SCBA Required
- Type of Filter/Canister Required
- Location of Respirator or SCBA

- Filter/Cartridge change out schedule

The schedule will be reviewed and updated at least annually and whenever any changes are made in the work environments, machinery, equipment, or processes or if respirator different respirator models are introduced or existing models are removed.

Permanent respirator schedule assignments are:

Each person who engages in welding will have their own company provided dust-mist-fume filter APR. This respirator will be worn during all welding operations.

14.8 Physical and Medical Qualifications

Records of medical evaluations must be retained and made available in accordance with 29 CFR 1910.1020.

14.9 Medical Evaluations

Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. H&S provides a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace.

14.9.1 Medical evaluation procedures

The employee will be provided a medical questionnaire by the designated Occupational Health Care Provider.

14.9.2 Follow-up medical examination

H&S will ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions in Part B of the questionnaire or whose initial medical examination demonstrates the need for a follow-up medical examination. The follow-up medical examination will include any medical tests, consultations, or diagnostic procedures that the Physician deems necessary to make a final determination.

Administration of the medical questionnaire and examinations

The medical questionnaire and examinations will be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire will be administered in a manner that ensures that the employee understands its content. H&S will provide the employee with an opportunity to discuss the questionnaire and examination results with the Physician.

Supplemental information for the Physician

The following information must be provided to the Physician before the Physician makes a recommendation concerning an employee's ability to use a respirator:

- *The type and weight of the respirator to be used by the employee.*
- *The duration and frequency of respirator use (including use for rescue and escape).*
- The expected physical work effort.
- Additional protective clothing and equipment to be worn.
- Temperature and humidity extremes that may be encountered.

Any supplemental information provided previously to the Physician regarding an employee need not be provided for a subsequent medical evaluation if the information and the Physician remain the same.

H&S has provided the Physician with a copy of the written respiratory protection program and a copy of the OSHA Standard 1910.134

14.9.3 Medical determination

In determining the employee's ability to use a respirator, H&S will obtain a written recommendation regarding the employee's ability to use the respirator from the Physician. The recommendation will provide only the following information:

- Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator.
- The need, if any, for follow-up medical evaluations.
- A statement that the Physician has provided the employee with a copy of the Physician's written recommendation.

If the respirator is a negative pressure respirator and the Physician finds a medical condition that may place the employee's health at increased risk if the respirator is used, H&S will provide a APR if the Physician's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then H&S is no longer required to provide a APR.

Additional Medical Evaluations

At a minimum, H&S will provide additional medical evaluations that comply with the requirements of this section if:

- An employee reports medical signs or symptoms that are related to ability to use a respirator.
- A Physician, supervisor, or the respirator program administrator informs H&S that an employee needs to be reevaluated.
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation.
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing, and temperature) that may result in a substantial increase in the physiological burden placed on an employee.

14.10 Respirator Fit Testing

Before an employee is required to use any respirator with a negative or positive pressure tightfitting face piece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. H&S will ensure that an employee using a tight-fitting face piece respirator is fit tested prior to initial use of the respirator, whenever a different respirator face piece (size, style, model or make) is used, and at least annually thereafter.

H&S has established a record of the qualitative and quantitative fit tests administered to employees including:

- The name or identification of the employee tested.
- Type of fit test performed..
- Specific make, model, style, and size of respirator tested.
- Date of test.
- The pass/fail results for. QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

Additional fit tests will be conducted whenever the employee reports, or H&S, Physician, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

If after passing a QLFT or QNFT, the employee notifies SSHO, supervisor, or Physician that the fit of the respirator is unacceptable, the employee will be given a reasonable opportunity to select a different respirator face piece and to be retested.

14.10.1 Types of Fit Tests

The fit test will be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of OSHA Standard 1910.134.

QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half face pieces, or equal to or greater than 500 for tight-fitting full face pieces, the QNFT has been passed with that respirator.

Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators will be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless, of the mode of operation (negative or positive pressure) that is used for respiratory protection.

Qualitative fit testing of these respirators will be accomplished by temporarily converting the respirator user's actual face piece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator face piece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator face piece.

Quantitative fit testing of these respirators will be accomplished by modifying the face piece to allow sampling inside the face piece in the breathing zone of the user, midway between the nose and mouth. This requirement will be accomplished by installing a permanent sampling probe onto a surrogate face piece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the face piece.

Any modifications to the respirator face piece for fit testing will be completely removed, and the face piece restored to NIOSH approved configuration, before that face piece can be used in the

workplace. Fit test records will be retained for respirator users until the next fit test is administered. Written materials required to be retained will be made available upon request to affected employees.

14.11 Respirator Operation and Use

Respirators will only be used following the respiratory protection safety procedures established in this program. The Operations and Use Manuals for each type of respirator will be maintained by the Program Administrator and be available to all qualified users. Surveillance by the direct supervisor will be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, H&S will reevaluate the continued effectiveness of the respirator.

For continued protection of respirator users, the following general use rules apply:

- Users will not remove respirators while in a hazardous environment.
- Respirators are to be stored in sealed containers out of harmful atmospheres.
- Store respirators away from heat and moisture.
- Store respirators such that the sealing area does not become distorted or warped.
- Store respirator such that the face piece is protected

Face piece seal protection

H&S does not permit respirators with tight-fitting face pieces to be worn by employees who have facial hair that comes between the sealing surface of the face piece and the face or that interferes with valve function; or any condition that interferes with the face-to-face piece seal or valve function. If an employee wears corrective glasses or goggles or other personal protective equipment, H&S will ensure that such equipment is worn in a manner that does not interfere with the seal of the face piece to the face of the user.

14.12 Continuing Effectiveness of Respirators

H&S will ensure the following that employees leave the respirator use area:

- To wash their faces and respirator face pieces as necessary to prevent eye or skin irritation associated with respirator use.
- If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece.

- To replace the respirator or the filter, cartridge, or canister elements.
- If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece, H&S will replace or repair the respirator before allowing the employee to return to the work area.

14.13 Procedures for IDLH atmospheres

For all IDLH atmospheres, H&S will ensure that:

- One employee or, when needed, more than one employee is located outside the IDLH atmosphere.
- Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere.
- The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue.
- H&S or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue.
- H&S or designee authorized to do so by H&S, once notified, provides necessary assistance appropriate to the situation.

Employee(s) located outside the IDLH atmospheres will be equipped with:

- Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA.
- Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry.
- Equivalent means for rescue where retrieval equipment is not required.

14.14 Cleaning and Disinfecting

H&S will provide each respirator user with a respirator that is clean, sanitary, and in good working order. H&S will ensure that respirators are cleaned and disinfected using the Standard Operating Procedure SOP: Cleaning and Disinfecting.

The respirators will be cleaned and disinfected when:

- Respirators issued for the exclusive use of an employee will be cleaned and disinfected as often as necessary to be maintained in a sanitary condition.

- Respirators issued to more than one employee will be cleaned and disinfected before being worn by different individuals.
- Respirators maintained for emergency use will be cleaned and disinfected after each use.
- Respirators used in fit testing and training will be cleaned and disinfected after each use.
- Cleaning and Storage of respirators assigned to specific employees is the responsibility of that Employee.

14.15 Respirator Inspection

All respirators/SCBAs, both available for "General Use" and those on "Permanent Check-out", will be inspected after each use and at least monthly. Should any defects be noted, the respirator/SCBA will be taken to the program Administrator. Damaged Respirators will be either repaired or replaced. The inspection of respirators loaned on "Permanent Check-out" is the responsibility of that trained Employee.

Respirators will be inspected as follows:

- All respirators used in routine situations will be inspected before each use and during cleaning.
- All respirators maintained for use in emergency situations will be inspected at least monthly and in accordance with the manufacturer's recommendations, and will be checked for proper function before and after each use.
- Emergency escape-only respirators will be inspected before being carried into the workplace for use.

Respirator inspections include the following:

- A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters.
- Check of elastomeric parts for pliability and signs of deterioration.
- Self-contained breathing apparatus will be inspected monthly. Air and oxygen cylinders will be maintained in a fully charged state and will be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. H&S will determine that the regulator and warning devices function properly.

For Emergency Use Respirators the additional requirements apply:

- Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator.
- Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information will be maintained until replaced following a subsequent certification.

14.16 Respirator Storage

Respirators are to be stored as follows:

- All respirators will be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals.
- All respirators will be packed or stored to prevent deformation of the face piece and exhalation valve.

Emergency Respirators will be:

- Kept accessible to the work area;
- Stored in compartments or in covers that are clearly marked as containing emergency respirators
- Stored in accordance with any applicable manufacturer instructions.

14.17 Repair of Respirators

Respirators that fail an inspection or are otherwise found to be defective will be removed from service to be discarded, repaired, or adjusted in accordance with the following procedures:

- Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and will use only the respirator manufacturer's NIOSH approved parts designed for the respirator.
- Repairs will be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed.
- Reducing and admission valves, regulators, and alarms will be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

14.18 Breathing Air Quality and Use

H&S will ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

- Compressed and liquid oxygen will meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and
- Compressed breathing air will meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G7.1-1989, to include:
 - Oxygen content (v/v) of 19.5-22.5%;
 - Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;
 - Carbon monoxide (CO) content of 10 ppm or less;
 - Carbon dioxide content of 1,000 ppm or less; and
 - Lack of noticeable odor.
- compressed oxygen will not be used in atmosphere-supplying respirators that have previously used compressed air
- oxygen concentrations greater than 22.5% are used only in equipment designed for oxygen service or distribution

Cylinders used to supply breathing air to respirators meet the following requirements:

- Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178).
- cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air.
- moisture content in breathing air cylinders does not exceed a dew point of -50 deg.F 45.6 deg.C) at 1 atmosphere pressure.
- breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance will be introduced into breathing air lines.
- breathing gas containers will be marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

15.0 WATER SAFETY

When work tasks require employees to be on or near water, personnel will be required to follow basic water and boating safety procedures. When tasks require personnel to be on the water, a skiff will be used and standard operating procedures, based on U.S. Coast Guard Auxiliary and U.S. Coast Guard publications.

15.1 Boating Procedures

Hazards

Hazards associated with the operation and use of the jon boat include drowning, heat stress, cold stress, hypothermia, and injuries from falling. These injuries can be avoided if the standard operation procedures for boat use are followed diligently.

Standard operating procedures

- All occupants operating or using boats must wear a personal flotation device.
- Crafts used for transportation, safety boats or as workboats must be maintained in safe condition.
- The maximum carrying capacity number will not be exceeded.
- Since the jon boat is not equipped with the proper lighting, do not use it after sunset.
- Before taking the jon boat out, carefully inspect it making sure it is in good working order and all necessary safety equipment in on board.
- When it is necessary to stand up or lean over the boat, do so using the utmost caution.
- Do not take the jon boat into the lagoon during bad weather.
- Use the buddy system at all times.
- Horseplay is forbidden.
- Do not take any boats other than the jon boat into the lagoon.
- A safety ladder must be installed at the entry/exit point prior to the start of work.

Necessary equipment and PPE

- Life vests: one per person
- Guide ropes
- Flotation rings
- Oars
- Appropriate footwear
- Extra dry clothing
- Water resistant clothing
- Safety/rescue ladder

16.0 SEVERE WEATHER PROTECTION PROGRAM

H&S has taken steps to provide for the safety our employees and the property of our clients, as part of our overall protection program; we have implemented a "Severe Weather Protection Program".

During the hurricane season that runs from May 20th to October 15th for the United States, H&S will monitor the weather forecasts for approaching storms. If a storm is expected to approach the area of a current work site, the following steps will be taken to ensure the safety of the employees and the property of the client:

All employees will be informed (with as much advance notice as is possible) of the approach of a storm including the likely path of approach and departure. The site workers will begin the procedure to protect the client property once it has been determined that the storm is approaching the work area. The workers will attempt to close any openings that could allow storm water and winds from entering and damaging the client structure.

Attempts will be made to ensure any equipment or materials that could become damaged during the storm or become airborne during the storm are stored out of contact with the storm. Site employees will attempt to protect the client property but in the event that late notice is received concerning the imminent strike of any storm the employees will evacuate the area for self-preservation. All employees will be given ample time to collect any valuables prior to being told to evacuate the site, if possible. In the event that severe thunderstorms are predicted, forecast or anticipated, H&S Employees will follow the same steps as well as disconnect any non-essential electrical equipment.

16.1 Lightning

The potential for electrical storms with lightning can be a persistent and pervasive hazard during field operations. While there is a general awareness of the hazard associated with lightning, an antipathy exists due to a false perception that lightning fatalities are extremely rare. Field personnel should be aware of the forecasted weather condition during field operations and be especially alert to the potential for electrical storms. Regardless of forecasted conditions, personnel should remain vigilant for approaching storms. The National Oceanographic and Atmospheric Administration (NOAA) stresses that the perceived "strength" of a storm is not a valid indicator of the potential for dangerous lightning. Even electrical storms with comparatively light rainfall may be dangerous. NOAA cites periods of light rain and infrequent lightning after the primary storm has past as the most common situation for lightning injury and death. NOAA recommends the "flash-to-bang" method of estimating how close a storm is. The

distance is estimated by counting the seconds between the time that the lightning flash is seen and the boom is heard and applying the rule of five seconds per mile. According to NOAA, safe shelter must be reached completely in all situations before a flash is 2 to 3 miles away or 10 to 15 seconds flash-to-bang. NOAA recommends that, if caught in a storm, "don't be an isolated tall object and don't be connected to anything that may be an isolated tall object" (e.g. a tree). NOAA stresses that the best defense is to plan ahead and avoid exposure to lightning when an electrical storm occurs. Know where safe shelter is located and leave enough time to reach it.

The best shelter is a substantial building with plumbing and wiring (i.e. grounded). A structure with only a roof and supports and no plumbing or wiring is an ungrounded tall object and is very unsafe. A vehicle with a metal roof is not as safe as a grounded structure but is much safer than no shelter or ungrounded shelter. Refer to www.nssl.noaa.gov/edu/ltg for additional information on electrical storm safety.

NAVFAC requires that the 30-30 rule be followed before, during and after any electrical storm. The 30-30 rule is; (1). If you cannot count to 30 (30 seconds) between the lightning strike and the thunder - the storm is too close and you need to shut down operations and seek shelter. (2). You need to wait for thirty minutes after the last lightning strike before returning to work to make certain all is clear.

The NAVFAC 30-30 rule is to be followed during all activities at the NWIRP Bethpage site. In addition, the above NOAA recommendations will also be followed when not in conflict with the 30-30 rule.

17.0 EXCAVATION & TRENCHING SAFETY

17.1 Purpose

This program outlines procedures and guidelines for the protection of employees working in and around excavations and trenches. This program requires compliance with OSHA Standards described in Subpart P (CFR 1926.650) for the construction industry.

Compliance is mandatory to ensure employee protection when working in or around excavations. The programs in this manual on confined space, hazard communication, lock-out/tag-out, respiratory protection, and any other safety programs or procedures deemed essential for employee protection, are to be used in conjunction with this program.

17.2 Scope

This program pertains to all company projects that require any excavations or trenches.

17.3 References

- *29 CFR 1926.650*, Subpart P – Excavations
- Excavation Equipment Manufacturer Safety Procedures

17.4 Responsibilities

It is the responsibility of each supervisors and SSHO to implement and maintain the procedures and steps set forth in this program. Each employee involved with excavation and trenching work is responsible to comply with all applicable safety procedures and requirements of this program.

17.5 Definitions

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

CAVE-IN – The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by failing or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

COMPETENT PERSON – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

DURATION OF EXPOSURE – The longer an excavation is open, the longer the other factors have to work on causing its collapse.

EXCAVATION – Any man-made cut, trench, or depression in an earth surface, formed by earth removal.

HAZARDOUS ATMOSPHERE – An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

PROTECTIVE SYSTEM – A method of protecting employees from cave-ins, from material that could fall or roll from an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide necessary protection.

SHIELD – A structure that is capable of withstanding the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. All shields must be in accordance with 29 CFR 1926.652(c)3 or (c)4.

SLOPING – A method of protecting workers from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences such as soil type, length of exposure, and application of surcharge loads.

SURCHARGE LOADS – Generated by the weight of anything in proximity to the excavation, push starts for a cave-in (anything up top pushing down). Common surcharge loads include the following:

- Weight of spoil pile;
- Weight of nearby buildings, poles, pavement, or other structural objects, and
- Weight of material and equipment.

TRENCH – A narrow excavation below the surface of the ground, less than 15 feet wide, with a depth no greater than width.

UNDERMINING – Undermining can be caused by such things as leaking, leaching, caving or over-digging. Undermined walls can be very dangerous.

VIBRATION – A force that is present on construction sites and must be considered. The vibrations caused by backhoes, dump trucks, compactors and traffic on job sites can be substantial.

17.6 General Requirements

Before any work is performed and before any employees enter the excavation, a number of items must be checked and insured, including the following:

- Before any excavation, underground installations must be determined; This can be accomplished by either contacting the local utility companies or the local “one-call” center for the area; All underground utility locations must be documented on the proper forms; All overhead hazards (surface encumbrances) that create a hazard to employees must be removed or supported to eliminate the hazard;
- If the excavation is to be over 20 feet deep, it must be designed by a registered professional engineer who is registered in the state where work will be performed;
- Adequate protective systems will be utilized to protect employees; This can be accomplished through sloping, shoring, or shielding;
- The worksite must be analyzed in order to design adequate protective systems and prevent cave-ins; There must also be an excavation safety plan developed to protect employees;
- Workers must be supplied with, and wear, any personal protective equipment deemed necessary to assure their protection;
- All soil piles will be stored a minimum of four (4) feet from the sides of the excavation; The soil pile must not block the safe means of egress;
- If a trench or excavation is 4 feet or deeper, stairways, ramps, or ladders will be used as a means of safe access and egress; For trenches, the employee must not travel any more than 25 feet of lateral travel to reach the stairway, ramp, or ladder;
- No employee will work in an excavation where water is accumulating unless adequate measures are used to protect employees;
- A competent person will inspect all excavations and trenches daily, prior to employee exposure or entry, and after any rainfall, soil change, or any other time needed during the shift; The competent person must take prompt measures to eliminate any and all hazards;
- Excavations and trenches 4 feet or deeper that have the potential for toxic substances or hazardous atmospheres will be tested at least daily; If the atmosphere is inadequate, protective systems will be utilized, and
- If work is in or around traffic, employees must be supplied with, and wear, orange reflective vests; Signs and barricades must be utilized to ensure employee safety.

17.7 Competent Person Responsibilities

The OSHA Standards require that the competent person must be capable of identifying existing and predicable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and have authorization to take prompt corrective measures to eliminate them and, if necessary, to stop work.

A competent person is required to:

- Have a complete understanding of the applicable safety standards and any other data provided;
- Assure the proper locations of underground installations or utilities, and that the proper utility companies have been contacted;
- Conduct soil classification tests and reclassify soil after any condition changes;
- Determine adequate protective systems (sloping, shoring, or shielding systems) for employee protection;
- Conduct all air monitoring for potential hazardous atmospheres;
- Conduct daily and periodic inspections of excavations and trenches, and
- Approve design of structural ramps, if used.

17.8 Excavation Safety Plan

An excavation safety plan is required in written form. This plan is to be developed to the level necessary to insure complete compliance with the OSHA Excavation Safety Standard and state and local safety standards.

Excavation Safety Plan factors:

- Utilization of the local one call system;
- Determination of locations of all underground utilities;
- Consideration of confined space atmosphere potential;
- Proper soil protection systems and personal protective equipment and clothing;

- Determination of surface and subsurface water;
- Depth of excavation and length of time it will remain open, and
- Proper adherence to all OSHA Standards, this excavation and trenching safety program, and any other coinciding safety programs.

17.9 Soil Classification System

The OSHA Standard defines soil classifications within the Simplified Soil Classification Systems, which consist of four categories: Stable Rock, Type A, Type B, and Type C. Stability is greatest in stable rock and decreases through Type A and B to Type C, which is the least stable. Appendix A of the Standard provides soil mechanics terms and types of field tests used to determine soil classifications.

Stable rock is defined as natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Type A Soil is defined as the following:

- Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (TSF) or greater, and/or
- Cemented soils like caliches and hardpan are considered Type A.

Soil is NOT Type A if...

- It is fissured;
- The soil is subject to vibration from heavy traffic, pile driving or similar effects;
- The soil has been previously disturbed, and/or
- The material is subject to other factors that would require it to be classified as a less stable material;

The exclusions for Type A most generally eliminate it from most construction situations.

Type B Soil is defined as the following:

- Cohesive soil with an unconfined compressive strength greater than 0.5 TSF, but less than 1.5 TSF;
- Granular cohesionless soil including angular gravel, silt, silt loam, and sandy loam;
- The soil has previously been disturbed except that soil classified as Type C soil;
- Soil that meets the unconfined compressive strength requirements of Type A soil, but is fissured or subject to vibration, and/or

- Dry rock that is unstable.

Type C Soil is defined as the following:

- Cohesive soil with an unconfined compressive strength of 0.5 TSF or less;
- Granular soils including gravel, sand and loamy sand;
- Submerged soil or soil from which water is freely seeping, and/or
- Submerged rock that is not stable.

17.10 Soil testing and Identification

The competent person will classify the soil type in accordance with the definitions in Appendix A on the basis of at least one visual and one manual analysis. These tests should be run on freshly excavated sample from the excavation and are designed to determine stability based on a number of criteria, including the following: the cohesiveness; the presence of fissures; the presence and amount of water; the unconfined compressive strength; the duration of the exposure; undermining, and the presence of layering, prior excavation and vibration.

The cohesion tests are based on methods to determine the presence of clay. Clay, silt and sand are size classifications, with clay being the smallest-sized particles, silt intermediate, and sand the largest. Clay minerals exhibit good cohesion and plasticity (can be molded). Sand exhibits no elasticity and virtually no cohesion unless surface wetting is present. The degree of cohesiveness and plasticity depend on the relative amounts of all three types and water.

When examining the soil, the following three questions must be asked:

- Is the sample granular or cohesive?
- Is it fissured or non-fissured?
- What is the confined compressive strength measured in TSF?

Methods of Testing Soils

- **Visual Test:** If the excavated soil is in clumps, it is cohesive. If it breaks up easily, not staying in clumps, it is granular.
- **Wet Manual Test:** Wet your fingers and work the soil between them. Clay is a slick paste when wet, meaning it is cohesive. If the clumps fall apart in grains, it is granular.
- **Dry Strength Test:** Try to crumble the sample in your hands with your fingers. If it crumbles into grains, it is granular. Clay will not crumble into grains, only into smaller chunks.
- **Pocket Penetrometer Test:** This instrument is most accurate when soil is nearly saturated. This instrument will give unconfined compressive strength in tons per square foot. The

spring-operated device uses a piston that is pushed into a coil up to a calibration groove. An indicator sleeve marks and retains the reading until it is recorded. The reading is calibrated in tons per square foot (TSF) or kilograms per cubic centimeter.

- **Thumb Penetration Test:** The competent person attempts to penetrate a fresh sample with thumb pressure. If the sample can be dented, but penetrated only with great effort, it is Type A. If it can be penetrated several inches and molded by light pressure, it is Type C. Type B can be penetrated with effort and molded.
- **Shearvane:** This test measures the approximate shear strength of saturated cohesive soils. The blades of the vane are pressed into a flat section of undisturbed soil, and the knob is turned slowly until soil failure. The dial is read directly when using the standard vane. The results will be in tons per square foot or kilograms per cubic centimeter.

The competent person will perform several tests of the excavation to obtain consistent, supporting data all along its depth and length. The soil is subject to change several times within the scope of an excavation and moisture content will vary with weather and job conditions. The competent person must also determine the level of protection based on what conditions exist at the time of the test and allow for changing conditions.

17.11 Excavation Protection Systems

The three basic protective systems for excavations and trenches are sloping and benching systems, shoring and shields.

The protective systems will have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied to, or transmitted to, the system. Every employee in an excavation will be protected from cave-ins by an adequate protection system.

Exceptions to using protective systems include the following:

- Excavations are made entirely in stable rock, and
- Excavations are less than 5 feet deep and declared safe by a competent person.

17.12 Sloping and Benching Systems

There are four options for sloping:

- Slope to the angle required by the OSHA Standard for Type C, which is the most unstable soil type;
- The table provided in Appendix B of the OSHA Standard may be used to determine the maximum allowable angle (after determining the soil type);

- Tabulated data prepared by a registered Professional Engineer can be utilized, or
- A registered Professional Engineer can design a sloping plan for a specific job.

Sloping and benching systems for excavations 5 feet to 20 feet in depth must be constructed under the instruction of a designated competent person.

Sloping and benching systems for excavations greater than 20 feet deep must be designed and stamped by a registered Professional Engineer.

Sloping and benching specifications can be found in Appendix B of the OSHA Standard (Subpart P).

17.13 Shoring

Shoring is another protecting system or support system. Shoring utilizes a framework of vertical members (uprights), horizontal members (whales) and cross braces to support the sides of the excavation to prevent a cave-in. Metal hydraulic, mechanical or timber shorings are common examples.

17.14 Shield Systems (trench Boxes)

Shielding is the third method of providing a safe workplace during excavation. Unlike sloping and shoring, shielding does not prevent a cave-in. Shields are designed to withstand the soil forces caused by a cave-in and protect the employees inside the structure. Most shields consist of two flat, parallel metal walls that are held apart by metal cross braces.

Shielding design and construction is not covered in the OSHA Standards. Shields must be certified in design by a registered Professional Engineer and must have either a registration plate on the shield or registration papers from the manufacturer on file at the jobsite office. **ANY REPAIRS OR MODIFICATIONS MUST BE APPROVED BY THE MANUFACTURER.**

Safety Precautions for Shield Systems

- Shields must not have any lateral movement when installed;
- Employees will be protected from cave-ins when entering and exiting the shield (e.g., ladder within the shield or a properly sloped ramp at the end);
- Employees are not allowed in the shield during installation, removal or during any vertical movement;
- Shields can be 2 feet above the bottom of an excavation if they are designed to resist loads at the full depth and if there are not indications of caving under or behind the

shield;

- The shield must extend at least 18 inches above the point where proper sloping begins (the height of the shield must be greater than the depth of the excavation); and
- The open end of the shield must be protected from the exposed excavation wall. The wall must be sloped, shored or shielded. Engineer designed end plates can be mounted on the ends of the shield to prevent cave-ins.

17.15 Personal Protective Equipment

It is company policy to wear a hard hat, safety glasses and steel-toed work boots on the jobsite. Because of the hazards involved with excavations, other personal protective equipment (e.g., goggles, gloves and respiratory protection) may be necessary, depending on the potential hazards present.

17.16 Inspections

Daily inspections of excavations, the adjacent areas and protective systems will be made by the competent person for evidence of a situation that could result in a cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions.

- All inspections will be conducted by a competent person prior to the start of work and as needed throughout the shift;
- Inspections will be made after every rainstorm or any other increasing hazard;
- All documented inspections will be kept on file in the jobsite safety files and forwarded to the Safety Director weekly, and
- A copy of the Daily Excavation Inspection form is located at the end of this section.

17.17 Training

The competent person(s) must be trained in accordance with the OSHA Excavation Standard and all other programs that may apply (e.g., Hazard Communication, Confined Space and Respiratory Protection), and must demonstrate a thorough understanding and knowledge of the programs and the associated hazards.

All other employees working in and around the excavation must be trained in the recognition of hazards associated with trenching and excavating.

18.0 EMERGENCY RESPONSE PLAN

OSHA provides for two levels of emergency planning for facilities that manufacture, handle, use, or store hazardous materials. Both types of plans must be available to employees under the Hazard Communication Standard of 29 CFR 1910.1200. For facilities which fall under a particular OSHA standard (e.g. asbestos or vinyl chloride), and which will evacuate all employees in the event of an emergency, and will not permit any employees to assist in emergency response, a basic emergency action plan meeting the requirements of the appropriate standard and 29 CFR 1910.38(a) is required. All H&S employees and subcontracted personnel under H&S' control are to respond to any emergency releases of hazardous materials at an "Awareness Level" only as defined by OSHA 29 CFR, 19 10.120.

For facilities that plan to respond to emergencies and assist in the control and mitigation of a release, an Emergency Response Plan is required. This plan is also required for responses to past hazardous materials releases. The Emergency Response plan prepared for this site contains the following 11 elements required by (29 CFR 1910.120 (1)(2)):

- Pre-Emergency planning;
- Personnel roles, lines of authority, and communication;
- Emergency recognition and prevention;
- Safe distances and places of refuge;
- Site security and control;
- Evacuation routes and procedures;
- Decontamination procedures;
- Emergency medical treatment and first aid;
- Emergency alerting and response procedures;
- Critique of response and follow-up; and
- Personal protective equipment and emergency equipment specifications.

In addition, basic safety guidelines and hazardous material handling and storage procedures are attached for reference.

18.1 Pre-Emergency Planning

Prior to starting work at the site, H&S will contact local emergency organizations including: Local Hospital, and the Police and Fire Departments to ensure that they are adequately prepared to respond to all potential emergencies.

Emergency telephone numbers, a map, and directions to the Local Hospital will be conspicuously posted at the site in the operations building and in each pump station. **A map showing the route to the hospital is included as Appendix D.**

Emergency showers, eyewash fountains, and first aid kits will be readily available on-site. Eyewash fountains are located in all buildings on site. Emergency showers and first aid kits will be located in the operations building.

The Site Safety and Health Officer, Stacey Lee, is certified in First Aid and CPR.

Possible hazards and recommended procedures

- Skin contact with reagent chemicals
 - a. Eyes and hands: Use eyewashes located in all buildings.
 - b. Body: Use decontamination shower located in the operations building.
- Slips/trips/falls
 - a. Minor injuries: Use first aid kit located in the operations building. Notify the Safety and Health Officer immediately.
 - b. Major injuries: Call 911 and provide first aid as required. Notify the Safety and Health Officer as soon as possible.
- Skin contact with contaminated water
 - a. Eyes and hands: Use eyewashes located in all buildings.
 - b. Body: Use the decontamination shower located in the operations building.
- Sprains/strains from lifting heavy or bulky loads
 - a. Discontinue all lifting/moving of heavy objects
 - b. Notify the Safety and Health Officer as soon as possible.

18.2 Personal Roles, Lines of Authority, and Communication

Emergency Contact List

Emergency Contact	Phone Number
Health and Safety Manager Mr. Edward Kearney, CIH	Office: (508) 366-7442
Project Manager: Mr. Gregory Birch	Office: (302) 373-5724
SSHO: Ms. Stacey Lee	Office: (508) 366-7442 Cell: (508) 614-0729
PWD FEAD Site Representative Mr. Greg Pearman	Office: (860) 235=2040
PWD FEAD New London Chris Shukis	Office: (860) 694-4556
Facility Manager Al Taormina	Office: (516) 346-0344 Cell: (516-702-5861)
Bethpage, NY Emergency Services (Police/Fire) Bethpage Fire Department Non-Emergency Nassau County Police Department – Eighth Precinct	911 (EMERGENCY) (631) 931-2660 (516) 573-6800
North Shore LIJ: Plainview Hospital	(516) 562-0100
NAVFAC Project Manager: Lora Fly Office:	(757) 341-2012 Cell: (757) 636-4042
Poison Center:	1-800-222-1222

18.3 Emergency Recognition and Prevention

Possible hazards and control mechanisms

- 1) Skin contact with reagent chemicals
 - a) Site personnel will use appropriate PPE (See Section 5)
 - b) Site personnel will use proper material handling procedures (See attachment to 18.0)

- 2) Skin contact with contaminated water
 - a) Site personnel will use appropriate PPE (See Section 5).
 - b) Site personnel will use proper material handling procedures (See attachment to 18.0).

- 3) Slips/trips/falls
 - a) Personnel will be fully aware of their surroundings at all times.
 - b) Personnel will be informed of any possible terrain hazards prior to beginning work.

- 4) Sprains/strains from lifting heavy or bulky loads
 - a) Personnel will use proper lifting techniques and procedures that are understood and followed by managers, supervisors and employees.
 - b) There will be a conditioning period for new or reassigned employees.

18.4 Safe Distances and Places of Refuge

In the event of an unforeseen emergency, resulting in a necessary evacuation, all personnel must report to the designated place of refuge. All personnel while at the site must report to the parking lot across Williams Road to the south east of the site. Given the possible severity of the situation, (i.e. chemical spill, water spill, fire, etc.) the refuge spot will provide a refuge, for all personnel on site, at a safe distance from the emergency.

18.5 Site Security and Control

Access to the site will be limited to authorized personnel. Such personnel include H&S employees, and other state and federal agency personnel and their contractors. Sign-in procedures will be implemented to ensure that only authorized personnel will be on the site. The facility operator, who will maintain the documentation accordingly, will coordinate this effort. Authorized personnel will accompany visitors at all times.

18.6 Evacuation Routes and Procedures

In the event of an emergency, when an evacuation is necessary, all personnel on site will report to the parking lot across Williams Road to the south east of the site. Once there, a head count, assessment of the emergency, and notification to all necessary emergency facilities can be conducted in a timely fashion. Evacuation plans will be conspicuously posted in all buildings on site.

18.7 Decontamination procedures

Thorough personal hygiene is effective against chemical contamination. Wash hands frequently throughout the day, before leaving the lab or work area, after contact with any hazardous material, before contacting excretory organs in the latrine and before eating. Decontamination procedures for specific tasks are discuss further in Section 5.1.

18.9 Emergency Medical Treatment and First Aid

It is important for personnel to understand the chemicals they are working with. First line supervisors must understand the chemicals, their effects, and emergency first aid procedures. The first place to look for first aid procedures is the Material Safety Data Sheet (MSDS).

If a toxic or hazardous chemical makes contact with the skin, start flushing the area immediately. Locate and maintain safety showers and emergency eye wash stations properly. Flush eye wash stations and safety showers on a regular basis. Locate safety showers in an area, which it will be immediately accessible and will not create additional hazards.

If a person receives an injury, execute the following checklist. If a chemical causes the injury, try to have someone get a copy of the MSDS ready to accompany the victim to the medical facility. A map to the nearest medical facility is provided in Appendix D.

- Warn others and render assistance to persons involved.
- If further exposure is life threatening, then remove injured from affected area.
- If chemicals are involved, wash person under safety shower.
- **Notify the Fire Department (911)** and provide location, type of injury, and number of persons injured.
- If the injured person needs immediate medical attention: Remain calm.
- If alone - **YELL FOR HELP!**
- Initiate lifesaving measures (CPR/First Aid).

- Do not move injured person unless there is danger of further harm.
- Keep injured person warm.
- Send someone knowledgeable of the incident for help.
- Request Supervisor to complete Accident Report after injured person has been tended to.

If a **person catches on fire**, the rescuer should have victim

STOP — DROP — ROLL

Do not use fire blankets to extinguish flames. **Call the Fire Department at 911.**

18.10 Emergency Alerting and Response Procedures

Hazardous Material Spill: Immediate Response

This section of this document contains a detailed plan for responding to spills. Below is a synopsis of key parts for ease of use.

Attend to any persons who may have been injured or contaminated and remove them from the area if possible. Do not move injured person unless there is danger of further harm. If the spill material is flammable, turn off ignition and heat sources. Avoid breathing spill material vapors and if necessary, use a respirator. Ensure exhaust ventilation is adequate if it is safe to do so. Request the Supervisor to complete an Accident Report after the injured person receives appropriate medical attention.

If the spill is small, obtain supplies to clean up the spill. During cleanup, wear appropriate PPE. If the spill is large or protective apparel is not available, get out of the area and direct attention to the spill area as quickly as possible when response personnel arrive.

The cleanup of a chemical spill should only be done by knowledgeable and experienced personnel.

A **Minor Chemical Spill** is one that the area workers are capable of handling safely without the use of full suit protective clothing and respirators and when the material is contained within a small area of the shop or work space (essentially less than 5 gallons of material). Report the spill to the H&S Office as soon as possible so it can evaluate the impact. *All other chemical spills are considered Major.*

Confine minor spills to a small area. Use appropriate kit to neutralize and absorb acids and bases. Collect residue, place in container, and dispose as chemical waste. For other chemicals, use appropriate kit or absorb spill with vermiculite, dry sand, or diatomaceous earth. Collect residue,

place in container and dispose as chemical waste. Clean spill area with water and report the spill to the H&S Corporate Health & Safety Officer for further distribution.

A **Major Chemical Spill** is one that is beyond the capacity of shop personnel to contain or a spill requiring a robust chemical protective posture including a full suit and a respirator. For all but a very few instances, this means a spill over 5 gallons in size. Follow the procedure outlined below in the event of a major spill.

Initial Spill Discovery/Notification Procedures

In the event of a spill, the following actions should be taken and the order will depend on existing conditions:

- a. Stop the source of the spill if possible and institute evacuation procedures, if applicable.
- b. Notify the following:
 1. Fire Department (631) 931-2660 non emergency
 2. Local Spill Response Hotline
 2. H&S PM and SHM (508) 366-7442
 3. NAVFAC COTR Lora Fly (757) 341-2012

Provide the following information:

- Your name
- Location of spill and facility number
- Number of injured personnel and nature of injuries
- Substance spilled
- Amount spilled
- Extent of spill
- Rate material currently spilling
- Time spill occurred
- Any other pertinent information

- c. Initiate Site-specific Emergency Response Plan if available and if properly trained.
- d. Make spill scene OFF LIMITS to unauthorized personnel.
- e. Remain at the spill site (at a SAFE distance) until the on-scene commander arrives.
- f. Report to the OSC and assist response personnel until released.

Fires and Explosions: Immediate Response Actions

Fires require immediate action to prevent the loss of life and property. Typically, a sensor will alert the Fire Department if there is a fire inside a structure, however, it is essential that someone pulls an alarm lever and call the fire department for verification.

A *small fire* is extinguishable within 1 - 2 minutes. Determine if means are available to extinguish the fire; if not, then vacate the area and activate nearest building fire alarm. Cover the fire with an inverted empty metal trashcan or wet paper towels. If this fails to extinguish the fire, use an appropriate fire extinguisher (see below). To use fire extinguisher:

THINK P-A-S-S

- P - pull the pin
- A - aim the hose at the base of the fire
- S - squeeze the handle
- S - sweep the hose back and forth

Class A - ordinary combustible solids such as paper, wood, coal, rubber and textiles.

Class B - petroleum hydrocarbons (diesel fuel, motor oil, and grease) and volatile flammable solvents.

Class C - electrical equipment.

Class D - combustible or reactive metals (such as sodium and potassium), metal hydrides, or organo-metallics (such as alkyl-aluminum's).

Always maintain access to the exit; ventilate the area after the fire is out; avoid smoke or fumes; call the fire department and report the incident.

A *large fire* is one in which there is no chance for personnel in the immediate area to extinguish in less than two minutes. Shop level personnel are not to try to extinguish or control large fires by direct means. Fire fighting is extremely dangerous and requires extensive, specialized training. If it is safe to do so, shop personnel should remove or cut-off the ignition source, remove the fuel, or close doors and windows (to remove oxygen and prevent the fire from spreading). The safety of shop personnel is the top priority. If there is a large fire, follow these steps:

- REMAIN CALM.
- Activate manual pull alarm.
- Call Fire Department **911** or (631) 931-2660
- If possible, turn off all sources of heat, electricity, and gas.
- If possible, close windows.
- Evacuate by the stairwells; make sure stairwell doors remain closed after use.
- Assist the injured.
- Exit building as quickly as possible.
- Alert other personnel in the building.
- Contact H&S (Westborough Office 508-366-7442).

Only trained personnel should use fire extinguishers. Never enter a room that is smoke-filled or if the door is warm to touch. **DO NOT ATTEMPT RESCUE.** Have a person knowledgeable of the incident and the area meet emergency personnel outside to provide relevant information. For additional information on fire prevention and safety, call H&S's Corporate Health & Safety Officer at 508-366-7442.

18.11 Critique of Response and Follow-up

Initial Emergency Investigation

The initial investigation has three purposes:

- Prevent further possible injury and property damage
- Collect facts about the accident
- Collect and preserve evidence

Steps:

- a) Secure the area. Do not disturb the scene unless a hazard exists.
- b) Prepare the necessary sketches and photographs. Label each carefully and keep accurate records.
- c) Interview each victim and witness, as well as those who were present before the accident and those who arrived at the site shortly after the accident. Keep accurate records of each interview.

Determine:

- a) What was abnormal before the accident.
- b) Where the abnormality occurred.
- c) When it was first noted.
- d) How it occurred.

18.12 Follow-up Emergency Investigation

The follow-up investigation is used to analyze data and determine the causes and corrective actions necessary to prevent reoccurrence.

Steps:

- a) Analyze the data obtained in the initial investigation
- b) Repeat any of the prior steps, if necessary.
- c) Determine:
 1. Why the emergency situation occurred.
 2. A likely sequence of events and probable causes (direct, indirect, basic).
- d) Determine the most likely causes.
- e) Conduct a post-investigation briefing.

f) Prepare a summary report, including the recommended actions to prevent a reoccurrence.

An investigation is not complete until all data are analyzed and a final report is completed. In practice, the investigative work, data analysis, and report preparation proceed simultaneously over much of the time spent on the investigation.

18.13 Personal Protective Equipment and Emergency Equipment Specifications

Personal protection and personal hygiene are two very basic aspects of work place safety. Wearing appropriate personal protective equipment (PPE) and practicing good personal hygiene as described below will minimize exposures to hazardous chemicals during routine use and in the event of an accident. Review the Material Safety Data Sheet (MSDS) for specific recommendations and PPE requirements.

- Wear a lab coat, apron, or coveralls to prevent splashing skin or clothing. Employees and contractors should cover legs and feet (no sandals or open-toed shoes), and confine loose clothing and long hair in the industrial or laboratory facilities.
- It is federal and state law and H&S policy that personnel, including visitors in work areas, wear safety glasses, goggles, or face shields at all times where eye hazards are a possibility. Wear goggles when chemical splashes are possible. Wearing of contact lenses in work areas is a controversial issue. If contact lenses must be worn (specifically visitors), it is necessary to wear protective glasses or goggles at all times when in the industrial areas.
- Full-face shields must be worn when conducting a procedure that may result in a violent reaction or where the splash hazard is so great, that eye, nose, or oral ingestion of hazardous chemicals is likely without the protection. H&S Environmental recommends full-face shields with bottom caps to protect under the chin due to the tendency to raise the chin when a splash occurs.
- Gloves are essential when working with hazardous substances. The proper gloves will prevent skin absorption, infection or burns. Not all glove materials are equally effective in protection from chemical hazards. Consult a chemical resistance chart from the glove manufacturer for assistance in appropriate selection.
- Conservation of hearing is an important preventative measure. To reduce occupational hearing loss, all H&S employees, who work in potentially noisy areas, are provided hearing protection.

18.14 Basic Safety Guidelines

Some general rules or standard operating procedures apply to all facilities at the site. Respect and understand the safety and health hazards associated with the chemicals and equipment in your work areas, and practice basic safety guidelines at *all* times.

- Children and other unauthorized persons are not to be in water treatment areas, laboratories or other work areas where hazardous substances or operations are present. This includes contractors. When H&S's Site Supervisor schedules work, coordinate contractor services with shop level supervisors. Shop level supervisors are responsible for informing non-shop personnel of any unique hazards associated with the shop.
- Maintain free access to electrical equipment, plugs, switches and panels in case of an emergency. Ensure all receptacle outlets in shops are the polarized grounding type. Use Ground Fault Circuit Interrupters (GFCI) in locations involving wet processes or outdoor work. Ground or double insulate electrical hand tools.
- Inspect electrical extension cords on a periodic basis for damage and/or defects. Do not run cords through doors, walls or partitions, under rugs or above dropped ceilings. Do not wrap cords around fixtures, tie in knots, or drape over pipes, lights, or ventilation ductwork. Cords may not run in aisles or corridors where they may receive damage or create a tripping hazard. Do not use extension cords may not be used as a substitute for fixed receptacle outlets. Cords used for 110-120 volt service will be UL listed standard heavy-duty three wire equipped with a polarized three prong plug. One of the wires will be an equipment-grounding conductor. In no case will a two-wire type extension be used.
- Use proper equipment that is in good condition. For example, never use rusty or damaged drums. Use properly sized dollies to move drums of liquid around shops. Always secure containers in vehicles with strapping in good working order.
- Fire extinguishers must be available, charged, and hung in a location that is immediately (10 seconds and within 50 feet) accessible. H&S Site Supervisor must conduct periodic inspections to ensure extinguishers have a full charge of fire suppressant chemicals.
- Eating, drinking and the application of cosmetics are forbidden in areas where hazardous chemicals are in use. These activities are only permissible in well-defined designated non-chemical areas. Do not store food in the same refrigerator with chemicals, biohazards or radioactive materials. Practical jokes or other behavior that might confuse, startle, or distract another worker is forbidden.

- Do not block exits, aisles and safety equipment in any way with equipment, furniture, etc. Aisles within work areas should be 36 inches in clear width. Mark doors not in use but accessible from a corridor or adjacent room with an appropriate label. Do not use hallways as storage areas. Do not use work areas and floors for excessive storage.
- Work areas where hazardous materials or operations are present must follow OSHA, HMIS, or NFPA marking guidelines. Post an annually updated emergency contact card on each entrance to the building for each shop.

18.15 Hazardous Material Handling and Storage

Hazards associated with various chemicals and gases vary widely. Understanding the hazards associated with a compound and minimizing the quantity used and stored in the work place will decrease chance of injury. First line supervisors are responsible for ensuring subordinate personnel and visitors are aware of the threats and hazards posed by the specific chemicals employed in the processes they own. The MSDS must be immediately available to employees; review the MSDS for the formulas and compositions of work place chemicals.

The Army Corps of Engineers uses EM-385-1-1 as the standard for compatible chemical storage. Segregate chemicals by hazard classification; do not store incompatibles in close proximity. Once segregated by hazard classification, chemicals may be stored alphabetically, or by stock number. A basic segregation theme may be:

Group	Keep Away From:
Oxidant	Organic
Air/water reactive	Air and water
Caustics	Acids
Cyanides	Acids

After completing the segregation by hazard classifications further segregate mineral/organic acids, unstable compounds, heat sensitive compounds, gases, and other subsets of major groups. Store volatile toxic substances in storage cabinets designed for the application or under hoods when cabinets are unavailable. Store flammable materials in appropriately labeled containers, in safety cans and Department of Transportation (DOT) approved containers. Do not store waste halogenated solvents in metal safety cans due to corrosion potential. When storing volatile substances under a hood, restrict other uses of the hood to activities compatible with the chemical and the physical properties of the stored or used chemicals. Do not allow personnel or visitors to smoke in the vicinity of fuels or fuel tanks. Do not expect non-site personnel to recognize the hazards some employees work with on a daily basis.

Check the integrity of containers and observe compatibility; for example, hydrofluoric acid must not be stored in glass and some oxidizers should not be stored in plastic containers. Use appropriate handcarts to move cylinders. Secure cylinders to the cart during transport. Avoid moving quantities of fuel, solvents or gases on the streets during peak commuting hours.

Always consider cylinders as full and handle them with corresponding care. Store cylinders in well ventilated areas with protective caps screwed on and the cylinder secured (e.g., strapped or chained down) to reduce the chance of the cylinder being knocked on the ground. Do not store cylinders near heat or high traffic areas. Do not store flammables and oxidizers together. Do not store empty and full cylinders together.

Make sure all labels are legible. According to 29 CFR 1910.1200 (f), secondary containers must have a label. Mark all secondary containers with the chemical name and appropriate hazards. Date all chemicals that may become unstable over time; test and/or dispose of them when appropriate. Check the MSDS for detailed instructions about disposing of regulated or hazardous waste or "over shelf life" stock.

Above all, USE COMMON SENSE to avoid chemical spills. Close caps securely and avoid storing chemical containers in hard to reach areas. Pour chemicals carefully, and never add water to concentrated acid. Ground metal containers and non-conductive containers (e.g., glass or plastic) holding more than five gallons when transferring flammable liquids.

Accident prevention includes using only the amount of hazardous substances needed to accomplish the mission. All individuals are responsible for evaluating their processes and refining working techniques to maximize the use of resources. A waste minimization plan should include:

- An up-to-date chemical inventory.
- Annual review of process needs and research of new techniques that consider the hazards and quantities of waste produced.
- Destruction procedures as the final step in processes; for example, neutralization of corrosive wastes that do not contain heavy metals should be a standard operating procedure.
- Elimination of hazardous materials such as heavy metals and halogenated hydrocarbons; solvents with RCRA listed substances.

Waste minimization efforts include centralized purchasing program designed to reduce duplication and overbuying.

When working with hazardous materials, it is advisable to have a second person present, or at a minimum, maintain surveillance via telephone contact.

19.0 DRUG AND ALCOHOL ABUSE PREVENTION

H&S is committed to protecting the safety, health and well-being of all employees and other individuals in our workplace. We recognize that alcohol abuse and illegal drug use pose a significant threat to our ability to achieve our business goals

H&S adheres to a corporate substance abuse policy that is consistent with Drug-Free Workplace Act of 1988 as well as Federal and DoD Acquisition Requirements. Each employee is required to acknowledge his/her obligation to abide by the terms of this policy.

19.1 Corporate Policy

The following policy statements apply:

1. H&S will not tolerate or condone substance abuse. It is our policy to maintain a workplace free from alcohol and other drug abuse and its effects.
2. It is the policy of H&S that employees who engage in the sale, use, unlawful manufacture, distribution, dispensing, possession or transfer of illegal drugs, other drugs, or controlled substances, or who offer to buy or sell such substances; the excessive use of alcohol during working hours; or the abuse of prescribed drugs will be subject to disciplinary action up to and including termination.
3. It is the policy of H&S to commit the resources necessary to achieve and maintain a drug-free workplace.

H&S expects the full support of its substance abuse policy by all employees and all persons doing business with H&S. Accordingly, as a condition of employment, H&S requires that employees adhere to a strict policy regarding the use and possession of illegal drugs and alcohol. At the same time H&S encourages employees to voluntarily seek help with drug and alcohol problems.

19.2 Procedures

To provide a safe drug-free and alcohol-free working environment, H&S:

1. Establishes definitive rules and regulations.
2. Provides increased awareness through training, education and communication on the subject of alcohol and other drug abuse.
3. Conducts testing for illegal drugs of Employees in Sensitive Positions during employment.
4. Provides training to supervisors to assist in identifying and addressing illegal drug use by employees.
5. Recognizes that there may be employees who have an alcohol or other drug problem and stand willing to assist in the resolution of that problem by encouraging employees to seek help through employee assistance programs.

APPENDIX A

SITE SAFETY AND HEALTH PLAN ACKNOWLEDGEMENT

SAFETY AND HEALTH PLAN REVIEW

Project Name: _____

Project Location: _____

Date: _____

Conducted By: _____

I have reviewed the H&S Accident Prevention Plan (APP) and Site Specific Health & Safety Plan (SSHP) for the above indicated site and understand the hazards and control measures required on this project.

I agree to follow the procedures outlined in this plan and to inform the H&S Project Manager, Project Superintendent, and/or Site Safety and Health Officer should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this project.

Date	Name	Signature	Company



APPENDIX B

PARTIAL LIST OF MSDS FORMS

Material Safety Data Sheet



Vinyl Chloride (Chloroethylene)

Section 1. Chemical product and company identification

Product name	: Vinyl Chloride (Chloroethylene)
Supplier	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Product use	: Synthetic/Analytical chemistry.
Synonym	: Ethylene, chloro-; Chloroethene; Chloroethylene; Monochloroethylene; Vinyl chloride; Vinyl chloride monomer; Vinyl C monomer; C ₂ H ₃ Cl; Ethylene monochloride; Monochloroethene; Chlorethene; Chlorethylene; Chlorure de vinyle; Cloruro di vinile; Rcra waste number U043; Trovidur; UN 1086; VC; VCM; Vinile; Vinylchlorid; Vinyl chloride, inhibited; Vinyle(chlorure de); Winylu chlorek; 1-Chloroethylene
MSDS #	: 001067
Date of Preparation/Revision	: 4/27/2010.
In case of emergency	: 1-866-734-3438

Section 2. Hazards identification

Physical state	: Gas. [COLORLESS GAS OR LIQUID (BELOW 7 F) WITH A PLEASANT ODOR AT HIGH CONCENTRATIONS. [NOTE: SHIPPED AS A LIQUEFIED COMPRESSED GAS.]]
Emergency overview	: WARNING! FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CAN CAUSE CANCER. CONTENTS UNDER PRESSURE. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not ingest. May cause target organ damage, based on animal data. Risk of cancer depends on duration and level of exposure. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed. Contact with rapidly expanding gases can cause frostbite.
Target organs	: May cause damage to the following organs: blood, kidneys, liver, mucous membranes, lymphatic system, upper respiratory tract, skin, eyes, central nervous system (CNS).
Routes of entry	: Inhalation
Potential acute health effects	
Eyes	: Irritating to eyes.
Skin	: Irritating to skin.
Inhalation	: Acts as a simple asphyxiant.
Ingestion	: Ingestion is not a normal route of exposure for gases
Potential chronic health effects	: CARCINOGENIC EFFECTS: Classified A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for humans.) by European Union. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available.
Medical conditions aggravated by over-exposure	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Vinyl Chloride (Chloroethylene)	75-01-4	100	ACGIH TLV (United States, 1/2009). TWA: 1 ppm 8 hour(s). OSHA PEL (United States, 11/2006). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

- Flammability of the product** : Flammable.
- Auto-ignition temperature** : 471.85°C (881.3°F)
- Flash point** : Open cup: -79.15°C (-110.5°F).
- Flammable limits** : Lower: 4% Upper: 22%
- Products of combustion** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
- Fire-fighting media and instructions** : In case of fire, use water spray (fog), foam or dry chemical.
- In case of fire, allow gas to burn if flow cannot be shut off immediately. Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.
- Contains gas under pressure. Flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : Use only with adequate ventilation. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Do not ingest. Keep container closed. Keep away from heat, sparks and flame. To avoid fire, eliminate ignition sources. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Storage** : Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Segregate from oxidizing materials. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name

vinyl chloride

ACGIH TLV (United States, 1/2009).

TWA: 1 ppm 8 hour(s).

OSHA PEL (United States, 11/2006).

STEL: 5 ppm 15 minute(s).

TWA: 1 ppm 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).

STEL: 5 ppm 15 minute(s).

TWA: 1 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight	: 62.5 g/mole
Molecular formula	: C ₂ H ₃ Cl
Boiling/condensation point	: -13.8°C (7.2°F)
Melting/freezing point	: -160°C (-256°F)
Critical temperature	: 158.5°C (317.3°F)
Vapor density	: 2.21 (Air = 1)
Specific Volume (ft³/lb)	: 6.25
Gas Density (lb/ft³)	: 0.16

Section 10. Stability and reactivity

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Extremely reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
vinyl chloride	LD50 Oral	Rat	500 mg/kg	-
	LC50 Inhalation Gas.	Rat	18 pph	15 minutes
	LC50 Inhalation Gas.	Rat	5000 ppm	1 hours

Chronic effects on humans	: CARCINOGENIC EFFECTS: Classified A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for humans.) by European Union. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, lymphatic system, upper respiratory tract, skin, eyes, central nervous system (CNS).
Other toxic effects on humans	: No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects	: Can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenic effects	: No known significant effects or critical hazards.
Reproduction toxicity	: No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Not available.

Products of degradation	: Products of degradation: carbon oxides (CO, CO ₂) and water, halogenated compounds.
Environmental fate	: Not available.
Environmental hazards	: No known significant effects or critical hazards.
Toxicity to the environment	: Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1086	VINYL CHLORIDE, STABILIZED	2.1	Not applicable (gas).		<p>Reportable quantity 1 lb. (0.454 kg)</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: Forbidden.</p> <p>Cargo aircraft Quantity limitation: 150 kg</p> <p>Special provisions 21, B44, T50</p>
TDG Classification	UN1086	VINYL CHLORIDE, STABILIZED	2.1	Not applicable (gas).		<p>Explosive Limit and Limited Quantity Index 0.125</p> <p>ERAP Index 3000</p> <p>Passenger Carrying Road or Rail Index Forbidden</p>
Mexico Classification	UN1086	VINYL CHLORIDE, STABILIZED	2.1	Not applicable (gas).		-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 15. Regulatory information

United States

- U.S. Federal regulations** : **United States inventory (TSCA 8b)**: This material is listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: vinyl chloride
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: vinyl chloride: Fire hazard, reactive, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: vinyl chloride
Clean Water Act (CWA) 311: No products were found.
Clean Air Act (CAA) 112 accidental release prevention: vinyl chloride
Clean Air Act (CAA) 112 regulated flammable substances: vinyl chloride
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Vinyl Chloride (Chloroethylene)	75-01-4	100
Supplier notification	: Vinyl Chloride (Chloroethylene)	75-01-4	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

- State regulations** : **Connecticut Carcinogen Reporting**: This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.
Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is not listed.
New York Acutely Hazardous Substances: This material is listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

- California Prop. 65** : **WARNING**: This product contains a chemical known to the State of California to cause cancer.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Vinyl Chloride (Chloroethylene)	Yes.	No.	Yes.	No.

Canada

- WHMIS (Canada)** : Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class F: Dangerously reactive material.

Vinyl Chloride (Chloroethylene)

CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

United States

Label requirements

: FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
HARMFUL IF SWALLOWED.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CANCER HAZARD - CAN CAUSE CANCER.
CONTENTS UNDER PRESSURE.

Canada

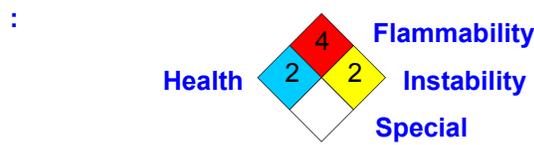
Label requirements

: Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class F: Dangerously reactive material.

Hazardous Material Information System (U.S.A.)

Health	*	2
Flammability		4
Physical hazards		2

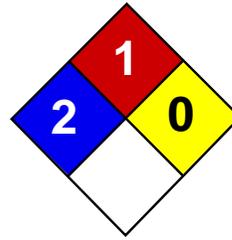
National Fire Protection Association (U.S.A.)



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Trichloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroethylene

Catalog Codes: SLT3310, SLT2590

CAS#: 79-01-6

RTECS: KX4560000

TSCA: TSCA 8(b) inventory: Trichloroethylene

CI#: Not available.

Synonym:

Chemical Formula: C₂HCl₃

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Trichloroethylene	79-01-6	100

Toxicological Data on Ingredients: Trichloroethylene: ORAL (LD50): Acute: 5650 mg/kg [Rat]. 2402 mg/kg [Mouse]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH.

MUTAGENIC EFFECTS: Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 420°C (788°F)

Flash Points: Not available.

Flammable Limits: LOWER: 8% UPPER: 10.5%

Products of Combustion: These products are carbon oxides (CO, CO₂), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/

spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 50 STEL: 200 (ppm) from ACGIH (TLV) TWA: 269 STEL: 1070 (mg/m³) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 131.39 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 86.7°C (188.1°F)

Melting Point: -87.1°C (-124.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.4649 (Water = 1)

Vapor Pressure: 58 mm of Hg (@ 20°C)

Vapor Density: 4.53 (Air = 1)

Volatility: Not available.

Odor Threshold: 20 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:

Easily soluble in methanol, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity:

Extremely corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

Acute oral toxicity (LD50): 2402 mg/kg [Mouse]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human. Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Trichloroethylene : UN1710 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Trichloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Trichloroethylene Pennsylvania RTK: Trichloroethylene Florida: Trichloroethylene Minnesota: Trichloroethylene Massachusetts RTK: Trichloroethylene New Jersey: Trichloroethylene TSCA 8(b) inventory: Trichloroethylene CERCLA: Hazardous substances.: Trichloroethylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R36/38- Irritating to eyes and skin. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

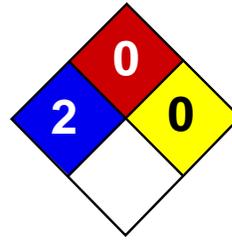
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:54 PM

Last Updated: 11/01/2010 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet

Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolve; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C₂-Cl₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium, barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symptoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorientation, seizures, emotional instability, stupor, coma). It may cause pulmonary edema. Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver (hepatitis, fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremities, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fathead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

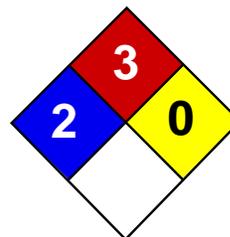
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:29 PM

Last Updated: 11/01/2010 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

1,2-Dichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,2-Dichloroethane

Catalog Codes: SLD2521, SLD3721

CAS#: 107-06-2

RTECS: KH9800000

TSCA: TSCA 8(b) inventory: 1,2-Dichloroethane

CI#: Not available.

Synonym: Ethylene dichloride

Chemical Formula: C₂H₄CL₂

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,2-}Dichloroethane	107-06-2	100

Toxicological Data on Ingredients: 1,2-Dichloroethane: ORAL (LD50): Acute: 670 mg/kg [Rat]. 413 mg/kg [Mouse]. DERMAL (LD50): Acute: 2800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 1414.2 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Extremely hazardous in case of ingestion. Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant). Corrosive to skin and eyes on contact. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

Very hazardous in case of ingestion, of inhalation. CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 413°C (775.4°F)

Flash Points: CLOSED CUP: 13°C (55.4°F). OPEN CUP: 18°C (64.4°F).

Flammable Limits: LOWER: 6.2% UPPER: 15.6%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Flammable in presence of open flames and sparks. Slightly flammable to flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive to explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Corrosive liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep locked up Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 10 CEIL: 75 (ppm) from ACGIH (TLV) TWA: 40 CEIL: 300 (mg/m3) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 98.96 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 83.5°C (182.3°F)

Melting Point: -35.3°C (-31.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.2351 (Water = 1)

Vapor Pressure: 61 mm of Hg (@ 20°C)

Vapor Density: 3.42 (Air = 1)

Volatility: Not available.

Odor Threshold: 26 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; $\log(\text{oil/water}) = 0$

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility:

Easily soluble in methanol, diethyl ether, n-octanol, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 413 mg/kg [Mouse]. Acute dermal toxicity (LD50): 2800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1414.2 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP. The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:

Extremely hazardous in case of ingestion. Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Ethylene dichloride : UN1184 PG: II

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: 1,2-Dichloroethane California prop.

65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,2-Dichloroethane Pennsylvania RTK: 1,2-Dichloroethane Massachusetts RTK: 1,2-Dichloroethane TSCA 8(b) inventory: 1,2-Dichloroethane CERCLA: Hazardous substances.: 1,2-Dichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:**WHMIS (Canada):**

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R11- Highly flammable. R20/22- Harmful by inhalation and if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:17 PM

Last Updated: 11/01/2010 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

APPENDIX C

FIELD CHECKLISTS AND FORMS

CALIBRATION LOG: DIRECT-READING MONITORING INSTRUMENT

Project Name: _____
Project Location: _____
Conducted By: _____
Instrument: _____

Date:	Calibration Gas:
Name:	Concentration:
Initial Reading:	Comments:
Adjusted Reading:	

Date:	Calibration Gas:
Name:	Concentration:
Initial Reading:	Comments:
Adjusted Reading:	

Date:	Calibration Gas:
Name:	Concentration:
Initial Reading:	Comments:
Adjusted Reading:	

Date:	Calibration Gas:
Name:	Concentration:
Initial Reading:	Comments:
Adjusted Reading:	

Date:	Calibration Gas:
Name:	Concentration:
Initial Reading:	Comments:
Adjusted Reading:	

CONFINED SPACE ENTRY PERMIT

This permit must be completed prior to entry into the confined space. Entry cannot be performed if any boxes are marked "No." This permit is valid for only 8 hours only.

Date of entry: _____ Time of Entry: _____

Location: _____ Type of space: _____

Equipment to be worked on: _____

Work to be performed: _____

Anticipated time needed to complete work: _____

Anticipated Harzards: _____

Entry personnel: _____

Attendants: _____

		<u>Acceptable conditions</u>		
1. Atmospheric checks:	Oxygen	_____ % O ₂	19.5 % to 23.5 %	
	Explosive	_____ % L.F.L.	<10% L.E.L./L.F.L.	
	Toxic	_____ ppm	0-35 ppm Carbon	
Monoxide			0-10 ppm Hydrogen	
Sulfide				

Atmospheric Tester's Initials: _____ Time: _____

2.	Isolation of pumps/lines:	N/A	Yes	No	
	Pumps or lines blocked, blinked, or disconnected	()	()	()	
3.	Ventilation:	N/A	Yes	No	
	Mechanical	()	()	()	
	Natural ventilation only	()	()	()	
4.	Hot work permit required	()	()	()	
5.	Atmospheric checks after isolation and ventilation, if applicable:				
	Oxygen: _____ % O ₂				
	Explosive: _____ % L.E.L.				
	Toxic: _____ PPM				
6.	Communication procedures: _____				
7.	Lockout procedures, if applicable: _____				
8.	Entrant(s), attendant(s), and rescue personnel (if applicable) have successfully completed required training.		Yes	No	
			()	()	
9.	Equipment:	N/A	Yes	No	
	Direct reading sampling device which is properly calibrated	()	()	()	
	Safety harnesses and lifelines for entrants and attendants	()	()	()	
	Mechanical retrieval/hosting equipment	()	()	()	
	Communication equipment	()	()	()	
	SCBA or Type C air line respirator	()	()	()	
	Personal protective equipment and clothing	()	()	()	
	Electrical equipment/Lighting/Non sparking Tools	()	()	()	
	Traffic barriers/entrance covers	()	()	()	

I have reviewed the work authorized by this permit and the information pertaining to each item. Safety procedures have been received and are understood by all personnel.

Entry Supervisor: _____ **Date:** _____

CRANE CRITICAL LIFT PLAN FORM

Project Name / Location: _____

Critical Lift Description: _____

Critical Lift Plans are required for: Lifts over 20 tons that exceed 75% of the crane chart capacity at the required radius; Lifts with two or more cranes; Lifts where the load on the crane cannot be accurately determined in advance (including pulling); Lifts that side-load the crane boom (load line not vertical); Lifts with crane mounted fixed leads; Lifts with specific hazards or difficulties; Lifts where a critical lift plan is specified.

CRANES: Note features of crane setup that affect capacity (boom type, jib attachments, counterweights used, crawler position, crane machine list/side pull angle derating, over front/over side capacities, etc. (attach description).

Crane A		Crane B	
Manufacturer		Manufacturer	
Model		Model	
Boom Length		Boom Length	
Setup		Setup	

LOAD, RADIUS AND CRANE CAPACITY: Load weight shall be determined by crane load indicating device, calculation, weighing, or from published information, project correspondence, or engineered drawings. Rigging weight shall include boom point attachments to crane, hoist lines, blocks, headache ball, slings, lifting beams, shackles and other hardware. Chart capacity shall be for the crane as described in crane setup above.

Crane A		Crane B	
Load Description:		Load Description:	
Load Dimensions		Load Dimensions	
Load Weight	lbs.	Load Weight	lbs.
Rigging Weight	lbs.	Rigging Weight	lbs.
Total Weight	lbs.	Total Weight	lbs.
Maximum Lift Radius	feet	Maximum Lift Radius	feet
Chart Capacity	lbs.	Chart Capacity	lbs.
Percent of Maximum Capacity	%	Percent of Maximum Capacity	%

FIELD SETUP (Circle "Yes" or "No"; If "Yes", Attach Description):

Ground Slope or Ground Stability Issues	Yes	No	Mats or blocking under outriggers or crawler	Yes	No
Tail Swing clearances less than 3 feet	Yes	No	Load to Boom clearances <10% of boom length	Yes	No
Boom to Obstruction is <10% of boom length	Yes	No	Two-block clearances <10% of boom length	Yes	No
Overhead power lines in vicinity of lift	Yes	No	Minimum Radius limitations	Yes	No
Requirements for rotating load during lift	Yes	No	Pulling of load, and means to measure	Yes	No
Maximum Wind Speed for Lift (mph)	Yes	No	Environmental Limitations (attach description)	Yes	No
Tag lines to be used (if special, attach description)	Yes	No	Swing Speed Limitations (attach description)	Yes	No
Means of Communication to coordinate lift (if special, attach description)			Hand Signals	Radio	
For lifts with more than one crane, describe means to control load on each crane (attach description)			Crane A	Crane B	
Other Issues (if special, attach description)					

KEY PERSONNEL: Lift Superintendent shall explain lift requirements to all personnel involved with the lift.

Lift Superintendent	
Crane Operator	
Alternate Crane Operator	
Other Key Personnel	

ATTACHMENTS (Circle "Yes" or "No"):

Crane Chart (Required)	Yes	No	Crane Position Diagram*	Yes	No
Rigging Component List (Required)	Yes	No	Rigging Diagram*	Yes	No
Load Calculation, with rigging diagram (Required)	Yes	No	Lift Sequence Diagram**	Yes	No
Field Setup Description	Yes	No	Rigging Design Calculation***	Yes	No

*: Crane position and rigging diagram required unless setup is simple

** : Lift sequence diagram required for complex setups

***: Rigging design calculation required unless load on rigging components are obvious and have catalog load capacities.

APPROVAL: Critical lift plans shall be prepared by the PM, Superintendent, or qualified designee, and approved by the Superintendent responsible for the lift. Plans prepared by the Superintendent require approval by the PM. A copy of the plan shall be kept onsite.

APPROVAL	Print Name	Signature	Date
Prepared By			
Approved By			



EXCAVATION SAFETY CHECKLIST
(Competent Person to Complete)

Date / Day:

Project Name:

Project Location:

Competent Person:

Excavation Description:

Excavation Depth/Width:

Permit # /Date:

EXCAVATION INFORMATION

	<u>Circle</u>	<u>Describe</u>
Hazardous Atmosphere:	Yes / No	_____
Access / Egress:	Yes / No	_____
Traffic Control:	Yes / No	_____
Wet Conditions:	Yes / No	_____
Utilities:	<u>Circle</u>	<u>Company / Date</u>
Electrical:	Yes / No	_____
Gas:	Yes / No	_____
Telephone:	Yes / No	_____
Water:	Yes / No	_____
Sewer:	Yes / No	_____
Protective System Used:	<u>Circle</u>	<u>Describe</u>
Sloping:	Yes / No	_____
Benching:	Yes / No	_____
Shoring:	Yes / No	_____
Shielding:	Yes / No	_____

EXCAVATION SAFETY CHECKLIST (Continued)

Visual Soil Classification Test

Date / Time: _____

Competent Person: _____

Soil Sample Location: _____

The Competent Person is required to make daily inspections of excavations, adjacent areas, and excavation protective systems. This checklist is completed by the Competent Person to document visual soil classification tests used to determine soil type(s) present in an excavation. A separate analysis is performed on each layer of soil in the excavation walls or if the excavation stretches over a distance where the soil type may change.

	<u>Circle</u>	<u>Describe</u>
Particle Type:		
Fine grained soil (cohesive):	Yes / No	_____
Coarse grained soil (sand/gravel):	Yes / No	_____
Water Conditions:		
Dry:	Yes / No	_____
Wet/Surface Water/Submerged:	Yes / No	_____
Surface Encumbrances:	Yes / No	_____
Previously Disturbed Soil:	Yes / No	_____
Layered Soils / Dip into Excavation:	Yes / No	_____
Exposure to Vibrations:	Yes / No	_____
Fissures / Cracking / Spalling:	Yes / No	_____
Hazardous Atmosphere:	Yes / No	_____
Confined Space Exposure:	Yes / No	_____
Vehicle Traffic Present:	Yes / No	_____

EXCAVATION SAFETY CHECKLIST (Continued)

Manual Soil Classification Test

Date / Time: _____

Competent Person: _____

Soil Sample Location: _____

The Competent Person is required to make daily inspections of excavations, adjacent areas, and excavation protective systems. This checklist is completed by the Competent Person to document manual soil classification tests used to determine soil type(s) present in an excavation. A separate analysis is performed on each layer of soil in the excavation walls or if the excavation stretches over a distance where the soil type may change. Unconfined compressive strength tests are performed on undisturbed soils. No soil is Type A if the soil is fissured; subject to vibration; previously disturbed; or layered dipping into excavation on a slope of 4H:1V.

	Circle	Describe
Plasticity Test:		
Cohesive:	Yes / No	_____
Non-Cohesive:	Yes / No	_____
Dry Strength Test:		
Granular (crumbles easily):	Yes / No	_____
Cohesive (broken with difficulty):	Yes / No	_____
Thumb Penetration Test:		
Type A Soil (soil indented by thumb with very great effort)	Yes / No	_____
Type B Soil (soil indented by thumb with some effort)	Yes / No	_____
Type C Soil (soil easily indented by thumb with little or no effort)	Yes / No	_____
Pocket Penetrometer Test:		
Type A Soil (>1.5 tsf)	Yes / No	_____
Type B Soil (0.5 - 1.5 tsf)	Yes / No	_____
Type C Soil (<0.5 tsf)	Yes / No	_____

Soil Classification (Circle): Type A / Type B / Type C

Excavation Protective System: _____

Competent Person: _____

Signature: _____

Date: _____



FORKLIFT INSPECTION REPORT

Date / Day: _____

Project Name: _____

Project Location: _____

Equipment Type: _____

Mfr / Model: _____

Item	Mon _____	Tues _____	Wed _____	Thurs _____	Fri _____	Sat _____	Sun _____
Check radiator and battery							
Check engine oil							
Check hydraulic oil and hydraulic system							
Check for hose crimp leaks							
Check lights; horn; seatbelts							
Check tires							
Check brakes							
Check back-up alarm signal							
Test operating controls							

Comments:

I have inspected this equipment and it is in good working condition except as noted above.

Inspected By: _____

Signature: _____

Date: _____

HAZARDOUS SUBSTANCE INVENTORY LIST

MSDS on File	Product Name	Manufacturer	Location and Container Type
PPC-001	Gasoline	Various	
PPC-002			

HEAVY EQUIPMENT INSPECTION REPORT

Date / Day: _____

Project Name: _____

Project Location: _____

Equipment Type: _____

Mfr / Model: _____

Inspection Description	Checked	Observations (readings, levels, condition, damage, repairs needed)
General appearance		
Hour meter reading		
Engine operation / check belts		
Engine oil / water level		
Transmission oil level		
Hydraulic / misc. oil level		
Brake operation / fluid level		
Grease		
Batteries		
Fuel level (gas / diesel)		
Hoses & fittings (air, hydraulic...)		
Operation / controls		
Tires / tracks		
Cab (mirrors, seatbelt, glass, horn, turn signals, lights, wipers)		
Back-up lights and alarm		
Fire extinguisher condition		
Coupling devices and connectors		
Exhaust system		
Blade / boom / bucket		
Frame, ladders and walkway		
Steering		

Defects and Repairs Needed / Comments:

Inspected By: Signature:

HOT WORK PERMIT

Date:								
Project Name / Number:								
Specific Location:								
Work Description:								
Hot Work Hazards:								
Chemicals Present/ Introduced:								
Comments:								
HOT WORK PERSONNEL								
Hot Work Supervisor:		Welder #1:						
Fire Watch:		Welder #2:						
IGNITION SOURCES								
<input type="checkbox"/> Oxygen / Acetylene Torch Cutting		<input type="checkbox"/> Grinding / Abrasive Saw						
<input type="checkbox"/> Propane Torch Cutting		<input type="checkbox"/> Drilling						
<input type="checkbox"/> Electric Arc Welding		<input type="checkbox"/> Electric Tools						
<input type="checkbox"/> Other:		<input type="checkbox"/> Soldering						
HOT WORK CHECKLIST (Circle Applicable Items)			YES					
Remove Materials: Removed flammable and combustible materials from area			NO					
Cover Materials: Covered and secured non-movable combustible materials			N/A					
Chemical Handling: Handling of flammables/combustibles in the area stopped								
Floor / Wall Openings: Floor and wall openings covered or protected								
Air Monitoring: Combustible gas test performed (must be less than 10% LEL)								
Control of Ignition Sources: Ignition sources isolated / Inert gas blanket								
Electrical equipment: De-energized / Locked out-tagged out / Blocked out								
Fire Protection Equipment: Fire extinguisher / Fire hose / Fire monitor								
Fire Watch: Fire watch equipped with fire extinguisher and/or fire hose								
Fire Watch Standby: Standby in area for 30 minutes after hot work completed								
General PPE: Hardhat / Safety glasses / Leather boots / Ear plugs								
Protective Clothing: Leather jacket / chaps / leather gloves / Leather boots								
Eye Protection: Welding hood / Welding goggles								
Respirators: HF APR / FF APR / FF PAPR / P-100 Cartridges / SAR / SCBA								
Safety Equipment: First-aid kit / Eyewash supplies								
Access / Egress: Means of access and egress identified and available								
Water Source: Water source available								
Contractors: Contractors in area advised of hot work operation and fire hazard								
Personnel Training: Hot work / Fire extinguisher / Emergency procedures								
Safety Briefing: Hot work operations / Emergency signals / Evacuation routes								
Postings: Hot work permit / Caution signs / Barricade tape / Other:								
LOG OF TESTS								
Time	LEL (%)	_____	_____	Time	LEL (%)	_____	_____	Comments
Tester Name:				<i>Comments:</i>				
Instrument Type/ Model / Serial #:								
Instrument Calibration Date/Method:								
APPROVAL								
Hot work conditions satisfied. The hot work permit is valid only for the conditions existing at the time the permit is issued. The permit expires if a change in activity or conditions that affect safety occurs.								
Hot Work Supervisor Name:								
Time Permit Approved: Signature:								
Time Permit Cancelled: Signature:								

POST AT JOB SITE

Incident Reporting and Investigation Procedures Posting

(Injury/Property Damage/Liability Exposure/Spills/Fires/Serious Near Miss Incidents)

Notify the Site Supervisor or Site Safety and Health Officer (SSHO) immediately of injuries, property damage, liability exposure, spills, fires, and serious near miss incidents.

The Site Supervisor or his/her representative shall:

- Take care of injured personnel immediately
- Secure remaining dangerous conditions to prevent accidents and additional damage
- Secure the incident scene to preserve information
- Identify employees involved in the incident and witnesses and obtain initial information
- Notify the Project Manager (PM) Safety and Health Manager (SHM) about the incident and receive further instructions. **Notify as soon as possible and no later than 2 hours of the incident**
- Initiate fact finding. Investigate the site, interview witnesses, and document circumstances and facts. Complete preliminary documentation forms. Depending upon incident severity and complexity, fact finding may involve other investigators determined by the SHM
- Complete required H&S forms: Incident Statement by Employee, Incident Statement by Witness, Incident Report by Supervisor, Injury and Illness Report, Vehicle Accident Report, and/or Property Damage, Loss and General Liability Report. Submit all forms (if a form is not applicable write N/A on the form.)
- **Submit completed forms to the SHM and PM within 24 hours of an incident and immediately forward additional information as it becomes available.**

NOTE: Accidents resulting in a fatality or multiple hospitalizations require reporting to the nearest OSHA office within 8 hours ([1-800-321-OSHA](tel:1-800-321-OSHA)). This report shall be made by the SHM. A written report shall follow that provides OSHA with all details of the accident required by 29 CFR 1904.8. Any equipment, material, or related evidence that might help in an investigation must not be moved except to prevent further accidents. The SHM will record injuries on the OSHA 300 log.

INCIDENT REPORTING CONTACT INFORMATION:

SHM: Edward Kearney – Office (781) 213-9198 – Fax (781) 213-6992 – Cell (508) 274-5703

SSHO: Gregory Birch – Office (508) 366-7442 – Fax (508) 366-7445 – Cell (302) 373-5724

<p>FAILURE OF A H&S EMPLOYEE TO PROMPTLY REPORT A SAFETY INCIDENT OR FAILURE TO PRESERVE AN ACCIDENT SCENE UNTIL AN INVESTIGATION IS COMPLETED, IS GROUNDS FOR DISCIPLINARY ACTION.</p>
--

INCIDENT REPORT BY SUPERVISOR

Date / Time of Incident:
Project Name / Project No.:
Client Name / Location:
Specific Location of Incident:
Employees Involved in Incident (if applicable):
Detailed Description of Incident:
Primary Cause of Incident:
Contributing Cause(s) of Incident:
Recommendation for Preventing Such Incidents in the Future:
Supervisor Name (print):
Signature:
Date:

INCIDENT STATEMENT BY EMPLOYEE

Employee Name:
Date / Time of Incident:
Project Name / Project No.:
Client Name / Location:
Specific Location of Incident:
Describe What You Were Doing Just Before the Incident:
Detailed Description of How the Incident Occurred:
Names of Witnesses:
Other Relevant Information:
How Can the Likelihood of this Happening Again Be Reduced:
Employee Name (print):
Signature:
Date:

INCIDENT STATEMENT BY WITNESS

Witness Name / Address / Telephone:
Employer / Telephone:
Date / Time of Incident:
Project Name / Project No.:
Client / Location:
Specific Location of Incident:
DETAILED DESCRIPTION OF INCIDENT BASED ON PERSONAL OBSERVATION
Describe where you were and what you were doing just before the incident:
Describe any injuries:
Describe any property damaged:
Describe what was the apparent nature of the injury and/or damage:
Describe what personnel and/or equipment were involved:
Describe what caused the injury and/or damage:
Describe the sequence of events:
List any observed unsafe acts or conditions:
Names of other witnesses:
Other relevant information:
Witness Name (print):
Signature:
Date:

INJURY AND ILLNESS REPORT

Injured Employee Name:	Date / Time of Injury:
Social Security Number:	Date of Birth / Age:
Sex: M <input type="checkbox"/> F <input type="checkbox"/> # of Dependents:	Date of Hire:
Job Title:	Pay Rate:
Home Address:	Home Telephone:
Home Office:	Injury on H&S Premises: Yes <input type="checkbox"/> No <input type="checkbox"/>
Client / Location:	Injury on Client Premises: Yes <input type="checkbox"/> No <input type="checkbox"/>
Specific Accident Location:	
Nature of Injury:	
Exact Body Part Injured:	
Medical Attention: None <input type="checkbox"/> First Aid <input type="checkbox"/> Paramedics <input type="checkbox"/> Doctor <input type="checkbox"/> Hospital ER <input type="checkbox"/> Overnight <input type="checkbox"/>	
Medical Attention Description:	
Hospital / Doctor Name / Telephone:	
Hospital / Doctor Address:	
Date / Time Injury Reported:	
By Whom:	
Time employee began work:	Avg. # of hours worked per week:
Did employee leave work: Yes <input type="checkbox"/> No <input type="checkbox"/>	
When:	
Has employee returned to work: Yes <input type="checkbox"/> No <input type="checkbox"/>	
When:	
Note: Employee must present a return to work release from examining physician before return to work	
Did employee have a work activity restriction: Yes <input type="checkbox"/> No <input type="checkbox"/>	Dates restricted:
Describe:	
Did employee miss a regularly scheduled work shift: Yes <input type="checkbox"/> No <input type="checkbox"/>	Dates missed:
Injury Incident Description:	
What actions have been taken to prevent recurrence:	
What was the employee doing just before the incident occurred?	
Witness Name:	Telephone:
Address:	Statement Attached: Yes <input type="checkbox"/> No <input type="checkbox"/>
INVESTIGATION AND REVIEW (Report to SHM within 2 hours of injury)	
Completed by Name (print) / Signature / Date:	
Title / Phone:	
Site Supervisor Name (print) / Signature / Date:	
Project Manager Name (print) / Signature / Date:	
SHM Name (print) / Signature / Date:	
Attached to this report: <input type="checkbox"/> Incident Statement by Employee <input type="checkbox"/> Incident Report by Supervisor	
<input type="checkbox"/> Incident Statement by Witness <input type="checkbox"/> Photographs <input type="checkbox"/> Maps/Sketches <input type="checkbox"/> Other _____	
(Section to be completed by a H&S Safety Team Representative) Case #:	

PROPERTY DAMAGE, LOSS AND GENERAL LIABILITY REPORT

Project Name / Project No.:
Project Location:
Project Manager / Supervisor:
Date / Time of Damage or Loss:
Description / Identification of damaged or lost property:
Location of damaged or lost property (before loss):
Detailed description of how the damage or loss occurred:
Cause and corrective action recommended to prevent recurrence:
OWNER
Owner of damaged or lost property Name / Telephone:
Address:
Employer Name and Address:
WITNESS
Witness Name / Telephone:
Witness Address:
Employer Name and Address:
WITNESS
Witness Name / Telephone:
Witness Address:
Employer Name and Address:
REPAIR COST
Repair or Replacement Cost:
Attachments: <input type="checkbox"/> Photographs <input type="checkbox"/> Police Report <input type="checkbox"/> Incident Statement by Witness <input type="checkbox"/> Incident Report by Supervisor <input type="checkbox"/> Incident Statement by Employee <input type="checkbox"/> Injury Report
Supervisor Name (print):
Signature:
Date:

SAFETY INSPECTION REPORT

Date / Day: _____

Project Name: _____

Project Location: _____

Work Description: _____

Comments: _____

OBSERVATIONS

--

Safety Conditions Requiring Corrective Action	Corrective Action, Assignment, and Completion Date

Project Manager: _____

Safety Inspector: _____

Distribution: _____

SAFETY MEETING ATTENDANCE ROSTER

Project Name: _____
Project Location: _____
Date: _____
Topic: _____

Date	Signature	Company

Conducted By: _____
Signature: _____
Date: _____



SITE SAFETY AND HEALTH PLAN REVIEW

Project Name: _____

Project Location: _____

Date: _____

Conducted By: _____

I have reviewed the H&S Site Safety and Health Plan for the above indicated site and understand the hazards and control measures required on this project.

I agree to follow the procedures outlined in this plan and to inform the H&S Project Manager, Project Superintendent, and/or Site Safety and Health Officer should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this project.

Date	Name	Signature	Company



TAILGATE SAFETY MEETING RECORD

Date / Day:	Time:
Project Name:	Project No.:
Client:	Location:
Specific Location:	
Work Description:	
Comments:	
SAFETY TOPICS PRESENTED	
Protective Clothing / Equipment: Hard Hats, Personal Floatation Devices (while over water), Safety Shoes, Long Pants, Sleeved Shirts. Safety Glasses and Hearing Protection when required.	
Chemical Hazards: Hydraulic Fluids, Oil, Grease, Gasoline, Diesel Fuel	
Physical Hazards: Heavy Equipment Operations (Crane), Heavy Loads, Small Tool Operations, Overhead Power Lines (electrical), Water Hazards (Use PFDs, Watch for Boat Traffic), Slips, Trips, & Falls (Keep Good Housekeeping).	
Emergency Procedures:	
Emergency Hospital:	
Hospital Telephone:	
Hospital Directions:	
Special Equipment: Fire Extinguishers / First Aid Kits / Spill Kits	
Other: Safety Topic:	
SAFETY MEETING ATTENDEES	
Name Printed / Initial	Name Printed / Initial
1.	6.
2.	7.
3.	8.
4.	9.
5.	10.
Meeting conducted by (print name / signature):	

TRAINING ATTENDANCE ROSTER

Project Name: _____
Project Location: _____
Date: _____
Topic _____

Date	Name	Signature	Company

Instructor Name: _____
Signature: _____
Date: _____



TRAINING COMPLETION RECORD: LEAD HEALTH HAZARDS

Name: _____

Signature: _____

Date: _____

Personnel who may potentially be exposed to inorganic lead above the OSHA action level or PEL, without regard to respirator use, are subject to the requirements of the applicable OSHA regulation for lead (29 CFR 1910.1025; 29 CFR 1926.62). Training must be provided at no cost to the employee and must be conducted in a manner that the employee is able to understand. Training is required at initial assignment and at least annually thereafter for personnel who are exposed above the OSHA action level and/or exposed to lead compounds that may cause skin or eye irritation (e.g., lead arsenate, lead azide).

I acknowledge that I have received inorganic lead employee information and training for lead work operations. Training included a review of the information listed below (initial topics reviewed):

	OSHA "Lead" standard and its appendices
	Location where a copy of the OSHA standard is available
	Applicable training, certification, and licensing requirements according to Federal, State and local regulations
	Requirements of any Lead Compliance Plan in effect
	Requirements of the OSHA hazard communication standard (29 CFR 1200) applicable to lead handling activities; substance physical properties and hazards; location and availability of the written hazard communication program and MSDSs; interpretation of MSDSs to obtain appropriate hazard information; hazard communication signs and labeling; and requirements for retention of DOT markings, placards and labels
	Information and review regarding lead use in specific work areas: quantity, location, manner of use, release, and storage in the workplace and specific operations that could result in exposure at or above the action level; methods and observation techniques to determine presence and release in work areas; techniques to minimize and/or prevent exposure including use of engineering controls, safe work practices, and PPE; modification of habits such as smoking and personal hygiene; signs, symptoms, and health effects of overexposure; and emergency procedures for exposure
	Purpose, selection, fitting, use, and limitations of respirators and protective clothing
	Purpose and description of the OSHA-required medical surveillance program
	Purpose and description of the medical removal provisions in the OSHA standard
	Instructions regarding chelating agent use
	Employee rights of access to medical and exposure monitoring records (29 CFR 1910.20)

VEHICLE ACCIDENT REPORT

SITE VEHICLE	
Date / Time:	Location:
Driver Name:	Accident Date:
Drivers License #:	State:
Driver Address:	Project Location:
Vehicle Year/Make /Model:	
License Plate #:	State:
Vehicle Owner (Circle): Owned / Leased / Rented / Private	
Vehicle Owner Name:	Telephone:
Vehicle Owner Address:	
Vehicle Damage:	Est. Repair Cost:
OTHER VEHICLE	
Driver Name:	Telephone:
Drivers License #:	State:
Drivers Address:	
Vehicle Owner Name:	Telephone:
Vehicle Owner Address:	
Insurance Company:	Telephone:
Address:	Policy No.:
Vehicle Year / Make / Model:	Agents Name:
License Plate No.:	State:
Vehicle Damage:	
Passengers (list on back): Yes / No	Injuries (list on back): Yes / No
ACCIDENT DESCRIPTION	
Sketch Attached: Yes / No	Photos Attached: Yes / No
Description:	
WITNESS INFORMATION	
Witness Name:	Telephone:
Address:	
Statement Attached: Yes / No	
POLICE REPORT	
Police Department:	Telephone:
Police Officer Name:	Police Report #:
Date / Time Reported:	
INVESTIGATION AND REVIEW	
Report Prepared By / Date:	
Supervisor Name / Signature / Date:	

APPENDIX D

HOSPITAL ROUTE MAP

ROUTE TO HOSPITAL SITE 1, NWIRP BETHPAGE BETHPAGE, NEW YORK

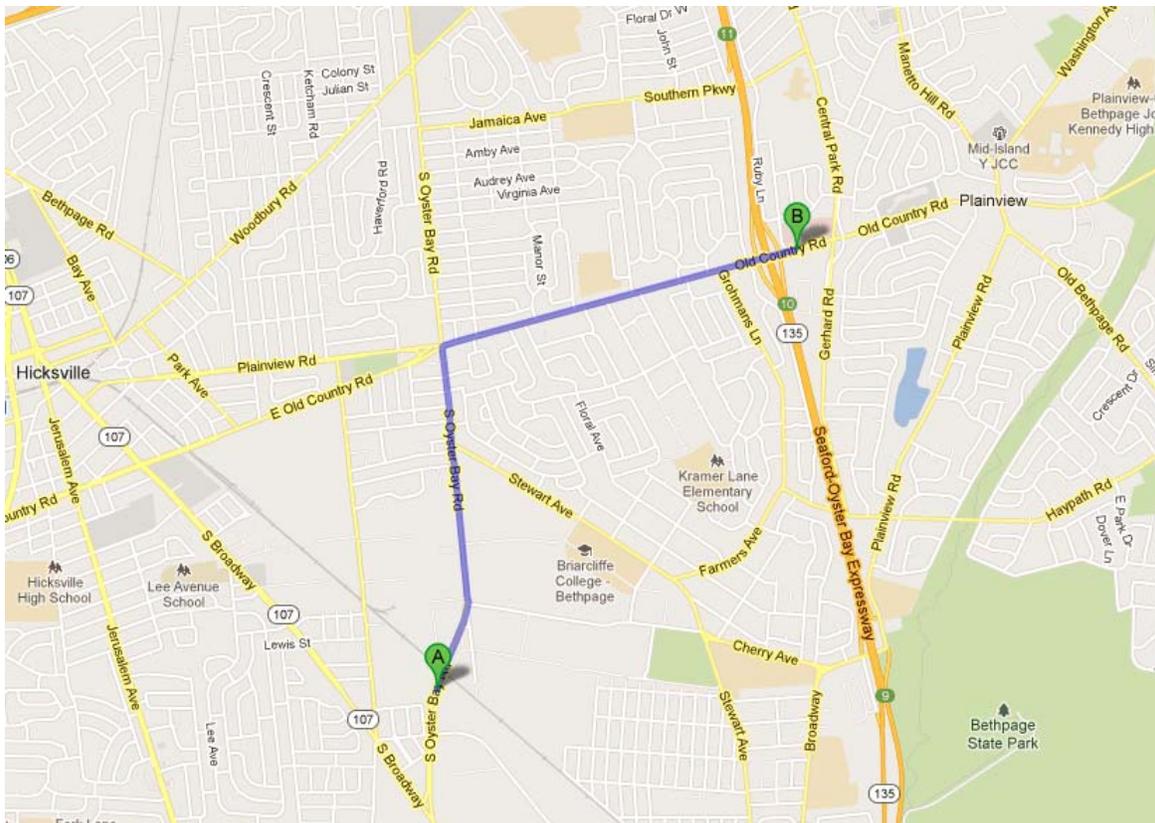
Directions To: **North Shore LIJ: Plainview Hospital**

888 Old Country Road
Plainview, New York 11803
(516) 719-3000

From: **Site 1, NWIRP Bethpage**
999 South Oyster Bay Road
Bethpage, New York 11714

Total Distance: 2.3 mi
Est. Duration: 5 min

1. Head North on South Oyster Bay Road, 1.1 miles.
2. Turn right onto Old Country Road, 1.2 miles.
3. Arrive at Plainview Hospital on left.



ATTACHMENT B
RESUMES AND QUALIFICATIONS

EDWARD KEARNEY, CIH
SAFETY AND HEALTH MANAGER

PROFESSIONAL QUALIFICATIONS

A Certified Industrial Hygienist (CIH) with a graduate degree in Environmental Analysis and more than 16 years of experience in the comprehensive practice of occupational safety and health. Diverse experience in S&H compliance with OSHA, EPA, CAA, AHERA, NIOSH, and federal and state regulations.

EDUCATION

- ▲ BS, Environmental Analysis, University of New England, ME, 1982.

CERTIFICATIONS AND TRAINING

- ▲ Certified Industrial Hygienist, LSP No. 3717, Massachusetts
- ▲ Certified EPA/AHERA Asbestos Inspector
- ▲ Certified EPA/AHERA Management Planner
- ▲ Certified EPA/AHERA Designer and Project Monitor
- ▲ 40-Hour HazWOPER worker training
- ▲ 8-Hour HazWOPER manager and supervisor training
- ▲ 8-Hour HazWOPER refresher training
- ▲ First-aid and CPR training

EXPERIENCE AND BACKGROUND

- ▲ Provided technical assistance/H&S support for construction & hazardous waste projects
- ▲ Directed and supervised project Site Safety and Health Officers (SSHOs)
- ▲ Prepared Site Safety and Health Plans (SSHPs) for hazardous waste site operations
- ▲ Functioned as SSHO for a wide range of construction and hazardous waste projects
- ▲ Supervised confined space entry, excavation, and emergency response operations
- ▲ Experienced and certified in multiple disciplines for asbestos and lead management
- ▲ Conducted daily safety meetings and monthly supervisor safety meetings
- ▲ Performed safety inspections and audits of site activities
- ▲ Conducted incident investigations and completed follow up documentation
- ▲ Established required levels of protection for site personnel for site activities
- ▲ Performed calibration and maintenance of air monitoring instruments
- ▲ Conducted worker exposure monitoring for chemical and physical agents
- ▲ Instructed H&S training for hazardous waste, respiratory protection, PPE, HazCom, etc.
- ▲ Developed H&S standard operating procedures (SOPs)
- ▲ Managed company medical surveillance and OSHA recordkeeping programs
- ▲ Coordinated injury and illness management program and other safety programs.



EMPLOYMENT HISTORY

H&S: Corporate Safety & Health Manager (2005-present)

Axiom: Owner, Corporate Safety & Health Manager (1999-2005)

E-Consulting: Safety & Health Specialist (1993-1998)



JOHN HUDACEK
SITE SAFETY AND HEALTH OFFICER (SSHO)

PROFESSIONAL QUALIFICATIONS

Over eighteen years of experience in the construction-environmental industry as a Construction Manager, Quality Control Manager, and Site Health and Safety Officer providing construction and environmental project management and quality control on large multi-disciplinary projects. Extensive experience in quality control/submittal preparation based on compliance programs as per federal contractual requirements with client list to include USACE, AFCEE, NAVFAC and EPA.

CERTIFICATES AND TRAINING

- ▲ 40-Hour HazWOPER worker training
- ▲ 8-Hour HazWOPER supervisor training
- ▲ 8-Hour HazWOPER refresher training
- ▲ 510 OSHA Construction Safety training
- ▲ NFPA 70e Arc Flash Safety training
- ▲ First Aid and CPR training
- ▲ Bloodborne Pathogens training
- ▲ Excavation Safety training
- ▲ Excavation Competent Person training
- ▲ Confined Space Entry training
- ▲ USACE Construction Quality Management for Contractor's training
- ▲ Hazardous Waste Worker training

EXPERIENCE AND BACKGROUND

- ▲ Enforced contract specifications, regulatory compliance, site assessments and project oversight
- ▲ Trained and managed field staff and subcontractors,
- ▲ Performed cost tracking, scheduling and report preparation
- ▲ Participated in job walks and pre-job planning
- ▲ Prepared and reviewed project work plans and job hazard analyses (JHAs)
- ▲ Provided supervision for recognition, evaluation and control of site hazards
- ▲ Established safe work procedures
- ▲ Specified and obtained safety supplies and monitored safe work practices
- ▲ Presented daily safety meetings, initial site safety briefings and safety training
- ▲ Performed safety inspections and follow up actions
- ▲ Conducted exposure monitoring
- ▲ Completed incident reporting and investigations
- ▲ Maintained safety and health recordkeeping and control of work practices in accordance with company policies, OSHA, NIOSH, NFPA 70e rules
- ▲ Provided health and safety technical assistance as needed



EMPLOYMENT HISTORY

- ▲ H&S Environmental, Inc.: Site Safety and Health Officer (2012-Present)
- ▲ BP Solar-Alternative Energy (2010-2011)
- ▲ ECOR Solutions Inc. West Chester, PA (2008-2010)
- ▲ Cape Environmental Inc. Atlanta GA (2001-2008)
- ▲ URS-Dames & Moore, Radian International (1996-2001)
- ▲ Various small environmental firms (1989-1996)
- ▲ US Army/Army Reserve (1992-2008)



STACEY LEE
ALTERNATE SITE SAFETY AND HEALTH OFFICER (SSHO)

PROFESSIONAL QUALIFICATIONS

Project Scientist and Safety and Health (S&H) professional with several years of experience in health and safety supervision of construction and environmental remediation projects.

EDUCATION

- ▲ BS, Biological Sciences, Northeastern University, Boston, MA, 2008

CERTIFICATIONS AND TRAINING

- ▲ 40-Hour HazWOPER worker training
- ▲ 8-Hour HazWOPER supervisor training
- ▲ 8-Hour HazWOPER refresher training
- ▲ 30-Hour OSHA Construction Safety training
- ▲ First-aid and CPR training
- ▲ Bloodborne pathogen training
- ▲ Confined space training
- ▲ Competent person training
- ▲ USACE Construction Quality Management for Contractors training
- ▲ CSX Roadway Worker Training
- ▲ CSX Bridge Worker Safety
- ▲ CSX On-Track Machinery
- ▲ DOT Transportation Certification Hazardous Materials

EXPERIENCE AND BACKGROUND

- ▲ Provided S&H support for construction, environmental field sampling, and abatement projects.
- ▲ Prepared Site Safety and Health Plans (SSHPs) for hazardous waste site operations
- ▲ Functioned as SSHO for a range of construction and environmental remediation projects
- ▲ Supervised confined space entry operations
- ▲ Conducted safety training and daily safety meetings for field personnel
- ▲ Performed safety inspections and audits of site activities
- ▲ Supervised field sampling activities
- ▲ Performed field testing, calibration, and maintenance of air monitoring/water quality instruments

EMPLOYMENT HISTORY

H&S Environmental: Site S&H Officer and Associate Scientist (2009-Present)
Woods Hole Oceanographic Institute (2008)



THE NATIONAL ENVIRONMENTAL TRAINERS

John Hudacek

has satisfactorily passed an exam and completed an 8 hour Supervisor annual refresher training course entitled **Hazardous Waste Operations and Emergency Response** meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations). This course has been awarded 1.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals.



February 11, 2012

Course Number 1002, Awarded 8 PDH's
Florida Board of Professional Engineers CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

A handwritten signature in black ink, appearing to read "Clay A. Bednarz".

Clay A. Bednarz, MS, RPIH



36-600713971

This card acknowledges that the recipient has successfully completed a
30-hour Occupational Safety and Health Training Course in
Construction Safety and Health

John Hudacek

Peter Rice 66873
(Trainer name – print or type)

06/27/2010
(Course end date)

THE NATIONAL ENVIRONMENTAL TRAINERS

John Hudacek

has satisfactorily passed an exam and completed a training course entitled
Bloodborne Pathogens

meeting the requirements identified in Title 29 CFR 1910.1030.

This course has been awarded .5 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13335. This course is also eligible for .08 Continuance of Certification (COC) points from the Board of Certified Safety Professionals.

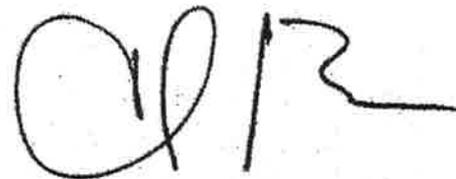


January 31, 2009

Course Number 1019, Awarded 3 PDH's
Florida Board of Professional Engineers CEU Provider Number 0004284

www.nationalevironmentaltrainers.com

Signature of Instructor



Clay A. Bednarz, MS, RPIH

American
Red Cross



This recognizes that

JOHN L. HUDACEK

has completed the requirements for

Adult & Pediatric First Aid/CPR/AED

conducted by

PHSS Central & Southern Ohio

Date completed: *5/30/12*

Valid for 2 year(s)

Certificate of Completion

This Certifies That

John L. Hudacek



Successfully Completed

Excavation Safety Training - Course #FS-301

In accordance with training requirements of OSHA 29 CFR 1926.650-652, (Subpart P)

CST-(TS-301)-081210-01

(16 Academic Hours)

Presented by:

C/P/E Environmental Services LLC

December 10, 2008

Location: SLAC Project Site Office, Menlo Park, California

A handwritten signature in black ink, appearing to read 'Ken W. Beatty', written over a horizontal line.

Lead Instructor: Ken W. Beatty, CSP, CHST



CONSTRUCTION SAFETY COUNCIL

This is to certify that

John Hudacek

has completed the

Online Excavation Competent Person Class

November 14, 2008

Executive Director

THE NATIONAL ENVIRONMENTAL TRAINERS

John Hudacek

has satisfactorily passed an exam and completed a training course entitled
Confined Space Entry

meeting the requirements identified in Title 29 CFR 1910.146.

This course has been awarded .5 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13336. This course is also eligible for .25 Continuance of Certification (COC) points from the Board of Certified Safety Professionals.



January 31, 2012

Course Number 1010, Awarded 3 PDH's
Florida Board of Professional Engineers CEU Provider Number 0004284

www.nationalevironmentaltrainers.com

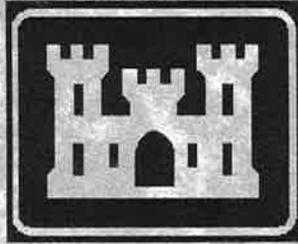
Signature of Instructor



Clay A. Bednarz, MS, RPIH

U.S. ARMY CORPS OF ENGINEERS

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA



CERTIFICATE

John Hudacek

NAB021211025

has completed the Corps of Engineers and Naval Facility Engineering Command Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS - #784

Towson, Maryland

February 9, 2012

NAB/WA9 CEU:0.8 LU:8 PDH:8

Randy W. Sitton

Location

Training Date(s)

Instructional District/ NAVFAC

CQM-C Manager

Richard Burcham/Joe Zurzolo

theodore.j.schorr@usace.army.mi

410-962-3032

Facilitator/Instructor

Email

Telephone

Facilitator/Instructor Signature

Theodore J. Schorr For Randy Sitton

Gary Z. Anderson

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE
CQM-C Recertification online course: <https://www.myuln.net>

Director, USACE Learning Center



International Brotherhood of Teamsters

John L. Hudacek

has completed the
IBT Hazardous Waste
Worker Training Program

Sept. 26 Thru Sept 30, 1994 level of PPE trained for A

at Lake Success, New York

Ron Carey
General President

Tom Lewis
General Secretary-Treasurer

John H. Vetter

**INSTITUTE FOR ENVIRONMENTAL
EDUCATION, INC.**

16 Upton Drive, Wilmington, MA 01887
(Phone) 978.658.5272

IEE

IEE

*This is to certify that
Stacey Lee*

has attended the 40-hour course

Hazardous Waste Operations
pursuant to OSHA 29 CFR Part 1910.120(e)(3)I

Institute for Environmental Education, Inc.
16 Upton Drive, Wilmington, MA 01887
(Phone) 978.658.5272 (Fax) 978.658.5435

IEE

Stacey Lee
has attended the 40-hour course

Hazardous Waste Operations

pursuant to OSHA 29 CFR Part 1910.120(e)(3)I

March 16-20, 2009

Course Dates

Course Location

Institute for Environmental Education
16 Upton Drive
Wilmington, MA 01887

March 16-20, 2009

Course Date

09-3817-180-239955

CertNumber

March 20, 2009

Examination Date

March 20, 2009

Examination Date

09-3817-180-239955

Certificate Number



Training Director



Training Director

THE NATIONAL ENVIRONMENTAL TRAINERS

Stacey Lee

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled
Hazardous Waste Operations and Emergency Response
meeting the requirements identified in Title 29 CFR 1910.120.

This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals



February 21, 2012

Course Number 1001, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

A handwritten signature in black ink, appearing to read 'Clay A. Bednarz', written over a light gray grid background.

Clay A. Bednarz, MS, RPIH

THE NATIONAL ENVIRONMENTAL TRAINERS

Stacey Lee

has satisfactorily passed an exam and completed an 8-hour Supervisor annual refresher training course entitled **Hazardous Waste Operations and Emergency Response** meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations). This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals



February 18, 2011

Course Number 1002, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalevironmentaltrainers.com

Signature of Instructor

A handwritten signature in black ink, appearing to read 'Clay A. Bednarz', written over a light gray grid background.

Clay A. Bednarz, MS, RPIH



36-600796853

This card acknowledges that the recipient has successfully completed a
30-hour Occupational Safety and Health Training Course in
Construction Safety and Health

Stacey Lee

Peter Rice 66873

05/23/2011

(Trainer name – print or type)

(Course end date)

OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev. 12/2009



PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE
This is to certify that

Stacey Lee

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

THIS CERTIFICATE EXPIRES 23-February 2015

Given at Concord, MA By New England District 23-February 2010
Location Instructional District Date


Maurice Beaudoin PE (568-990-2550)
Facilitator

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE


Chief, USAEC Professional Development Support Center

This certifies that
Stacey Lee

has attended and successfully completed the course

DOT 49 CFR 172.704: Hazardous Materials
[DOT General-Site Specific-Safety-Security-Modal]

conducted by

*"Environmental, Health and
Safety Services"*



*P.O. Box 609
West Falmouth, Massachusetts
(978) 857-9552*

#0013

Certificate Number

May 18, 2009

Date of Course

Pass

Grade

May 18, 2012

Expiration Date

Beth Comeau DiPietro

Instructor

Beth Comeau DiPietro

Instructor's Signature

THE NATIONAL ENVIRONMENTAL TRAINERS

Stacey Lee

has satisfactorily passed an exam and completed a training course entitled

Bloodborne Pathogens

meeting the requirements identified in Title 29 CFR 1910.1030.

This course has been awarded .5 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13335. This course is also eligible for .08 Continuance of Certification (COC) points from the Board of Certified Safety Professionals



August 02, 2012

Course Number 1019, Awarded 3 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

A handwritten signature in black ink, appearing to read 'Clay A. Bednarz', written over a light gray grid background.

Clay A. Bednarz, MS, RPIH

American Red Cross



This recognizes that **Stacey Lee** has completed the requirements for **Bloodborne Pathogens Training: PDT** conducted by **CMC - Worcester, MA** Date completed: **05/24/2011** The American Red Cross recognizes this certificate is valid from completion date for: **1 Year**

redcross.org

Instructor's Signature

Thom M. Klein

Chapter

CENTRAL MASSACHUSETTS

Holder's Signature

Stacey Lee

Stock No. 656798

American Red Cross



This recognizes that **Stacey Lee** has completed the requirements for **AED-Adult** conducted by **CMC - Worcester, MA** Date completed: **05/24/2011** The American Red Cross recognizes this certificate is valid from completion date for: **2 Years**

redcross.org

Instructor's Signature

Thom M. Klein

Chapter

CENTRAL MASSACHUSETTS

Holder's Signature

Stacey Lee

Stock No. 656798

American Red Cross



This recognizes that **Stacey Lee** has completed the requirements for **CPR-Adult** conducted by **CMC - Worcester, MA** Date completed: **05/24/2011** The American Red Cross recognizes this certificate is valid from completion date for: **2 Years**

redcross.org

Instructor's Signature

Thom M. Klein

Chapter

CENTRAL MASSACHUSETTS

Holder's Signature

Stacey Lee

Stock No. 656798

American Red Cross



This recognizes that **Stacey Lee** has completed the requirements for **Standard First Aid** conducted by **CMC - Worcester, MA** Date completed: **05/24/2011** The American Red Cross recognizes this certificate is valid from completion date for: **2 Years**

redcross.org

Instructor's Signature

Thom M. Klein

Chapter

CENTRAL MASSACHUSETTS

Holder's Signature

Stacey Lee

Stock No. 656798

THE NATIONAL ENVIRONMENTAL TRAINERS

Stacey Lee

has satisfactorily passed an exam and completed a training course entitled

Competent Person for Excavation Trenching and Shoring

meeting the requirements identified in Title 29 CFR 1926.650.

This course is also eligible for .08 Continuance of Certification
(COC) points from the Board of Certified Safety Professionals



May 31, 2011

Course Number 1011, Awarded 3 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalevironmentaltrainers.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

ATTACHMENT C
ORGANIZATIONAL CHART

ATTACHMENT C – ORGANIZATIONAL STRUCTURE

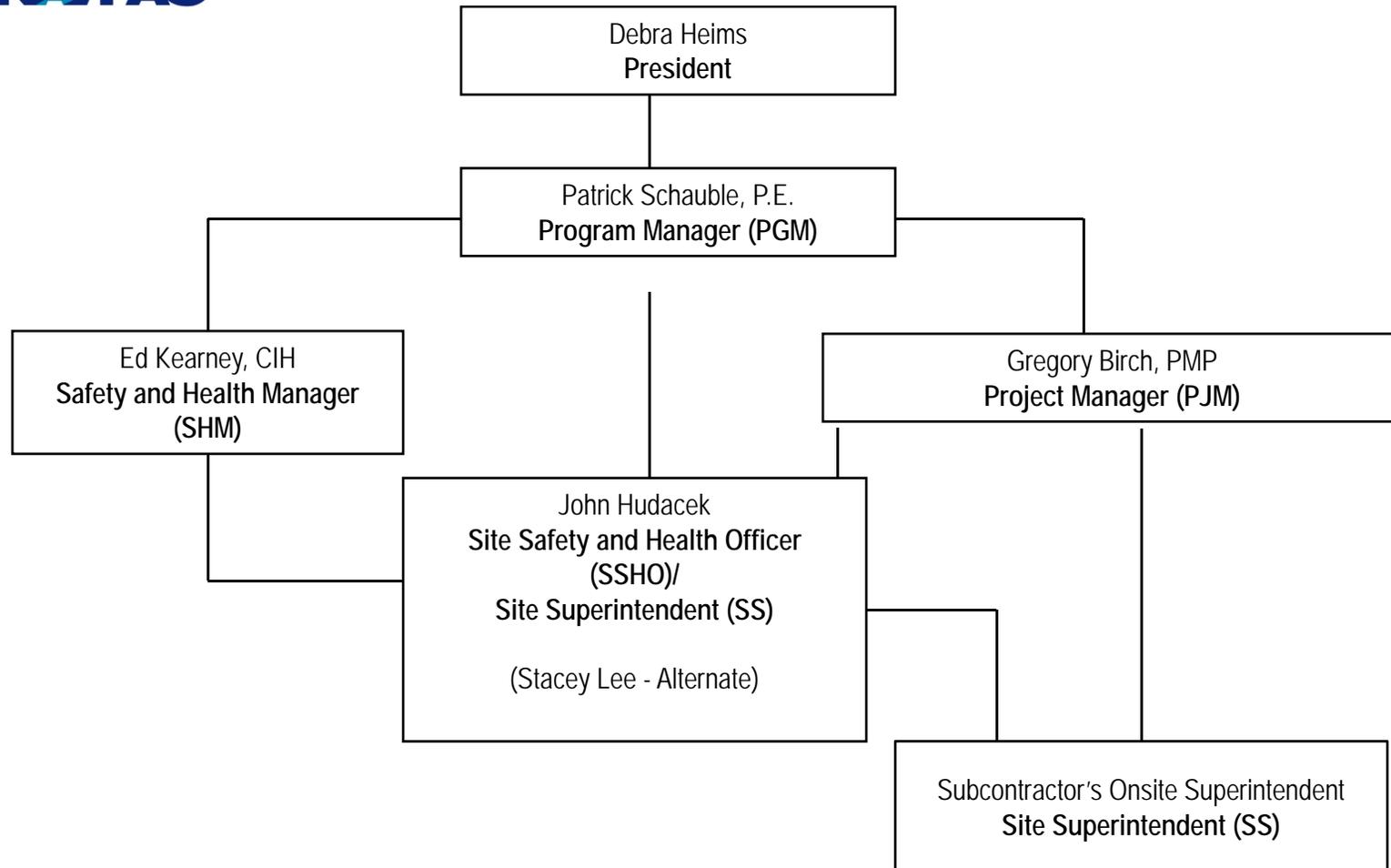


CONTRACTOR QUALITY CONTROL H&S ORGANIZATIONAL STRUCTURE

SITE 1 REMOVAL ACTIONS
NWIRP BETHPAGE
BETHPAGE, NEW YORK



CONTRACT NUMBER: N40085-12-D-1717



ATTACHMENT D
ACTIVITY HAZARD ANALYSIS

Activity Hazard Analysis (AHA)

Activity/Work Task 1: Mobilization and Site Preparation		Overall Risk Assessment Code (RAC) (Use highest code)				M
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix				
		Probability				
Date Prepared: Jul-12	Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Gregory Birch / PM	Catastrophic	E	E	H	H	M
Reviewed by (Name/Title): Ed Kearney / SHM	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
		Negligible	M	L	L	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)				
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.			RAC Chart	
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible			E = Extremely High Risk	
					H = High Risk	
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.			M = Moderate Risk	
					L = Low Risk	
Job Steps	Hazards	Controls			RAC	
Site Restoration / Demobilization -Backfill excavation areas -Topsoil and seed effected areas -Remove remaining materials, equipment, and temporary facilities	Heavy equipment operation hazards (rollover, pinch points, striking hazards, tight work areas, etc.)	Inspect equipment and document on inspection form prior to operating onsite; Check for operational and back-up alarms; Operator's look before backing; Stay clear and do not allow personnel to be in the area of moving parts; Operator's training verification; Load and unload containers on a level surface; Establish communication between operator and other workers; Operate at safe speeds; Watch for changed conditions; use a spotter			M	
	Hydraulic pump malfunctions (Fluid spray, leak, etc.)	Provide training to the manufacturer's specifications on operations of hydraulic systems. Inspect equipment before operation. Spill kit and PPE on site.			L	
	Slips, trips, and falls, uneven work surfaces, wet surfaces, housekeeping	Be cautious and use handrails when exiting/entering equipment (floating plant, equipment, etc.) Always maintain 3 points of contact; Watch for slip, trip and fall hazards; Keep ground surfaces clear of tripping hazards such as hoses, cords, boxes, and debris; Maintain good housekeeping; Look where walking; Maintain good balance; Use short steps when working on slippery surfaces; Wear adequate foot wear to meet conditions; Communicate safety hazard information during safety briefings; Establish site work zones.			L	
	Exposure to overhead and under ground utilities, power sources, or obstructions	Be aware of all overhead utility lines, power sources, and obstructions; Survey for overhead utilities before bringing equipment with high extensions; A minimum of 10 feet safety clearance must be maintained at all times; Anytime there is a potential to come within 10 feet of a power source/obstruction, a spotter MUST be used; Uderground utility location and marking will be completed by NJ One call prior to work; utilization of lockout/tagout as required. <i>NOTE: Serious injury or death may occur as a result of contacting overhead utilities, power sources, or obstructions. NO WORK SHALL BE PERFORMED WHERE OVERHEAD UTILITIES, POWER SOURCES, OR OBSTRUCTIONS ARE PRESENT WITHOUT PRIOR APPROVAL FROM THE SSHO.</i>			M	
	Twisting motions and/or lifting. Ergonomic hazards may exist when performing tasks such as hooking/unhooking lifting cable hooks on loads/materials; material handling tasks; lifting (i.e. hand injuries, etc.)	Use correct motion/lifting techniques, as well as proper body placement/alignment; recommend pre-shift/pre-task stretching; wear work gloves when handling materials; watch for items that can cut, punture, pinch, or crush; always use proper techniques; use kevlar gloves for handling sharp instruments/materials, leather gloves for handling heavy objects, grippy gloves for slippery or wet conditions.			L	
	Inclement weather and adverse environmental conditions (i.e. lightning, reduced visibilty due to fog, heavy rain, etc.)	Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. Operate equipment at appropriate speeds to meet the changing conditions. Wait 30 minutes after an observed lightning event. Personnel are to seek shelter in place or in designated assembly locations communicated during safety briefings.			L	
	Equipment and vehicular traffic	Operate at appropriate speeds to meet the conditions and use extreme caution; be aware of other drivers on the roads and their actions; have ground personnel wear high visibility garments; do not cross paths of moving equipment; or walk behind equipment without permission; keep out of traffic areas when possible. Follow traffic control instructions.			L	
	Hand and power tools/equipment	Use proper hand and/or power tool for the job; Use GFCIs for power tool operation; Use safety glasses; DO NOT use damaged tools; Properly secure materials when working on them; make sure the work area is adequately clear when using equipment; inspect electrical cords; defective equipment will be tagged and removed from service; ABC fire extinguishers will be onsite			L	

Activity Hazard Analysis (AHA)

Activity/Work Task 1: Mobilization and Site Preparation		Overall Risk Assessment Code (RAC) (Use highest code)				M
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix				
Date Prepared: Jul-12		Probability				
Severity		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Gregory Birch / PM		Catastrophic	E	E	H	M
Reviewed by (Name/Title): Ed Kearney / SHM		Critical	E	H	H	L
		Marginal	H	M	M	L
		Negligible	M	L	L	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)				
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				
		RAC Chart				
		E = Extremely High Risk				
		H = High Risk				
		M = Moderate Risk				
		L = Low Risk				
Job Steps	Hazards	Controls				RAC
	Biological hazards (i.e. insects, snakes, rodents, poisonous plants, etc.)	Inspect and shake out PPE as necessary. Be alert to insects and snakes that may be present in the work area as well as in your equipment or PPE. Wear sleeved shirts, long pants, and gloves. Avoid contact with unprotected skin and facial areas. Insect repellent with DEET and IVY BLOCK will be available at the work site for protection for insects and poisonous plants.				L
Equipment to be Used		Training Requirements/Competent		Inspection Requirements		
Excavator, Backhoe, Generators, Power/Hand Tools, GFCIs, Field Trailer, Portable Toilets, First Aid Kit, Spill Kit, ABC Fire extinguishers, Hardhats, Safety Glasses, Safety Shoes, High Visibility Vests/Clothing, Sunblock and Repellants.		Indoctrination Training (APP/SSHPP), 30 Hour OSHA Construction Safety, First Aid/CPR, Daily Safety Briefings, Weekly/Monthly Safety Training (As required).		SSHO/QC Daily Site Inspections, Heavy Equipment (Daily), Power Cord Sets (Daily), Power/Hand Tools (Daily), Fire Extinguishers (Monthly), First Aid Kits (Monthly), GFCIs (Monthly).		

Activity Hazard Analysis (AHA)

Activity/Work Task 2: UST Removal, Transportation and Disposal		Overall Risk Assessment Code (RAC) (Use highest code)				M	
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix					
Jul-12		Probability					
Date Prepared:		Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Gregory Birch / PM		Catastrophic	E	E	H	H	M
Reviewed by (Name/Title): Ed Kearney / SHM		Critical	E	H	H	M	L
		Marginal	H	M	M	L	L
		Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.) Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above) "Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely. "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.		RAC Chart					
		E = Extremely High Risk					
		H = High Risk					
		M = Moderate Risk					
L = Low Risk							
Job Steps	Hazards	Controls				RAC	
Underground Storage Tank(s) Removal Excavate contaminated soil to predescribed depths	Heavy equipment operation hazards (rollover, pinch points, striking hazards, tight work areas, etc.)	Inspect equipment and document on inspection form prior to operating onsite; Check for operational and back-up alarms; Operator's look before backing; Load and unload containers on a level surface; Establish communication between operator and other workers; Operate at safe speeds; Watch for changed condisitons; Use a spotter.				M	
Load effected soil in tri-axel trucks for transport to disposal facility	Hydraulic pump malfunctions (fluid spray, leak, etc.)	Provide training to the manufacturer's specifications on operations of hydraulic systems. Inspect equipment before operation. Spill kit and PPE on site.				L	
Relenquish soil to disposal facility for disposal	Slips, trips, and falls, uneven work surfaces, wet surfaces, housekeeping	Be cautious and use handrails when exiting/entering equipment. Always maintain 3 points of contact; Watch for slip, trip and fall hazards; Keep ground surfaces clear of tripping hazards such as hoses, cords, boxes, and debris; Maintain good housekeeping; Look where walking; Maintain good balance; Use short steps when working on slippery surfaces; Wear adequate foot wear to meet conditions; Communicate safety hazard information during safety briefings; Establish site work zones.				L	
	Exposure to overhead and under ground utilities, power sources, or obstructions	Be aware of all overhead utility lines, power sources, and obstructions; Survey for overhead utilities before ebringing equipment with high extentions; A minimum 10 feet safety clearance must be maintained at all times; Anytime there is a potential to come within 10 feet of a power sources/obstruction, a spotter MUST be used; Underground utility location and marking will be ocmpleted by NY Dig Safely call prior to work; Utilization of lockout/tagout as required. NOTE: Serious Injury or death may occur as a result of contacting overhead utilities, power sources or obstructions. NO WORK SHALL BE PERFORMED WHERE OVERHEAD UTILITIES, POWER SOURCES, OR OBSTRUCTIONS ARE PRESENT WITHOUT PRIOR APPROVAL FROM THE SSHO.				M	
	Twisting motions and/or lifting. Ergonomic hazards may exist when performing tasks such as hooking/unhooking lifting cable hooks on loads/materials; material handling tasks; lifting (i.e. hand injuries, etc.)	Use correct motion/lifting techniques, as well as proper body placement/alignment; recommend pre-shift/pre-task stretching; wear work gloves when handling materials; watch for items that can cut, puncture, pinch, or crush; always use proper techniques; use kevlar gloves for handling heavy objects, grippy gloves for slippery or wet conditions.				L	
	Inclement weather and adverse environmental conditions (i.e. lightning, reduced visibility due to fog, heavy rain, etc.)	Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. Operate equipment at appropriate speeds to mee the changing conditions. Wait 30 minutes after an observed lightning event. Personnel are to seek shelter in place or designated assembly locations communicated during safety briefings.				L	
	Equipment and vehicular traffic	Operate at appropriate speeds to meet the conditions and use extreme caution; Be aware of other drivers on the roads and their actions; have ground personnel wear high visibility garments; do not cross paths of moving equipment or walk behind equipment without permission; keep out of traffic areas when possible; follow traffic control instructions.				L	
	Hand and power tools/equipment	Use proper hand and/or power tool for the job; use GFCIs for power tool operation; Use safety glasses; DO NOT use damaged tools; Properly secure materials when working on them; make sure the work area is adequately clear when using equipment; inspect electrical cords; defective equipment will be tagged and removed from service; ABC fire extinguishers will be onsite; lock-out/tag-out and confined space procedures will be followed if required.				L	
	Dropped loads (property damage and/or personal injury)	Discuss hoisting/rigging plan of activities prior to work; Operation and trianing requirements; designated person in charge (Superintendent); Qualification; Storage and maintenance of rigging equipment requirements per manufacturers instructions.				M	

Activity/Work Task 2: UST Removal, Transportation and Disposal		Overall Risk Assessment Code (RAC) (Use highest code)				M	
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix					
Date Prepared: Jul-12		Probability					
Prepared by (Name/Title): Gregory Birch / PM		Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Reviewed by (Name/Title): Ed Kearney / SHM		Catastrophic	E	E	H	H	M
		Critical	E	H	H	M	L
		Marginal	H	M	M	L	L
		Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.					
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible					
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.					
		RAC Chart					
		E = Extremely High Risk					
		H = High Risk					
		M = Moderate Risk					
		L = Low Risk					
Job Steps	Hazards	Controls				RAC	
	Biological hazards (i.e. insects, snakes, rodents, poisonous plants, etc.)	Inspect and shake out PPE as necessary. Be alert to insects and snakes that may be present in the work area as well as in your equipment or PPE. Wear sleeved shirts, long pants, and gloves. Avoid contact with unprotected skin and facial areas. Insect repellent with DEET and IVY BLOCK will be available at the work site for protection against insects and poisonous plants.				L	
	Potential exposure to contaminants (i.e. TCE, PCE, As)	Use PPE as required and discussed in APP, such as neoprene/nitrile gloves, safety glasses, face shields, coveralls; Properly dispose of contaminated PPE. Properly decontaminate all equipment as outlined in the APP/SSHP. Dust will be inhibited using engineering controls as required.				M	
Equipment to be Used		Training Requirements/Competent		Inspection Requirements			
Backhoe, Tri-Axel Trucks, Generators, Power/Hand Tools, GFCIs, Field Trailer, Portable Toilets, First Aid Kit, Spill Kit, ABC fire extinguishers, Hardhats, Safety Glasses, Safety Shoes, High Visibility Vests/Clothing, Sunblock and Repellants.		Indoctrination Training (APP/SSHP), 30 Hour OSHA Construction Safety, First Aid/CPR, Daily Safety Briefings, Weekly/Monthly Safety Training (As required).		SSHO/QC Daily Site Inspections. Heavy Equipment (Daily), Power Cord Sets (Daily), Power/Hand Tools (Daily), Fire Extinguishers (Monthly), First Aid Kits (Monthly), GFCIs (Monthly).			

Activity Hazard Analysis (AHA)

Activity/Work Task 3: Confirmation and Waste Characterization		Overall Risk Assessment Code (RAC) (Use highest code)				M	
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix					
Date Prepared: Jul-12		Probability					
Prepared by (Name/Title): Gregory Birch / PM		Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Reviewed by (Name/Title): Ed Kearney / SHM		Catastrophic	E	E	H	H	M
		Critical	E	H	H	M	L
		Marginal	H	M	M	L	L
		Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				RAC Chart	
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible					
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				E = Extremely High Risk	
				H = High Risk			
				M = Moderate Risk			
				L = Low Risk			
Job Steps	Hazards	Controls				RAC	
Post-Excavation Sampling Collect representative soil samples from the excavation areas	Trenching Hazards (potential confined space)	Have competent person inspect excavations prior to entering. If trench is considered a confined space, follow all applicable procedures for entering, including air monitoring.				M	
	Slips, trips, and falls, uneven work surfaces, wet surfaces, housekeeping	Be cautious and use handrails when exiting/entering equipment/trenches (ladders, equipment, etc.) Always maintain 3 points of contact; Watch for slip, trip and fall hazards; Keep ground surfaces clear of tripping hazards such as hoses, cords, boxes, and debris; Maintain good housekeeping; Look where walking; Maintain good balance; Use short steps when working on slippery surfaces; Wear adequate foot wear to meet conditions; Communicate safety hazard information during safety briefings; establish site work zones.				L	
	Exposure to overhead and under ground utilities, power sources, or obstructions	Be aware of all overhead utility lines, power sources, and obstructions; Survey for overhead utilities before bringing equipment with high extensions; A minimum of 20 feet safety clearance must be maintained at all times; Anytime there is a potential to come within 20 feet of a power source/obstruction, a spotter MUST be used; Underground utility location and marking will be completed by NJ One call prior to work; utilization of lockout/tagout as required. NOTE: Serious injury or death may occur as a result of contacting overhead utilities, power sources, or obstructions. NO WORK SHALL BE PERFORMED WHERE OVERHEAD UTILITIES, POWER SOURCES, OR OBSTRUCTIONS ARE PRESENT WITHOUT PRIOR APPROVAL FROM THE SSHO.				M	
	Twisting motions and/or lifting. Ergonomic hazards may exist when performing tasks such as hooking/unhooking lifting cable hooks on loads/materials; material handling tasks; lifting (i.e. hand injuries, etc.)	Use correct motion/lifting techniques, as well as proper body placement/alignment; recommend pre-shift/pre-task stretching; wear work gloves when handling materials; watch for items that can cut, puncture, pinch, or crush; always use proper techniques; use kevlar gloves for handling sharp instruments/materials, leather gloves for handling heavy objects, grippy gloves for slippery or wet conditions.				L	
	Inclement weather and adverse environmental conditions (i.e. lightning, reduced visibility due to fog, heavy rain, etc.)	Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. Operate equipment at appropriate speeds to meet the changing conditions. Wait 30 minutes after an observed lightning event. Personnel are to seek shelter in place or in designated assembly locations communicated during safety briefings.				L	
	Equipment and vehicular traffic	Operate at appropriate speeds to meet the conditions and use extreme caution; be aware of other drivers on the roads and their actions; have ground personnel wear high visibility garments; do not cross paths of moving equipment; or walk behind equipment without permission; keep out of traffic areas when possible. Follow traffic control instructions.				L	
	Biological Hazards (i.e. insects, snakes, rodents, poisonous plants, etc.)	Inspect and shake out PPE as necessary. Be alert to insects and snakes that may be present in the work area as well as in your equipment or PPE. Wear sleeved shirts, long pants, and gloves. Avoid contact with unprotected skin and facial areas. Insect repellent with DEET and IVY BLOCK will be available at the work site for protection from insects and poisonous plants.				L	
	Heat Stress	Monitor for heat stress; adjust work/rest schedules as needed; work at a steady pace; drink plenty of fluids; during breaks use shaded rest areas; know the signs and symptoms of heat exposure and emergency treatment.				L	
	Potential contact with contaminants (e.g. TCE, PCE, As)	Use PPE as required and discussed in APP, such as neoprene/nitrile gloves, safety glasses, face shields, coveralls; Properly dispose of contaminated PPE.				M	

Activity/Work Task 3: Confirmation and Waste Characterization		Overall Risk Assessment Code (RAC) (Use highest code)				M	
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix					
Date Prepared: Jul-12		Probability					
Prepared by (Name/Title): Gregory Birch / PM		Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Reviewed by (Name/Title): Ed Kearney / SHM		Catastrophic	E	E	H	H	M
		Critical	E	H	H	M	L
		Marginal	H	M	M	L	L
		Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				RAC Chart	
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E = Extremely High Risk	
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				H = High Risk	
		M = Moderate Risk			L = Low Risk		
Job Steps	Hazards	Controls			RAC		
Equipment to be Used	Training	Inspection Requirements					
Field Trailer, Portable Toilets, First Aid Kit, ABC Fire Extinguishers, Hardhats, Safety Glasses, Safety Shoes, High Visibility Vests/Clothing, Sunblock and Repellants, neoprene/nitrile gloves, sampling equipment, sample containers.	Occupational Training (APP/SSHP), 30 Hour OSHA Construction Safety, First Aid/CPR, Daily Safety briefings, Weekly/Monthly Safety Training (As required), Excavation Competent Person	SSHO/QC Daily Site Inspections, Fire Extinguishers (Monthly), First Aid Kits (Monthly), GFCLs (Monthly).					

Activity Hazard Analysis (AHA)

Activity/Work Task 4: Site Restoration / Demobilization		Overall Risk Assessment Code (RAC) (Use highest code)					M
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix					
		Probability					
Date Prepared: Jul-12	Severity	Frequent	Likely	Occasional	Seldom	Unlikely	
Prepared by (Name/Title): Gregory Birch / PM	Catastrophic	E	E	H	H	M	
Reviewed by (Name/Title): Ed Kearney / SHM	Critical	E	H	H	M	L	
	Marginal	H	M	M	L	L	
		Negligible	M	L	L	L	
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				RAC Chart	
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E = Extremely High Risk	
						H = High Risk	
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.					
		M = Moderate Risk					
		L = Low Risk					
Job Steps	Hazards	Controls				RAC	
Site Restoration / Demobilization -Backfill excavation areas -Topsoil and seed effected areas -Remove remaining materials, equipment, and temporary facilities	Heavy equipment operation hazards (rollover, pinch points, striking hazards, tight work areas, etc.)	Inspect equipment and document on inspection form prior to operating onsite; Check for operational and back-up alarms; Operator's look before backing; Stay clear and do not allow personnel to be in the area of moving parts; Operator's training verification; Load and unload containers on a level surface; Establish communication between operator and other workers; Operate at safe speeds; Watch for changed conditions; use a spotter				M	
	Hydraulic pump malfunctions (Fluid spray, leak, etc.)	Provide training to the manufacturer's specifications on operations of hydraulic systems. Inspect equipment before operation. Spill kit and PPE on site.				L	
	Slips, trips, and falls, uneven work surfaces, wet surfaces, housekeeping	Be cautious and use handrails when exiting/entering equipment (floating plant, equipment, etc.) Always maintain 3 points of contact; Watch for slip, trip and fall hazards; Keep ground surfaces clear of tripping hazards such as hoses, cords, boxes, and debris; Maintain good housekeeping; Look where walking; Maintain good balance; Use short steps when working on slippery surfaces; Wear adequate foot wear to meet conditions; Communicate safety hazard information during safety briefings; Establish site work zones.				L	
	Exposure to overhead and under ground utilities, power sources, or obstructions	Be aware of all overhead utility lines, power sources, and obstructions; Survey for overhead utilities before bringing equipment with high extensions; A minimum of 10 feet safety clearance must be maintained at all times; Anytime there is a potential to come within 10 feet of a power source/obstruction, a spotter MUST be used; Uderground utility location and marking will be completed by NJ One call prior to work; utilization of lockout/tagout as required. <i>NOTE: Serious injury or death may occur as a result of contacting overhead utilities, power sources, or obstructions. NO WORK SHALL BE PERFORMED WHERE OVERHEAD UTILITIES, POWER SOURCES, OR OBSTRUCTIONS ARE PRESENT WITHOUT PRIOR APPROVAL FROM THE SSHO.</i>				M	
	Twisting motions and/or lifting. Ergonomic hazards may exist when performing tasks such as hooking/unhooking lifting cable hooks on loads/materials; material handling tasks; lifting (i.e. hand injuries, etc.)	Use correct motion/lifting techniques, as well as proper body placement/alignment; recommend pre-shift/pre-task stretching; wear work gloves when handling materials; watch for items that can cut, punture, pinch, or crush; always use proper techniques; use kevlar gloves for handling sharp instruments/materials, leather gloves for handling heavy objects, grippy gloves for slippery or wet conditions.				L	
	Inclement weather and adverse environmental conditions (i.e. lightning, reduced visibility due to fog, heavy rain, etc.)	Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. Operate equipment at appropriate speeds to meet the changing conditions. Wait 30 minutes after an observed lightning event. Personnel are to seek shelter in place or in designated assembly locations communicated during safety briefings.				L	
	Equipment and vehicular traffic	Operate at appropriate speeds to meet the conditions and use extreme caution; be aware of other drivers on the roads and their actions; have ground personnel wear high visibility garments; do not cross paths of moving equipment; or walk behind equipment without permission; keep out of traffic areas when possible. Follow traffic control instructions.				L	
	Hand and power tools/equipment	Use proper hand and/or power tool for the job; Use GFCIs for power tool operation; Use safety glasses; DO NOT use damaged tools; Properly secure materials when working on them; make sure the work area is adequately clear when using equipment; inspect electrical cords; defective equipment will be tagged and removed from service; ABC fire extinguishers will be onsite				L	

Activity Hazard Analysis (AHA)

Activity/Work Task 4: Site Restoration / Demobilization		Overall Risk Assessment Code (RAC) (Use highest code)				M
Project Location: NWIRP Bethpage, NY		Risk Assessment Code (RAC) Matrix				
Date Prepared: Jul-12		Probability				
Severity		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Gregory Birch / PM		Catastrophic	E	E	H	H
Reviewed by (Name/Title): Ed Kearney / SHM		Critical	E	H	M	M
		Marginal	H	M	L	L
		Negligible	M	L	L	L
Notes: (Field Notes, Review Comments, etc.)		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)				
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				RAC Chart
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E = Extremely High Risk
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				H = High Risk
		M = Moderate Risk				
		L = Low Risk				
Job Steps	Hazards	Controls				RAC
	Biological hazards (i.e. insects, snakes, rodents, poisonous plants, etc.)	Inspect and shake out PPE as necessary. Be alert to insects and snakes that may be present in the work area as well as in your equipment or PPE. Wear sleeved shirts, long pants, and gloves. Avoid contact with unprotected skin and facial areas. Insect repellent with DEET and IVY BLOCK will be available at the work site for protection for insects and poisonous plants.				L
Equipment to be Used		Training Requirements/Competent	Inspection Requirements			
Excavator, Backhoe, Generators, Power/Hand Tools, GFCIs, Field Trailer, Portable Toilets, First Aid Kit, Spill Kit, ABC Fire extinguishers, Hardhats, Safety Glasses, Safety Shoes, High Visibility Vests/Clothing, Sunblock and Repellants.		Indoctrination Training (APP/SSHP), 30 Hour OSHA Construction Safety, First Aid/CPR, Daily Safety Briefings, Weekly/Monthly Safety Training (As required).	SSHO/QC Daily Site Inspections, Heavy Equipment (Daily), Power Cord Sets (Daily), Power/Hand Tools (Daily), Fire Extinguishers (Monthly), First Aid Kits (Monthly), GFCIs (Monthly).			

ATTACHMENT E
COMPLETED CHECKLIST (EM 385-1-1)

ACCIDENT PREVENTION PLAN REVIEW CHECKLIST

Contract No:

N40085-12-D-1717

Description:

NWIRP BETHPAGE SITE 1 UNDERGROUND STORAGE TANK REMOVAL
--

Transmittal #

--

Plan Is (Check One)

Acceptable

Unacceptable

ITEMS REQUIRED IN ACCIDENT PREVENTION PLAN (CIRCLE AS APPLICABLE)

(NOTE: If any statement in a REQUIRED plan or section = N then the plan is UNACCEPTABLE)

LEGEND:

Y= Yes **N**= No **A**= Acceptable **U**= Unacceptable **R**= Required **NR**= Not Required

1. Signature Sheet (Required)

Y	N
<input checked="" type="checkbox"/>	<input type="checkbox"/>

a. Includes the name, signature, and title of the Plan Preparer (corporate safety staff person)

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

b. Includes the name, signature, and title of the Plan Approver, e.g., owner, company president, regional vice president (HTRW activities require approval of a CIH. A CSP may approve the plan for operations involving UST removal where contaminants are known to be petroleum based products.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

c. Includes the name(s), signature(s), and title(s) for Plan Concurrence (provide concurrence of other applicable corporate and project personnel e.g. Chief of Ops, Chief of Safety, Corporate IH, Project Manager or superintendent, project safety personnel, project QC)

2. Background Information (Required)

Y	N
<input checked="" type="checkbox"/>	<input type="checkbox"/>

a. Includes Contractor Name

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

b. Includes Contract Number

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

c. Includes Project Name

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

d. Includes Brief Project Description and Description of Work to be performed

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

e. Includes Location of the Project (map)

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

f. Includes Anticipated Phases of Work - these will require an AHA

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

g. Includes the Contractor Accident Experience Modification Rate (EMR) or a copy of completed OSHA 300 form or equivalent)

3. Statement of Safety and Health Policy (Required)

Y	N
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Includes a copy of a current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The contractor's written safety program goals, objectives, and accident experience goals for this contract.

4. Responsibilities and Lines of Authorities (Required)

Y	N	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Includes a statement of the employer’s ultimate responsibility for the implementation of his SOH program
<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Includes the identification and accountability of personnel for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes. Qualifications shall include the OSHA 30-hour course or equivalent course areas as listed here: (1) OSH Act/General Duties Clauses; (2) 29CFR 1904, Recordkeeping; (3) Subpart C: General Safety and Health Provisions, Competent Person; (4) Subpart D: Occupational Health and Environmental Controls (5) Subpart E: PPE, types and requirements for use (6) Subpart F: understanding fire protection in the workplace (7) Subpart K: Electrical (8) Subpart M: Fall Protection (9) Rigging, welding, and cutting, scaffolding, excavations, concrete and masonry, demolition; health hazards in construction, materials handling, storage and disposal, hand and power tools, motor vehicles, mechanized equipment, marine operations, steel erection, stairways and ladders, confined spaces or any others that are applicable to the work being performed
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Includes names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached. The District SOHO will review the qualifications for acceptance.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Includes requirements that no work shall be performed unless a designated competent person is present on the job site.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	e. Includes requirements for pre-task safety and health analysis
<input checked="" type="checkbox"/>	<input type="checkbox"/>	f. Includes Lines of Authority
<input checked="" type="checkbox"/>	<input type="checkbox"/>	g. Includes policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violations of safety requirements) should be identified; and company’s safety incentive programs
<input checked="" type="checkbox"/>	<input type="checkbox"/>	h. Includes written company procedures for holding managers and supervisors accountable for safety

5. Subcontractors and Suppliers – If applicable, provide procedures for coordinating SOH activities with other employers on the job site

Y	N	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Includes the identification of subcontractors and suppliers (if known)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Includes the means of controlling and coordination subcontractors and suppliers
<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Includes the safety and responsibilities of subcontractors and supplies
<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Includes the methods of addressing subcontractor safety plans

6. Training (Required)

Y	N	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Includes the list of subjects to be discussed with employees at safety indoctrination
<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Includes the list of mandatory training and certifications applicable to this project (e.g., explosive actuated tools, confined space entry, crane operator, diver, vehicle operator, HAZWOPER training and certification, PPE)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Includes the identity requirements for emergency response training. See paragraph 11.b below for a list of requirements that may require emergency response training.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Includes procedures for periodic safety and health training for supervisory and employee safety training (meetings).

7. Safety and Health Inspections (Required)

Y N

- a. Includes specific assignments of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: who will conduct (e.g., SSHO, PM, safety professional, QC, etc) – depends on level of technical proficiency needed to perform said inspection, proof of inspectors training/qualifications,
- b. Indicates when inspections will be conducted (minimum every 2 weeks)
- c. Includes procedures for documentation
- d. Indicated deficiency tracking system and follow-up procedures
- e. Includes any external inspections/certifications which may be required (e.g., USCG)

8. Accident Reporting - The contractor shall identify person(s) responsible to provide the following: **(Required)**

Y N

- a. The plan identifies who shall complete the Exposure data (man-hours worked), how, and when, and who it's submitted to
- b. Accident investigations, reports, and logs: Report all accidents as soon as possible but not more than 24 hours afterwards to the Contracting Officer/Representative (CO/COR). The contractor shall thoroughly investigate the accident and submit the findings of the investigation along with appropriate corrective actions to the CO/COR in the prescribed format as soon as possible but no later than five (5) working days following the accident. Implement corrective actions as soon as reasonably possible;
- c. The following require immediate accident notification:
 - (1) A fatal injury;
 - (2) A permanent total disability;
 - (3) A permanent partial disability;
 - (4) The hospitalization of three or more people resulting from a single occurrence;
 - (5) Property damage of \$500,000 or more.

9. Medical Support (Required)

Y N

- a. On-site medical support is completely addressed
- b. Off-site medical arrangements are completely addressed
- c. Approximate driving time and map to nearest hospital or emergency physician is included
- d. Includes the list of names and dates of first aid and CPR training for at least two (2) employees on site, except when within 5 mins. of medical facility or physician.

10. Personal Protective Equipment (PPE) (Required)

Y N

- a. Plan includes procedures identifying who will be conducting hazard assessments
- b. Plan includes procedures identifying when hazard assessments will be conducted.
- c. Plan includes procedures identifying how hazard assessments will be conducted.
- d. Plan includes how the contractor will ensure users of personal protective and safety equipment (PPE) are trained to know the following: when PPE, and what PPE, is necessary; how properly to don, doff, adjust, and wear PPE; limitations of the PPE; and proper care, inspection, testing, maintenance, useful life, storage, and disposal of the PPE.
- e. Includes a procedure for when the employer has reason to believe that any affected employee who has been trained does not have the understanding and skill required of the training, the employer shall retrain the employee.
- f. Includes a written certification that identifies the name of each employee trained, the date(s) of the training, and the subjects taught.

11. PLANS (PROGRAM, PROCEDURES) REQUIRED BY THE SAFETY MANUAL (to be added by appendix to the plan as applicable to this project; see APPENDIX "A" of EM 385-1-1 for specific

A

U

NR

b (2) . Emergency Response Plan (MARINE EMERGENCIES) If Required, it must include fire, sinking, flooding, man overboard, severe weather, hazardous material incidents (Section 19.A.04)

- 1.) Is in writing.
- 2.) Includes a method for reviewing with all affected employees.
- 3.) Includes a test procedure to ensure their effectiveness.
- 4.) Includes escape procedures and routes.
- 5.) Includes critical plant operations.
- 6.) Includes employee accounting following an emergency evacuation.
- 7.) Includes rescue and medical duties.
- 8.) Includes posting of emergency phone numbers and a means of reporting emergencies.
- 9.) Includes persons to be contacted for information or clarification.
- 10.) Is integrated with off-site emergency support.
- 11.) Includes a process of evaluation of operations, materials, and equipment involving potential exposure to hazardous substances, agents, or environments by a qualified industrial hygienist, or other competent person, to formulate a hazard control program.
- 12.) Includes a method to ensure that the hazard evaluation program is approved by the designated authority before the start of operations.
- 13.) Includes a method to ensure that emergency phone numbers are conspicuously placed for all employees to access.

A

U

NR

c. Written Hazard Communications Program (06.B.01)

a. Hazardous or Toxic Agent Inventory. A list of the hazardous or toxic agents with the following information:

- (1) Explanation of how the agents are to be used at the project.
- (2) For emergency response purposes, approximate quantities (e.g., liters, kilograms, gallons, pounds) that will be on site at any given time shall be provided for each material.
- (3) A site map will be attached to the inventory showing where inventoried substances are stored.
- (4) The inventory and site map will be updated as frequently as necessary to ensure accuracy.

b. Hazardous or Toxic Agent Labeling.
c. Material Safety Data Sheet (MSDS) Management. Procedures to ensure MSDSs are maintained at project site for each agent.

- (1) Employees shall review MSDSs for specific safety and health protection procedures.
- (2) Applicable information contained in the MSDS shall be incorporated in the AHA/PHAs or MSDS can be attached to the AHA/PHA for activities in which material will be used.
- (3) The information will be followed in the use, storage, and disposal of material and selection of hazard control and emergency response measures.

d. Employee Information and Training. Procedures to ensure employees are trained initially and periodically when use of hazardous or toxic agents is altered or modified to accommodate changing on-site work procedures. Training shall cover the following topics:

- (1) Requirements and use of the hazcom program on the project;
- (2) The location of all hazardous or toxic agents at the project;
- (3) Identification and recognition of hazardous or toxic agents on the project;
- (4) Physical and health hazards of the hazardous or toxic agents pertinent to project activities;
- (5) Protective measures employees can implement when working with project-specific hazardous or toxic agents.

A

U

NR

d. Written Respiratory Protection Plan (05.G.03). The program shall be in accordance with the requirements contained in this section, the

OSHA respirator standards, ANSI Z88.2, *NIOSH Respirator Decision Logic* (Department of Health and Human Services NIOSH Publication No. 87-108) and, for work around identified or suspected military chemical agent operations, AR 11-34.

- | | | | |
|-------------------------------------|--------------------------|--|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 1.) The program is site specific. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 2.) Methods used to identify and evaluate workplace respiratory hazards; |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 3.) Includes the selection of respiratory protective equipment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 4.) Includes the fit testing of respiratory protective equipment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 5.) Includes the proper use of respiratory protective equipment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 6.) Includes the maintenance of respiratory protective equipment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 7.) Includes procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 8.) Includes the training requirements for personnel required to use respiratory protective equipment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 9.) Includes a method to determine if employees are physically and medically qualified to wear respiratory protection devices. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 10.) Includes the project/facility specific voluntary use guidelines and a requirement for voluntary users to learn and understand the contents of 29 CFR 1910.134, Appendix D, Information for Employees Using Respirators When not Required Under the Standard. |

A	U	NR
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

e. Health Hazard Control Program (06.A.02)

- | | | | |
|-------------------------------------|--------------------------|--|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 1.) Includes a method to ensure all operations, materials, and equipment will be evaluated to determine the presence of hazardous environments or if hazardous or toxic agents could be released into the work environment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 2.) The activity and/or position hazard analysis is used for the evaluation. If so, the analyses shall identify all substances, agents, and environments that present a hazard and recommend hazard control measures. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 3.) The analyses identifies that it serves as certification of hazard assessment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 4.) The analysis identifies the workplace and activity evaluated. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 5.) The analysis identifies the name of the person certifying that the evaluation has been performed. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 6.) The analysis identifies date of the evaluation. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 7.) The analyses identifies operations, materials, and equipment involving potential exposure to hazardous substances, agents, or environments and that they shall be evaluated by a qualified industrial hygienist, or other competent person, to formulate a hazard control program. |

A	U	NR
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

f. Lead Abatement Plan (06.B.05 & specifications)

Submit to COR who will in turn submit to District Safety and Occupational Health Manager for review.

A	U	NR
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

g. Asbestos Abatement Plan (06.B.05 & specifications)

Submit to COR who will in turn submit to District Safety and Occupational Health Manager for review.

A	U	NR
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

h. Radiation Safety Program (06.E.03a)

Submit to COR who will in turn submit to the District Safety and Occupational Health Manager for review.

- | | | | |
|-------------------------------------|--------------------------|--------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | emergency services, for rescuing entrants from PRCSS, and for preventing unauthorized personnel from attempting a rescue. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 16.) The program includes employee training requirements, instructor certification, date of training and personnel receiving the training. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 17.) Includes practice training where each member of the rescue team/emergency makes practice PRCSS rescues at least once every 12 months. That simulate the configurations and hazards of the PRCSS from which rescue is to be performed. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 18.) Includes all aspects of off-site rescue and emergency services. |

A	U	NR
----------	----------	-----------

- | | | | |
|-------------------------------------|--------------------------|--------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Hazardous Energy Control Plan (lockout/tagout) (12.A.12) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (1) Includes a statement of the intended use of the procedure. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (2) Includes a means of coordinating and communicating hazardous energy control activities |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (3) Includes procedural steps and responsibilities for shutting down, isolating, blocking, and securing systems to control hazardous energy. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (4) Includes procedural steps and responsibilities for the placement, removal, and transfer of lockout and tagout devices. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (5) Includes procedural steps and responsibilities for placing and tagging, and moving or removing and untagging, protective grounds. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (6) Includes requirements for testing the system to verify the effectiveness of isolation and lockout and tagout devices. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (7) Includes a description of any emergencies which may occur during system lockout or tagout and procedures for safely responding to those emergencies. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (8) Includes requirements when authority for removal of hazardous energy control devices must be transferred from the authorized employee to another individual, and the names of the individuals qualified for receiving such transfer. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (9) Includes means of enforcement of compliance |

A	U	NR
----------	----------	-----------

- | | | | |
|--------------------------|--------------------------|-------------------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | m. Critical Lift Procedures (16.H) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1.) Critical lift procedure requires the plan to be prepared and documented before the lift by the crane operator, lift supervisor, and rigger. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2.) The critical lift procedure requires copy be provided to the designated authority. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3.) The critical lift procedure requires that the plan shall be reviewed and signed by all personnel involved with the lift. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4.) The critical lift procedure requires the plan to specify the exact size and weight of the load to be lifted and all crane and rigging components which add to the weight. The manufacturer's maximum load limits for the entire range of the lift, as listed in the load charts, shall also be specified. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5.) The critical lift procedure requires the plan to specify the lift geometry and procedures, including the crane position, height of the lift, the load radius, and the boom length and angle, for the entire range of the lift. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6.) The critical lift procedure requires the plan to designate the crane operator, lift supervisor and rigger and state their qualifications. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7.) The critical lift procedure requires the plan to include a rigging plan which shows the lift points and describes rigging procedures and hardware requirements. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8.) The critical lift procedure requires the plan to describe the ground conditions, outrigger or crawler track requirements, and, if necessary, the design of mats, necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift. For floating cranes or derricks, the plan describes the operating base (platform) condition and any potential list. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 9.) The critical lift procedure requires the plan to list environmental conditions under which lift operations are to be stopped. |

10.) The critical lift procedure requires the plan to specify coordination and communication requirements for the lift operation.

11.) The critical lift procedure requires, for tandem or tailing crane lifts, the plan to specify the make and model of the cranes, the line, boom, and swing speeds, and requirements for an equalizer beam.

A

U

NR

n. Floating Plant Contingency Plan for Severe Weather (19.A.03)

1.) The plan is part of the activity hazard analysis.

2.) The plan includes a description of the types of severe weather hazards the plant may potentially be exposed to and the steps which will be taken to guard against the hazards.

3.) The plan includes the time frame for implementing the plan (using as a reference the number of hours remaining for the storm to reach the work site if it continues at the predicted speed and direction), including the estimated time to move the plant to the safe harbor after movement is started.

4.) The plan includes the name and location of the safe location.

5.) The plan includes the name of the vessels which will be used to move any nonself-propelled plant, and their type, capacity, speed, and availability.

6.) The plan includes river gage readings at which floating plant must be moved away from dams, river structures, etc., to safe areas.

7.) The plan includes that USCG approved PFD (type I, II, III, or V) shall be worn by all personnel on decks exposed to severe weather, regardless of other safety devices used.

8.) The plan includes a sufficient number of vessels of adequate size and horsepower, each designed, outfitted, and equipped for towing service, shall be available at all times to move both self- and non self-propelled plant against tides, current, and winds during severe weather conditions.

9.) The plan includes how contractors working in an exposed marine location will monitor the NOAA marine weather broadcasts and will use other local commercial weather forecasting services as may be available.

A

U

NR

o. Float Plans (19.F.04)

1) The plan includes vessel information (make/model, or local identifier)

2) The plan includes the number of personnel on-board

3) The plan includes the activity to be performed

4) The plan includes the expected time of departure, route, and time of return

5) The plan includes the adequate means of communication

A

U

NR

p. Access and Haul Road Plan (04.B.01)

1.) The plan includes equipment usage, traffic density, and hours of operation.

2.) The plan includes road layout and widths, horizontal and vertical curve data, and sight distances.

3.) The plan includes sign and signalperson requirements, road markings, and traffic control devices.

4.) The plan includes drainage controls.

5.) The plan includes points of contact between vehicles and the public, and safety controls at these points of contact.

6.) The plan includes maintenance requirements, including roadway hardness and smoothness and dust control.

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	q. Demolition Plan (Engineering and Asbestos Surveys) (23.A.01) Submit to District Safety and Occupational Health Manager for review.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	r. Emergency Rescue (tunneling) (26.A) Submit to District Safety and Occupational Health Manager for review.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	s. Underground Construction Fire Prevention and Protection Plan (26.D.01) (1) The plan defines specific work practices to be implemented for preventing fires. (2) The plan includes response measures to be taken in case of fire to control and extinguish the fire. (3) The plan includes required equipment for fire prevention and protection. (4) The plan includes the personnel requirements and responsibilities for fire prevention and protection. (5) The plan includes the requirements for daily and weekly fire prevention and protection inspections. (6) The plan includes how it will be incorporated in either the accident prevention plan or the activity hazard analysis and posted at the job site. (7) The plan includes how it will be reviewed with all affected personnel as often as is necessary for them to maintain a working knowledge of emergency responsibilities and procedures.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	t. Compressed Air Plan (26.I.01) 1.) The plan includes requirements for a medical lock and its operation. 2.) The plan includes an identification system for compressed air workers. 3.) The plan includes communications system requirements. 4.) The plan includes requirements for signs and record keeping. 5.) The plan includes special compression and decompression requirements. 6.) The plan includes man lock and decompression chamber requirements. 7.) The plan includes requirements for compressor systems and air supply. 8.) The plan includes ventilation requirements. 9.) The plan includes electrical power requirements. 10.) The plan includes sanitation considerations. 11.) The plan includes fire prevention and fire protection considerations. 12.) The plan includes requirements for bulkheads and safety screens.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	u. Formwork and Shoring Erection and Removal Plans (27.C.02) Submit to District Safety and Occupational Health Manager for review.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	v. Lift Slab Plans (27.E.01) 1.) Lift-slab operations are planned and designed by a registered engineer or architect. 2.) Plans and designs include detailed instructions and sketches indicating the prescribed method of erection. 3.) Includes a requirement to submit the plans and designs to the Safety and Occupational Health Office for review.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	w. SHP and SSHP (28.B) Submit to COR who will in turn submit to District Safety and Occupational Health Manager for review. Will be reviewed by the EESS Section of HTRW

A	U	NR
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

x. Blasting Plan (29.A.01)

- 1.) The plan includes a method to obtain permission in writing from the Government's designated authority before explosive materials are brought on the job site (periodic replenishment of approved supplies does not require written approval).
- 2.) The plan includes a list the names, qualifications, and responsibilities of personnel involved with explosives.
- 3.) The plan delineates the contractor's requirements for handling, transportation, and storage of explosives.
- 4.) The plan includes loading procedures.
- 5.) The plan includes safety signals.
- 6.) The plan includes danger area clearance.
- 7.) The plan includes methods for securing the site.
- 8.) The plan includes vibration and damage control.
- 9.) The plan includes post-blast inspection and misfire procedures.
- 10.) The plan includes post-blast ventilation requirements.

<input type="checkbox"/>	<input type="checkbox"/>

A	U	NR
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

y. Diving Plan (30.A.14) Must be submitted to the Districts Dive Coordinator for review and acceptance.

- 1.) The plan includes the names and duties of dive team members, including diving supervisor.
- 2.) The plan includes the date, time, and location of the dive operation.
- 3.) The plan includes the diving mode to be utilized (SCUBA, surface-supplied air, etc.), giving a description of the backup air supply.
- 4.) The plan includes the nature of work to be performed by the divers and requirements for inspections.
- 5.) The plan includes the surface and underwater conditions, to include visibility, temperature, thermal protection, and currents.
- 6.) The plan includes the activity hazard analysis for each phase of work, to include the hazards associated with flying after diving.
- 7.) The plan includes the maximum depth and bottom time (altitude adjustments to dive tables shall be made for dives made at altitudes of 300 m (1000 ft) or more above sea level).
- 8.) The plan includes the emergency management plan, to include emergency procedures, means of notification, telephone numbers (for ambulance, doctors, and recompression chamber), and locations of evacuation route, nearest USCG rescue center, and emergency assistance.
- 9.) The plan includes the lockout/tagout procedures, including procedures for dealing with differential water pressures due to unequal water elevations.
- 10.) The plan includes the equipment certification, procedures, and checklists and requirements for special tools and equipment.
- 11.) The plan includes the following statement: "If for any reason the dive plan is altered in mission, depth, personnel, or equipment, the Baltimore District Diving Coordinator (DDC) shall be contacted and shall review any revision prior to actual operation."

<input type="checkbox"/>	<input type="checkbox"/>

A	U	NR
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

z. Plan for Prevention of Alcohol and Drug Abuse (Defense Federal Acquisition Regulation Supplement Subpart 252.223-7004, Drug-Free Work Force)(01.C.02)

- 1.) The program includes the following, or appropriate alternatives, employee assistance programs emphasizing high level direction, education, counseling, rehabilitation, and coordination with available community resources.
- 2.) The program includes the following, or appropriate alternatives, supervisory training to assist in identifying and addressing illegal drug use by Contractor employees.
- 3.) The program includes the following, or appropriate alternatives, provision for self-referrals as well as supervisory referrals to treatment with maximum respect for individual confidentiality consistent with safety and

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

<input checked="" type="checkbox"/>	<input type="checkbox"/>		security issues.
<input checked="" type="checkbox"/>	<input type="checkbox"/>		4.) The program includes the following, or appropriate alternatives, provision for identifying illegal drug users, including testing on a controlled and carefully monitored basis.
			5.) The program includes the following, or appropriate alternatives, appropriate personnel procedures to deal with employees who are found to be using drugs illegally. (Provisions of this clause pertaining to drug testing programs does not apply to the extent they are inconsistent with state or local law, or with an existing collective bargaining agreement; provided that with respect to the latter, the Contractor agrees that those issues that are in conflict will be a subject of negotiation at the next collective bargaining session.)
A	U	NR	aa. Excavation and Trenching (25.A.01)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1) Includes project conditions
<input checked="" type="checkbox"/>	<input type="checkbox"/>		2) Includes name and qualification of competent person
<input checked="" type="checkbox"/>	<input type="checkbox"/>		3) Includes diagram or sketch of work area
<input checked="" type="checkbox"/>	<input type="checkbox"/>		4) Includes the projected depth of excavation
<input checked="" type="checkbox"/>	<input type="checkbox"/>		5) Includes soil type and method of testing to determine type of soil
<input checked="" type="checkbox"/>	<input type="checkbox"/>		6) Includes the planned method of shoring, sloping and/or benching
<input checked="" type="checkbox"/>	<input type="checkbox"/>		7) Includes planned method for confined space entry, trench access/egress and atmospheric monitoring processes
<input checked="" type="checkbox"/>	<input type="checkbox"/>		8) Includes if required, the location of utility shut-offs
<input checked="" type="checkbox"/>	<input type="checkbox"/>		9) Includes methods for preventing damage to existing features
<input checked="" type="checkbox"/>	<input type="checkbox"/>		10) Includes the plan for management of excavated soil/asphalt/concrete
<input checked="" type="checkbox"/>	<input type="checkbox"/>		11) Includes plans for traffic control
<input checked="" type="checkbox"/>	<input type="checkbox"/>		12) Includes digging permits
<input checked="" type="checkbox"/>	<input type="checkbox"/>		13) Includes certification for UXO clearance
<input checked="" type="checkbox"/>	<input type="checkbox"/>		14) Includes plans for cofferdams (controlled flooding; fall protection; access/egress; and evacuation procedures)
A	U	NR	bb. Site Specific Fall Protection & Prevention Plan (Section 21.C)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
A	U	NR	cc. Steel Erection Plan (27.F.01)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
A	U	NR	dd. Night Operations Lighting Plan (7.A.08)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
A	U	NR	ee. Site Sanitation Plan (Section 2)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
A	U	NR	ff. Fire Prevention and Protection Plan (09.A.01)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
A	U	NR	gg. Wild Land Fire Management Plan (09.k)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
A	U	NR	hh. Pre-Cast Concrete Plan (27.D)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
A	U	NR	ii. Heat/Cold Stress Monitoring Plan ((06.I.02)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

12. **RISK MANAGEMENT PROCESSES.** Detailed project-specific hazards and controls shall be provided by an Activity Hazard Analysis (01.A.13) for each major phase/activity of work.

13. **ABBREVIATED APP for LIMITED-SCOPE SERVICE, SUPPLY AND R&D CONTRACTS.** If service, supply and R&D contracts with limited scopes are awarded, the contractor may submit an abbreviated Accident Prevention Plan. This APP shall address the following areas **at a minimum**. If other areas of the EM 385-1-1 are pertinent to the contract, the contractor must assure these areas are addressed as well.

a. Title, signature, and phone number of the plan preparer.

b. Background Information to include: Contractor; Contract number; Project name; Brief project description, description of work to be performed, and location (map); The project description shall provide a means to evaluate the work being done (see AHA requirements in 01.A.13) and associated hazards involved. Contractor's APP shall address the identified hazards involved and the control measures to be taken.

c. Statement of Safety and Health Policy detailing their commitment to providing a safe and healthful workplace for all employees.

d. Responsibilities and Lines of Authorities – to include a statement of the employer's ultimate responsibility for the implementation of his SOH program; Identification and accountability of personnel responsible for safety at all levels to include designated site safety and health officer (SSHO) and associated qualifications. The District SOHO will review the qualifications for acceptance.

e. Training - new hire SOH orientation training at the time of initial hire of each new employee and any periodic retraining/recertification requirements.

f. Procedures for job site inspections - assignment of responsibilities and frequency.

g. Procedures for reporting man-hours worked and reporting and investigating any accidents as soon as possible but not more than 24 hours afterwards to the Contracting Officer/Representative (CO/COR). An accident that results in a fatal injury, permanent partial or permanent total disability shall be immediately reported to the Contracting Officer.

h. Emergency Planning. Employees working alone shall be provided an effective means of emergency communication. This may be cellular phone, two-way radio or other acceptable means. The selected means of communication must be readily available and must be in working condition.

i. Drinking Water provisions, toilet and washing facilities.

j. First Aid and CPR training (at least two employees on each shift shall be qualified/certified to administer first aid and CPR) and provision of first aid kit (types/size).

k. Personal Protective Equipment.

(1) **WORK CLOTHING - Minimum Requirements.** Employees shall wear clothing suitable for the weather however minimum requirements for work shall be short-sleeve shirt, long pants work shoes. If analysis determines that safety-toed (or other protective) footwear is necessary (i.e., mowing, weedeating, chain saw use, etc), they shall be worn.

(2) **Eye and Face Protection.** Eye and face protection shall be worn as determined by an analysis of the operations being performed **HOWEVER**, all involved in chain saw use, chipping, stump grinding, pruning operations, grass mowing, weedeating and blowing operations shall be provided safety eyewear (Z87.1) as a minimum.

(3) **Hearing Protection.** Hearing protection must be worn by all those exposed to high noise activities (to include grass mowing and trimming, chainsaw operations, tree chipping, stump grinding and pruning).

(4) **Head Protection.** Hard hats shall comply with ANSI Z89.1 and shall be worn by all workers when a head hazard exists. At a minimum, hard hats shall be worn when performing activities identified in (2) above.

(5) **High Visibility Apparel** shall comply with ANSI/ISEA 107, Class 2 requirements at a minimum and shall be worn by all workers exposed to vehicular or equipment traffic.

(6) **Protective Leg chaps** shall be worn by all chainsaw operators.

(7) **Gloves of the proper type** shall be worn by persons involved in activities that expose the hands to cuts, abrasions, punctures, burns and chemical irritants.

(8) **If work is being performed around water and drowning is a hazard**, PFDs must be provided and worn as appropriate.

l. **Machine Guards and safety devices.** Lawn maintenance equipment must have appropriate guards and safety devices in place and operational.

m. **Hazardous Substances.** When any hazardous substances are procured, used, stored or disposed, a hazard communication program must be in effect and MSDSs shall be available at the worksite. Employees shall have received training in hazardous substances being used. When the eyes or body of any person may be exposed to corrosives, irritants or toxic chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within 10 seconds of the worksite.

n. **Traffic control** shall be accomplished in accordance with DOT's MUTCD.

o. **Control of Hazardous Energy (Lockout/Tagout).** Before an employee performs any servicing or maintenance on any equipment where the unexpected energizing or startup of the equipment could occur, procedures must be in place to ensure adequate control of this energy.

p. **Driving, working on (i.e., working with equipment/mowers) while on slopes, working from/in boats/skiffs, etc** shall also be considered and dealt with accordingly.

REMARKS: