N60200.AR.003959
NAS CECIL FIELD, FL
5090.3a

HEALTH AND SAFETY PLAN FOR OPERABLE UNIT 9 (OU 9) SITE 59 BUILDING 325/1845 AREA REMEDIAL INVESTIGATION NAS CECIL FIELD FL

9/1/2004

TETRA TECH NUS INC

Health and Safety Plan
For
Operable Unit 9, Site 59 – Bldgs. 324/1845 Area Remedial Investigation
at

Naval Air Station Cecil Field
Jacksonville, Florida

Southern Division
Naval Facilities Engineering Command
Contract No. N62467-94-D-0888
Contract Task Order 0359

September 2004

Revision 0
September 2004

HEALTH AND SAFETY PLAN
FOR THE
OPERABLE UNIT 9, SITE 59 – BLDGS. 324/1845 AREA REMEDIAL INVESTIGATION
at
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NO. N62467-94-D-0888
CONTRACT TASK ORDER 0359

September 2004

PREPARED UNDER THE SUPERVISION OF:

Mark P. Speranza

MARK P. SPERANZA, P.E.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMITTAL BY:

Matthew M. Soltis

MATTHEW M. SOLTIS, CIH, CSP
CLEAN HEALTH & SAFETY MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

TABLE OF CONTENTS

SECTION **PAGE**

1.0 INTRODUCTION 1-1
1.1 KEY PROJECT PERSONNEL AND ORGANIZATION 1-2
1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS 1-4

2.0 EMERGENCY ACTION PLAN 2-1
2.1 INTRODUCTION 2-1
2.2 EMERGENCY PLANNING - RECOGNITION/PREVENTION 2-2
2.3 SAFE DISTANCES AND PLACES OF REFUGE 2-4
2.4 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES 2-5
2.5 EMERGENCY CONTACTS 2-6
2.6 EMERGENCY ROUTE TO HOSPITAL 2-8
2.7 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT 2-9
2.7.1 Medical Data Sheet 2-9
2.7.2 Non-Life Threatening Medical Incidents 2-9
2.7.3 Life Threatening Injuries 2-9
2.7.4 Emergency Medical Treatment Protective Measures 2-10
2.8 PPE AND EMERGENCY EQUIPMENT 2-10
2.9 INJURY/ILLNESS REPORTING 2-1

3.0 SITE BACKGROUND 3-1
3.1 SITE HISTORY 3-1
3.2 CURRENT STATUS 3-1
3.3 SITE DESCRIPTION 3-1

4.0 SCOPE OF WORK 4-1

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION 5-1
5.1 MOBILIZATION/DEMOBILIZATION 5-1
5.2 MONITORING WELL INSTALLATION/SOIL BORINGS - ROTOSONIC AND DPT DRILLING METHODS 5-2
5.3 AQUIFER DEVELOPMENT/TESTING/SAMPING 5-4
5.3.1 Monitoring Well Development 5-4
5.3.2 Monitoring Well Sampling 5-5
5.3.3 Water Level Measurements 5-5
5.4 MULTI-MEDIA SAMPLING 5-7
5.4.1 Subsurface Soil Samples 5-7
5.5 GEOGRAPHICAL SURVEYING 5-7
5.6 DECONTAMINATION 5-8
5.6.1 Heavy Equipment 5-8
5.6.2 Sampling Equipment 5-8
5.7 WASTE MANAGEMENT 5-9
5.8 general safe work practices 5-11
5.9 drilling safe work practices 5-12
5.9.1 Before Drilling 5-12
5.9.2 Druing Drilling 5-14
5.9.3 After Drilling 5-14

TABLE OF CONTENTS

SECTION **PAGE**

6.0 HAZARD ASSESSMENT AND CONTROLS 6-1
6.1 CHEMICAL HAZARDS 6-1
6.2 PHYSICAL / NATURAL HAZARDS 6-2
6.3 NATURAL HAZARDS 6-3
6.3.1 Insect/Animal Bites and Stings 6-3
6.3.2 Ambient Temperature Extremes 6-6
6.3.3 Inclement Weather 6-7

7.0 AIR MONITORING 7-1
7.1 INSTRUMENTS AND USE 7-1
7.1.1 Photoionization Detector 7-1
7.1.2 LEL/O_2 Meter 7-1
7.1.3 Hazard Monitoring Frequency 7-1
7.2 INSTRUMENT MAINTENANCE AND CALIBRATION 7-2

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS 8-1
8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING 8-1
8.2 SITE-SPECIFIC TRAINING 8-1
8.2.1 Ramp Training (Air Side) at NASCF 8-2
8.3 MEDICAL SURVEILLANCE 8-2
8.3.1 Requirements for All Field Personnel 8-2

9.0 SITE CONTROL 9-1
9.1 EXCLUSION ZONE 9-1
9.1.1 Exclusion Zone Clearance 9-1
9.2 CONTAMINATION REDUCTION ZONE 9-2
9.3 SUPPORT ZONE 9-3
9.4 SAFE WORK PERMITS 9-4
9.5 SITE VISITORS 9-4
9.6 SITE SECURITY 9-5
9.7 SITE MAP 9-8
9.8 BUDDY SYSTEM 9-8
9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS 9-8
9.10 COMMUNICATION 9-8
9.11 SANITATION AND BREAK AREAS 9-9
9.11.1 Toilets 9-9
9.11.2 Potable Water 9-9
9.11.3 Showers and Change Rooms 9-10
9.11.4 Break Areas 9-10

TABLE OF CONTENTS

SECTION **PAGE**

10.0 SPILL CONTAINMENT PROGRAM 10-1
10.1 SCOPE AND APPLICATION 10-1
10.2 POTENTIAL SPILL AREAS 10-2
10.3 CONTAINMENT AREAS 10-2
10.3.1 Waste Storage 10-2
10.3.2 Flammable/POL Storage 10-3
10.4 MATERIALS HANDLING 10-3
10.5 LEAK AND SPILL DETECTION 10-3
10.6 PERSONNEL TRAINING AND SPILL PREVENTION 10-4
10.7 SPILL PREVENTION AND CONTAINMENT EQUIPMENT 10-4
10.8 SPILL CONTAINMENT/CONTROL RESPONSE PLAN 10-4

11.0 CONFINED-SPACE ENTRY 11-1

12.0 MATERIALS AND DOCUMENTATION 12-1
12.1 MATERIALS TO BE POSTED AT THE SITE 12-1

13.0 ACRONYMS/ABBREVIATIONS 13-1

ATTACHMENT I - INJURY/ILLNESS REPORTING
ATTACHMENT II - UTILITY LOCATION AND EXCAVATION CLEARANCE
ATTACHMENT III - EQUIPMENT INSPECTION CHECKLIST
ATTACHMENT IV SAFE WORK PERMITS
ATTACHMENT V MEDICAL DATA SHEETS
ATTACHMENT VI HEARING CONSERVATION
ATTACHMENT VII FIRE EXTINGUISHER USE AND APPLICATION

LIST OF TABLES

TABLE **PAGE**

2-1 EMERGENCY CONTACTS NAS CECIL FIELD 2-7
5-1 TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM 5-17
6-1 CHEMICAL/PHYSICAL/TOXICOLOGICAL PROPERTIES 6-2
6-2 TROPICAL STORM/HURRICANE RATING SCALE 6-8
6-3 TROPICAL STORM/HURRICANE WATCH AND WARNING 6-9

LIST OF FIGURES

FIGURE **PAGE**

2-1 MAP TO ST. VINCENTS' HOSPITAL 2-8
2-2 EMERGENCY RESPONSE PROTOCOL 2-12
7-1 DOCUMENTATION OF FIELD CALIBRATION 7-3
8-2 SITE-SPECIFIC TRAINING DOCUMENTATION 8-3
9-1 SAFE WORK PERMIT 9-7

1.0 INTRODUCTION

Authorization: This Health and Safety Plan (HASP) and the work described within are completed under the authorization of:

Contract:	Comprehensive Long-Term Environmental Action Navy (CLEAN III)
Contract Number:	N62467-94-D-0888
Contract Task Order:	0359
Statement of Work Number:	Not Available
Proposed Dates of Work:	To be determined

Application: This Health and Safety Plan (HASP) has been written to encompass site activities that are to be conducted at properties associated with Naval Air Station Cecil Field (NASCF), located in Jacksonville, Florida, as part of Contract Task Order (CTO) 0359. Specifically, this HASP addresses the remedial investigation activities to be conducted at Operable Unit 9, Site 59 – Bldgs. 324/1845 Area located at the former Naval Air Station Cecil Field (NASCF).

It is the intent and purpose of this HASP to provide project organization and responsibilities, as well as policy, procedures, safe work practices, and guidelines necessary to protect site workers, and the general population from chemical, physical, and biological hazards that may be associated with the planned site activities. It is through the execution of the elements defined within this HASP that efforts will be directed to minimize potential incidents and associated injury.

Site activities to be conducted at NASCF, operable Unit 9, Site 59 Buildings 324/1845 Area include the following:

- Mobilization/demobilization
- Monitoring Well Installation/Construction. Methods employed include:
  - Rotosonic Drilling (Employed for deep well depths and soil core profiling)
  - Direct Push Drilling Technique (DPT) (Employed for temporary well installation and shallow subsurface soil sampling)

- Multi-media Sampling including:
  - Soil sampling. Geotechnical samples will be acquired during well installation at 4 designated locations (2 shallow wells and 2 intermediate wells)
  - Ground water sampling. This activity includes Natural Attenuation Sampling, ground water level measurements, and aquifer testing [specific capacity (SPECAP)]

- Equipment (Heavy and sampling) decontamination

- Land surveying of sample locations and newly installed permanent wells as well as soil sampling locations.

- Investigation derived waste (IDW) handling and disposal

Elements of this HASP are supported through the use of the Tetra Tech NUS, Inc. Health and Safety Guidance Manual (HSGM). Both documents must be on-site to accomplish compliance.

Compliance: The elements of this HASP are intended to be in compliance with the requirements established by:

- Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER)
- Applicable sections of 29 CFR 1926 "Safety and Health Regulations for Construction."
- Tetra Tech NUS (TtNUS) Health and Safety Program
- Applicable City of Jacksonville and Jacksonville Port Authority policy and procedures

Modifications/Changes: The following conditions are considered sufficient basis for change and will serve as trigger to institute review and possible changes to this document.

- The addition of activities outside of those specified in Section 4.0, Scope of Work.
- Task Modifications to those activities specified within Section 4.0, Scope of Work.
- New information becomes available through the course of the investigation and/or from outside sources.

All changes to this HASP will be requested through the TtNUS Task Order Manager (TOM) to the TtNUS Health and Safety Manager (HSM). It is the responsibility of the TOM to notify all affected personnel of all changes to this HASP.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in on-site activities. Personnel assigned to these positions will exercise the primary responsibility for all on-site health and safety. These persons will be the primary points of contact for any

questions regarding the safety and health procedures and the selected control measures that are to be implemented for on-site activities.

- The TtNUS TOM is responsible for the overall direction of health and safety for this project.

- The Project Health and Safety Officer (PHSO) is responsible for developing this HASP in accordance with internal (Tetra Tech NUS, Inc. Health and Safety Program) and external requirements (Federal and State Regulatory requirements).

- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed Site Safety Officer. The FOL manages field activities, executes the work plan, and enforces safety procedures, as applicable to the work plan.

- The Site Health and Safety Officer (SHSO) supports site activities by advising and assisting the FOL on all aspects of health and safety on-site defined in this HASP and accordance with internal and external requirements.

- Compliance with the requirements stipulated in this HASP are monitored by the SHSO and coordinated through the TtNUS CLEAN HSM and PHSO.

NOTE: in some cases one person may be designated responsibilities for more than one position. For example, at NAS Cecil Field, the FOL may also be responsible for the SHSO duties. This action will be performed only as credentials, experience, and availability permits**.**

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Naval Air Station - Cecil Field (NASCF) **Address:** Jacksonville, Florida

U.S. Navy Remedial Project Manager (RPM): Mr. Mark Davidson **Phone Number:** (803) 820-5526

NASCF Site Contact:

Jacksonville Airport Authority Portion Rusty Chandler - Cecil Field Manager	(904) 573-1613 RusselC@jaa.aero
Diana Stone – NAS Cecil Field Facilities Manager	(904) 573-1604 (904)759-1213 (cell) (904)771-9186 (fax) dianast@jaxairports.org
City of Jacksonville (EDC) Andy Echardt Ralph Hogan	 (904) 573-1604 (904) 630-1223

Project Team:

TtNUS Personnel:	Discipline/Tasks Assigned:	Phone #/E-mail:
Mark Speranza, P.E.	Task Order Manager	(412) 921-8916 speranzam@ttnus.com
Mark Jonnet	Deputy Task Order Manager	(412) 921-8622 jonnetm@ttnus.com
David Siefken	Field Operations Leader (FOL)	(904) 636-6125 siefkend@ttnus.com
TBD	Site Health Safety Officer (SHSO)	( )
Matthew M. Soltis, CIH, CSP	CLEAN Health & Safety Manager	(412) 921-8912 soltism@ttnus.com
Thomas Dickson, CSP	Project Health & Safety Officer	(412) 921-8457 dicksont@ttnus.com
Mervin Dale, P.G.	TtNUS Access/Security Liasson/ Project Coordinator	(904) 281-0400 dalem@ttnus.com Pager (800) 471-6451

Non-TtNUS Personnel:	Affiliation/Discipline/Tasks Assigned:	Phone Number
TBD	Analytical Laboratory	
TBD	Concrete Coring	
TBD	Surveyor (Geographical)	
	DPT/Drilling Subcontractor	

FedEx	Sample/Parcel Delivery	1(800) 463-3339

Hazard Assessments (for purposes of 29 CFR 1910.132) and HASP preparation conducted by:

Thomas M. Dickson, CSP

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section of the HASP is part of a preplanning effort to direct and guide field personnel in the event of an emergency. The first measure in accomplishing this objective is to define what is (and what is not) an emergency.

An emergency as defined in 1910.120 is:

> *An occurrence or condition that can or has resulted in an uncontrolled release of a hazardous substance or potential safety hazard (i.e., fire, explosion, and chemical exposure) associated with that release.*

Incidental releases are <u>not</u> emergencies. An incidental release as defined in 1910.120 is:

> *The releases of a hazardous substance that can be absorbed, neutralized, or otherwise controlled and will not result in potential safety hazard (i.e., fire, explosion, chemical exposure) are not considered emergency responses.*

Based on the above definitions, TtNUS will, through necessary services, provide initial response measures for incidents such as:

- Initial fire-fighting support and prevention.
- Initial spill control and containment measures and prevention.
- Removal of personnel from emergency situations.
- Provision of initial medical support for injury/illness requiring only first-aid level support.
- Provision of site control and security measures, as necessary.

Incidents and conditions above this level of participation are and will be considered emergencies. These events are considered beyond the capabilities of field personnel and available resources to provide emergency response safely. Therefore, the emergency response agencies listed in this plan are capable of providing the most effective response and will be designated as the primary responders in the event of an emergency. These agencies are located within a reasonable distance (within 5 minutes) from the area of site operations, which ensures adequate emergency response time.

This Emergency Action Plan conforms to the requirements of 29 Code of Federal Regulations (CFR) 1910.38(a), as allowed in 29 CFR 1910.120(l)(1)(ii). The FOL and/or the SHSO shall serve as the

Emergency Action Plan Administrators. All inquiries regarding the implementation of this Emergency Action Plan should be directed to them.

2.2 EMERGENCY PLANNING – RECOGNITION/PREVENTION

As part of the pre-planning effort, an initial hazard/risk assessment was conducted to identify potential emergency scenarios/conditions associated with planned site activities. Based on this hazard/risk assessment the conclusion was that there is very minor potential for injury or illnesses resulting from exposure to chemical, physical, or other hazards, and subsequently little likelihood of emergency situations.

It is recognized that during subsurface investigative measures that the following conditions could result in an emergency situation:

Potential Emergency: Damaging an underground utility.
Planned Control Measure: Utility location and clearance in accordance with facility and TtNUS Utility Locating and Excavation Clearance procedures. See also Potential emergencies Physical hazards associated with drilling provided below.

Potential Emergency: Physical hazards associated with tenant and Flight line operations.
Planned Control Measure: The FOL and/or the SHSO shall ensure all personnel are familiar with the boundaries of the TtNUS work zones, approach pathways, and areas where the Tenant has requested restrictions (i.e., near aircraft, hangar doors, within vehicles approach routes, etc.). In addition, all personnel within these areas will have attended Ramp School and will understand operational protocol for these areas.

Potential Emergency: Physical Hazards associated with drilling operations including

- Struck by – Movement in and around operating equipment
- Entanglement into rotating equipment
- Energized systems

Planned Control Measure - Site Surveys

As part of early recognition the FOL and/or the SHSO will conduct the following activities

- An initial site walk through will be conducted prior to the commitment of personnel or equipment. The purpose of this walk through will be to
  - Examine the site for conditions that may predispose field personnel to potential hazards including

- The existence of overhead power sources near where the drill rig will operate
- Surface monuments indicating underground utilities in the area (manhole covers, valve boxes, etc.)
- Areas that may require alterations of traffic patterns or scheduling when the work will be conducted.
- Physical hazards within the work area.

- Periodic operations surveys – The FOL and/or the SHSO will conduct these surveys for the purpose of
  - Ensuring field personnel are following protective measures specified within the HASP (specifically Table 5-1 and the Safe Work Permit).
  - Review the initial hazard assessments to insure they reflect the hazards as it may pertain to site specific conditions.
  - Prepare for Emergencies. This includes staging emergency equipment, adequate site control measures, identifying site personnel who will engage incidental response measures and reviewing what measures will be taken and when prior to declaring an emergency.

These surveys should be documented within the project logbook. The results of these surveys are not to be disciplinary in nature however identify areas of need improvement, where applicable. The results of these surveys are to be discussed with the field personnel. Results should also be forwarded to the PHSO with any recommendations from the field.

For additional control measures regarding these physical hazards, see Section 6.2 Physical Hazards, Table 5-1 Monitoring Well Installation, and Section 9.0 Site Control for identified control measures to minimize or eliminate these hazards.

Potential Emergency: Fire or explosion associated with the installation of the bedrock casing. This particular hazard/potential emergency will be only be pertinent if hot work (welding) is performed during the assembly of the bedrock casing.

Planned Control Measures: The following measures will be incorporated to minimize and/or eliminate this potential hazard.

- Use and application of a Hot Work Permit System. This will include atmospheric monitoring (action levels), use of welding/heat shields, fire watches, etc. to insure this operation does not result in a fire and/or explosion.

- Initial and periodic atmospheric evaluation/measurement using an LEL/O2 meter. This will be done to insure that atmospheric conditions suitable to support fire and/or explosion are not achieved.

- Coordination with the City of Jacksonville and/or Jacksonville Port Authority and/or tenants to insure that this operation does not adversely impact operations within the vicinity

In a general approach to further minimize or eliminate potential emergency situations, pre-emergency planning activities associated with this project shall be implemented. The FOL and/or the SHSO are responsible for:

- Coordinating response actions with City of Jacksonville ("Land Side") and Jacksonville Port Authority (JPA) ("Air Side") Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.

- Identifying a chain of command for emergency action. It is currently anticipated that the FOL and/or the SHSO shall serve as the Incident Coordinator(s) in/during initial response measures.

- Preview all work locations to remove and/or barricade to restrict access to potential physical hazards.

- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible. This process will take place during as part of site-specific training, the Safe Work Permit issuance for activities to be conducted, as well as, during the daily safety/operation briefing.

2.3 SAFE PLACES OF REFUGE/EVACUATION ROUTES/CRITICAL OPERATIONS

In the event incidental measures are unsuccessful containing an incident, emergency services will be contacted and the site will be evacuated. All personnel will immediately stop activities and report to a pre-determined safe place of refuge. The safe places of refuge selected are as follows:

These locations have been selected because they serve as a location from which approaching Emergency Services may be directed to the incident location. See Figure 2-1 Site Plan for these locations.

These locations will be conveyed to personnel as part pre-site training. There are no critical operations associated with this scope of work that would be required to be manned during an emergency. Therefore,

all will report to the refuge location during an emergency evacuation. Personnel will remain there until directed otherwise by the TtNUS FOL and/or the SHSO. The FOL and/or the SHSO will take a head count at this location to confirm the presence of all site personnel. Emergency response agencies will be notified of any unaccounted for personnel and their last known or suspected location.

2.4 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Emergency Action Notification Procedures:

Utility Contact or Damage

Electrical – If contact is made, it is important not to contact the ground surface and the drill rig at the same time. Cease all operations, contact the area contact or authority, provide security surrounding the rig until the power source can be de-energized.

Gas – Immediately shut down all operations; eliminate all ignition sources; Contact 911 and the area contact or authority; move to designated assembly point; conduct a head count.

Plumbing (water/sanitary/storm); communication - Immediately shut down all operations; Contact the area contact or authority; provide perimeter security until the authorities arrive; move to designated assembly point; conduct a head count.

Fire and/or spill

If fire/spill situation is judged to be greater than just incidental, do not attempt any response other than immediate evacuation/notification of proper response authorities. Incidental spills <55 gallons. Incidental fires – apparent that can be extinguished with one portable fire extinguisher for incidental fires/spills, the following procedures are authorized.

Engage defensive measures, employ fire extinguishers or spill containment, as appropriate to control the release and/or fire.

Notify the FOL and/or the SHSO by verbal or radio communication regarding any incident or near incident.

Using members of the field crew, establish site security measures to restrict access to the area.

If the situation is controlled, the FOL and/or the SHSO will begin the Incident Investigation to determine cause and effect. All information will be gathered and incorporated on The Incident Report Form (Section 1.0 of the Health and Safety Guidance Manual) and provided to the HSM, TOM, and the PHSO.

Injury

Follow provisions specified in Section 2.8 of this HASP.

If the injury requires more than basic first aid response, the FOL and/or SHSO will enact emergency notification procedures to secure additional assistance in the following manner:

Dial 911 and then call other pertinent emergency contacts listed in Table 2-1 and report the incident. Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of the incident, as applicable. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

Note: All incidents and near incidents are to be reported to the PHSO and the HSM.

2.5 EMERGENCY CONTACTS

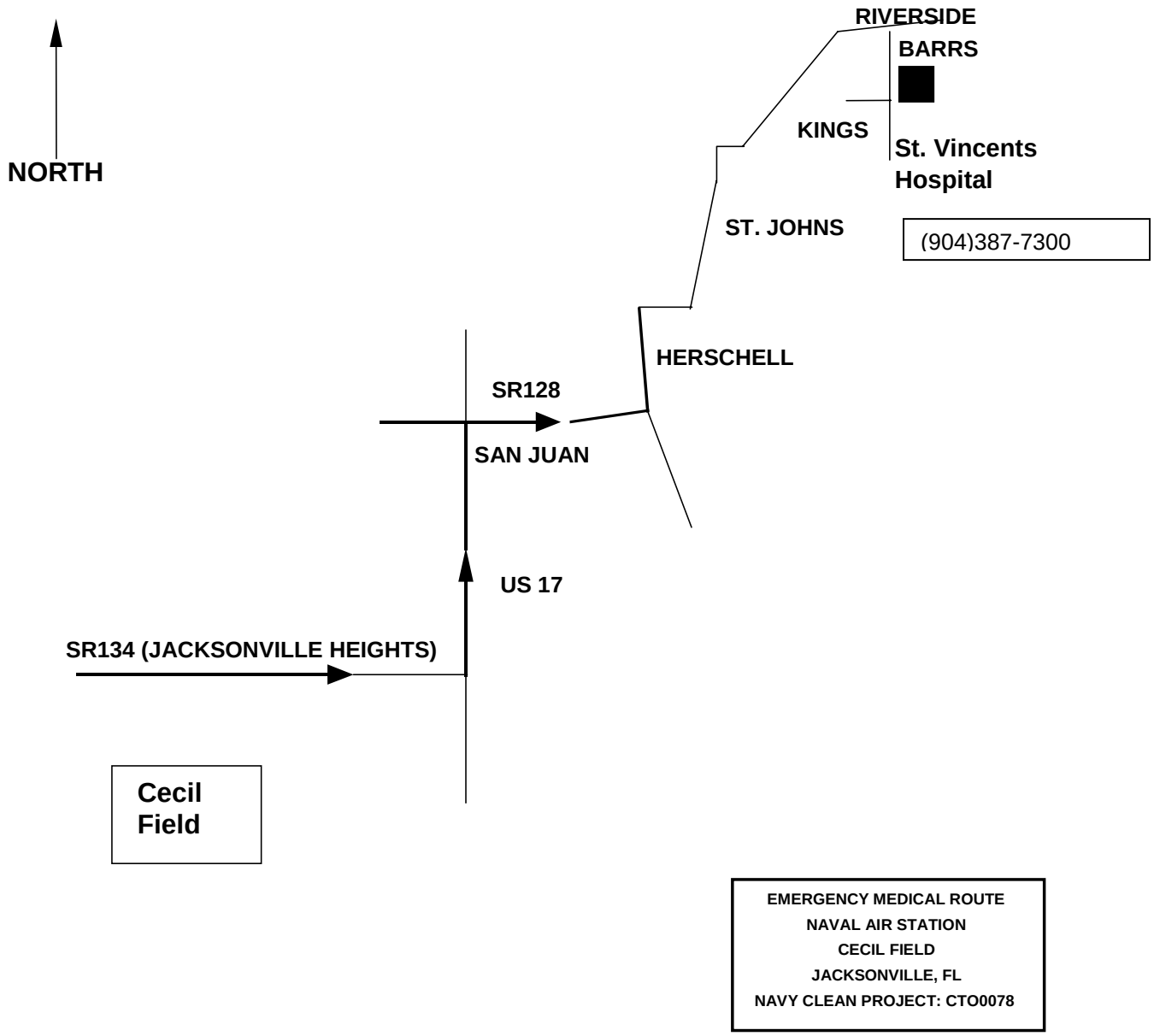
Prior to performing work at the site, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an incident. As indicated earlier, Table 2-1 provides a list of emergency contacts and their corresponding telephone numbers. This table along with maps to the hospital will be made readily available to all site personnel.

TABLE 2-1
EMERGENCY CONTACTS
NAS - CECIL FIELD, JACKSONVILLE, FLORIDA

CONTACT	PHONE NUMBER
EMERGENCY (Police, Fire, Ambulance Service)	**911**
City of Jacksonville Sheriff's Office (non-emergency)	(904) 630-7600
Primary Hospital - St. Vincent Hospital	(904)387-7300
Florida Poison Information Center - Jacksonville	(904) 549-4480
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
NAS - Cecil Field (Point-of-Contact) Ralph Hogan	(904) 771-6397
NAS-Flight Line Area Contact Diane Stone	(904) 573-1604
TtNUS, Pittsburgh Office	(412) 921-7090
TtNUS, Cecil Field Site Office	(904) 317-9199
Task Order Manager Mark Speranza, P.E.	(412) 921-8916
Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer Thomas Dickson, CSP	(412) 921-8457
Public Works (utilities, gas, water, sewage, telephone, fiber optics) Jacksonville Airport Authority Portion Rusty Chandler - Cecil Field Manager Diana Stone - Cecil Field Facilities Manager City of Jacksonville (EDC) Andy Echardt Ralph Hogan	 (904) 573-1613 RusselC@jaa.aero (904) 573-1604 904-759-1213 (cell) 904-771-9186 (fax) dianast@jaxairports.org (904) 630-1223 (904) 771-6397

Figure 2-1

Route to Hospital



2.6 EMERGENCY ROUTE TO HOSPITAL

1. Take SR 134 (Jacksonville Heights) approximately 8 miles to US 17, **Turn left (North) on U.S. 17**
2. Take US 17 approximately 2.5 miles to SR 128 (San Juan Ave.), **Turn right on San Juan**
3. Go east on San Juan approximately 1/4 mile to Herschell, **Turn left onto Herschell**
4. Herschell will then turn into St. Johns Ave., then St. Johns Ave. which will turn into Riverside. Take Riverside approximately 1 mile to King St., **Turn right on King Street**.

Hospital will be on the corner of King Street and Barrs.

2.7 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

Chemical hazards or emergencies associated with exposure to chemical hazards are not anticipated. During any site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination will not be performed if the incident warrants immediate evacuation.

2.7.1 Medical Data Sheet

In support of medical treatment, all personnel will be required to complete a Medical Data Sheet. Information to be contained on this Medical Data Sheet shall include any pertinent information regarding allergies to medications, current medications or restrictions, or other special conditions. The intent of this sheet is to provide information to medical services personnel in the event the employee is incapacitated. This information will permit medical services personnel to render more timely and effective treatment. A copy of the Medical Data Sheet may be found in Section 1.8.6 of the Health and Safety Guidance Manual and is available as part of the Mobilization/Demobilization Safe Work Packet in Attachment I.

2.7.2 Non-Life Threatening Medical Incident (Bruises, Cuts, Scrapes, Etc.)

The area of clothing or suit penetration will be isolated from the decontamination procedure by removing the protective garments or clothing surrounding the area of the injury and applying a light gauze wrap and plastic cover. Decontamination for unaffected areas will proceed as per Table 5-1 of this HASP.

2.7.3 Life Threatening Injuries

- Engage Emergency Notification Sequence, Notify off-site response agencies.
- If it will not endanger the injured individual (i.e., spinal cord injury, etc.) remove any outer PPE. Removal may require the use of bandage scissors to remove the outer garments. If this type of injury is suspected do not move injured person, notify emergencies services.
- Begin life saving techniques as appropriate [first aid, Cardio Pulmonary Resuscitation (CPR), cooling or warming regimens, etc.].
- Wrap the injured in a blanket for transport to the hospital.
- Follow instructions provided in Section 1.9.1 of the Health and Safety Guidance Manual.

Note: One person from the field team will accompany the injured to the hospital with his/her medical data sheet, appropriate MSDSs (if applicable), a copy of this HASP, and the incident forms. This person will collect as much information, as possible, and transfer that information to the HSM, TOM, and Work Care

as per the Incident Response Protocol provided in Section 1.9.1 and Section 1.9.2 of the Health and Safety Guidance Manual. All other personnel will engage site control/site security measures.

2.7.4 Emergency Medical Treatment Protective Measures

TtNUS and subcontractor personnel are only permitted to provide treatment to the level of their First-Aid Training. It should also be noted that all first aid shall be administered voluntarily. All First-Aid provided will incorporate the following protective measures:

Emergency medical treatment will be initiated under the following guarded restrictions:

- Take the necessary precautions to prevent direct contact with the injured person's body fluids. This may be accomplished through the employment of the following measures:
  - Use surgeons gloves when handling cuts, abrasions, bites, punctures, etc. or any part of the injured person. The use of safety glasses and surgeons masks maybe necessary if there is the potential for uncontrolled spread of body fluids. The PHSO will be immediately notified in event that personnel providing emergency first-aid has come into contact with body fluids or other potentially infectious tissues.
  - Should CPR be required, use a CPR Micro-Shield mouthpiece or a resuscitation bag when administering CPR to prevent contact with the injured person's body fluids.

In order to engage these protective measures the FOL and/or shall ensure that these items are part of their first-aid kit.

2.8 PPE AND EMERGENCY EQUIPMENT

First-Aid Kit – The SHSO will determine the minimum number of units necessary to insure the units are immediately available for all personnel. The first aid kits will meet the requirements of ANSI 308 for a standard Industrial First Aid Kit (it will indicate it meets this requirement on the kit). As indicated in Section 2.4.3 the first aid kit will also have

- Surgeons Gloves
- Surgeons Mask
- Safety Glasses
- CPR Pocket mask

Eye Wash Units (or bottles of disposable eyewash solution) – Will be readily (immediately) available to personnel handling sample containers with preservative, containers of natural attenuation reagents, and during well construction activities.

Fire Extinguisher - Fire extinguishers ABC Combination units will be maintained during any refueling operation or handling of flammable liquids, and hot work operations. The units must be readily available for use in the event of an emergency.

2.9 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) and Figure 2-2 Emergency Response Protocol must be followed. Following this procedure is necessary for documenting all of the information obtained at the time of the incident.

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets filed onsite (Attachment V). If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

FIGURE 2-2
EMERGENCY RESPONSE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of injury situations. In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109, being prepared to provide:
  - Any known information about the nature of the injury.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the involved Tetra Tech NUS, Inc. employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) at 1-800-245-2730.
- Contact the Human Resources Manager, (Marilyn Duffy) at 1-800-245-2730.

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare.

WorkCare will compile the results of all data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

FIGURE 2-2 (continued)

WORKCARE
POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. Exposing Agent

Name of Product or Chemicals (if known): _____

_____

Characteristics (if the name is not known)

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing? _____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was their skin contact? _____

Was the exposing agent inhaled? _____

Were other persons exposed? If yes, did they experience symptoms? _____

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved: _____ Worsened: _____ Remained Unchanged: _____

V. Treatment of Symptoms (check off appropriate response)

None: _____ Self-Medicated: _____ Physician Treated: _____

3.0 SITE BACKGROUND

3.1 SITE HISTORY

NAS Cecil Field is located in western Duval County, Florida, within the limits of the City of Jacksonville. In 1989, NAS Cecil Field was placed on the United States Environmental Protection Agency's (EPA's) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) as a result of pollution resulting from past waste disposal practices that predate CERCLA. In 1990, The United States Department of the Navy entered into a Federal Facilities Agreement (FFA) with EPA to define the overall extent of contamination. NAS Cecil Field has approximately 35 individual sites where hazardous wastes may have been handled, spilled, or buried. As a result, work at the various sites has been organized into nine Operable Units (OUs), as well as more than 100 other areas undergoing evaluation in the BRAC and Underground Storage Tank programs.

3.2 CURRENT STATUS

NAS - Cecil Field is closed. While the Jacksonville Port Authority is planning on maintaining the air field (airside), the City of Jacksonville is currently re-developing the landside.

3.3 SITE DESCRIPTION

Operable Unit (OU) 9, Site 59 –Bldgs. 324/1845 areas

Groundwater sampling conducted in this area under the Base Realignment and Closure (BRAC) program identified trichloroethene (TCE) contamination, and the area was designated Site 59 under Operable Unit (OU) 9 to be investigated under the Installation Restoration (IR) program as governed by the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA).

Building 324

Building 324 was built in 1989 and used as the Engine Maintenance Shack primarily by a naval subcontractor. Past investigations at this site revealed no evidence of contamination. A recent due diligence investigation though revealed evidence of primarily of TCE with little to no indication of degradation products within the groundwater.

Building 1845

Building 1845 is not considered to be part of the source contamination. However, during the due diligence investigation the plume was identified at various depths extending past Building 1845 and therefore defining the boundaries of Site 59.

4.0 SCOPE OF WORK

This section of the HASP addresses the proposed site activities that are to be conducted at NAS Cecil Field. The methods and activities to be conducted include:

- Mobilization/demobilization activities
- Monitoring well installation using Rotosonic and Direct Push Drilling Methods - A total of 43 new wells at 16 locations are proposed to delineate the horizontal and vertical extent of groundwater contamination as follows:
  - Nine 30-foot wells screened from 28 to to 33 feet bgs
  - Thirteen 50-foot wells screened from 48 to 53 feet bgs
  - Three 70-foot wells screened from 68 to 73 feet bgs
  - Seven 80-foot wells screened from 78 to 83 feet bgs
  - Ten wells screened at the base of the surficial aquifer [top of rock (TOR) wells] - The 10 TOR wells will be installed first, and geologic logging will be completed for these wells to evaluate site-specific geologic and hydrogeologic conditions. Screened intervals of the remaining wells to be installed as part of the RI may be adjusted based on the results of this geologic logging (i.e., locations of clay layers, etc.).
  - One bedrock well installed in the first water-bearing zone of the Hawthorne formation

- Multi-media Sampling including
  - Samples for geotechnical analyses will be collected from the following locations and intervals:
    a) Location 001 at the 30- and 80-foot intervals
    b) Locations 007 at the 50-foot and TOR intervals
    c) Location 009 at the 50- and 80-foot intervals
    d) Location 014 at the 80-foot and TOR intervals
    e) Subsurface Soil sampling – Subsurface soil samples (based on PID results may be collected at the discretion of the FOLI)

  - Groundwater Sample and Handling Activities (The following activities pertain to activities dealing with groundwater that may expose site workers to contaminants associated with groundwater handling).
    a) Monitoring well development
    b) Groundwater sampling - Chemical analysis groundwater contaminants – Low flow sampling using peristaltic pumps will occur at
       1) Forty-three (43) new wells and three (3) existing wells.

2) Additional sample media will be collected at four wells (CEF-059-002-30, CEF-059-003-TOR, CEF-059-004-TOR, and NG-12D). The information derived will be used in the evaluation of bioaugumentation as a potential treatment option for the site. At these four wells, analyses will be conducted to evaluate the presence of several species of halorespiring bacteria and to quantify the presence of Dehalococcoides (Dhc**)** bacteria through genetic tests. Analysis will be conducted on samples in areas where TCE concentrations are greater than Natural Default Attenuation Criterion of 300 µg/L.

3) Monitoring Natural Attenuation Parameters - 12 of these wells will be analyzed for field and laboratory geochemical parameters to evaluate the potential for natural attenuation at the site.

c) SPECAP Testing
   1) Location 001 at the 30- and 80-foot intervals
   2) Locations 007 at the 50-foot and TOR intervals
   3) Location 009 at the 50- and 80-foot intervals
   4) Location 014 at the TOR interval

d) Round of water level measurements

- Decontamination of heavy and sampling equipment
- Surveying
- IDW Management

For more detailed description of the planned tasks, refer to the Project Work Plan (WP). Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. All requested modifications to this document will be submitted to the HSM by the TOM or a designated representative.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARY

This section of the HASP is intended to provide hazard assessment and hazard control information derived as it pertains to the tasks to be performed.

Table 5-1 is intended to provide a one page/task summary to permit quick referencing of information as it pertains to the task-specific hazards and identified control measures.

Safe Work Permits will be issued for all exclusion zone activities (See Section 9.10). Table 5-1 will be employed as the Safe Work Permit's primary reference. The FOL and/or the SHSO completing the Safe Work Permit will add additional site-specific information.

The following information represents the hazard assessment (identifying the potential hazard) of the tasks to be conducted as part of this field effort. See Table 5-1 for the recommended control measures as they may pertain to these hazards.

5.1 MOBILIZATION/DEMOBILIZATION

This task includes, but not limited to, the following

- The procurement and shipping/unpacking of equipment, and materials for the field investigation.
- Review of planning documents (i.e., HASP, Sampling and Analysis Plan, Work Plan, Quality Assurance Plan, etc.)
- Site Reconnaissance to include site characterization, site preparation, the layout of sampling locations and to secure the necessary utility clearances and isolate physical hazards, where applicable.
- Secure, construct, or equip decontamination facilities to support the field activities.
- Secure, construct, or equip IDW storage facilities to support the field activities.

Physical Hazards – The hazard types associated with this task are considered primarily to be Physical hazards – Lifting, strains/sprains, lacerations achieved during unpacking of equipment and during site preparation (i.e., cutting open boxes, lifting equipment, locating sample points).

Chemical Hazards - It is not anticipated that personnel will be exposed to chemical contamination as part of this task. However, certain chemicals will be brought on-site to support field activities. These hazards will be addressed through the implementation of a Site-specific Hazard Communication Program (See Section 5.0 of the HSGM).

Natural Hazards – These hazards are considered low to moderate as the areas of investigation are considered light industrial areas that area regularly maintained (grass cut, regular traffic, paved/concrete areas, etc.) as indicated by the FOL.

5.2 MONITORING WELL INSTALLATION/SOIL BORINGS – ROTOSONIC AND DPT DRILLING METHODS

A sonic rig uses an oscillator or head with eccentric weights driven by hydraulic motors to generate high sinusoidal force in a rotating pipe drill. The frequency of vibration (generally between 50 and 120 cycles per second) of the drill bit or core barrel can be varied to allow optimum penetration of subsurface materials. A dual string assembly allows advancement of casing with the inner casing used to collect samples. Small amounts of air and water can be used to remove the material between the inner and outer casing. When a drill bit is used, most of the cuttings are forced into the borehole wall. A thin-wall or split-spoon sampler can be used to contain continuous samples. Sonic drilling is also referred to as vibratory drilling and rotosonic drilling.

Rotosonic drilling also incorporates rotation of the drilling core string to advance into the subsurface media.

Physical Hazards – Physical hazards includes

Entanglement within rotating equipment (drill strings); caught between **pinches and compressions**. These hazards are not only the most serious (entanglement) but also pinches/compressions are the most frequent in the drilling industry. **Slips, trips and falls** is another hazard to consider regarding Rotosonic drilling as the driller and driller's helper work on an elevated platform.

Entanglement - control measures include

- All emergency stop devices will be tested initially and periodically thereafter. This will be accomplished during the equipment inspection and at random intervals.
- One person on the drill crew will be designated as the Emergency Stop Device Operator (usually the Driller).
- Prior to the initiation of augers, the driller will announce they are about to start and will insure all personnel are away from rotating apparatus.
- The SHSO shall insure that all personnel have
  - -- Secured/removed all loose clothing and/or PPE articles
  - -- Removed all jewelry or other articles that could snag a rotating core drill.
  - -- During the inspection the SHSO shall insure that the drill stems and associated rotating equipment do not have obvious snag points. It should be noted that the core drill stems are

not as hazardous as HSA since these devices are assembled through flush threaded joints which presents fewer snag points.

Pinches/compression control measures include

During drilling, the drill rig has an articulating head that feeds off of the tender/support trucks where drill stems are stored. The head lowers and rotates parallel to the deck. The driller's helper slides a drill stem from the rack to the head. The driller engages the head to thread the stem. At this time the head begins to raise and turn perpendicular to the deck to continue drilling. The procedures are conducted in the reverse during extraction.

- Drill stems are to be removed/placed on/from the rack evenly to prevent collapse of the stacked pile.
- Once the drill stem is connected the helper will remove themselves from the swing radius.
- Personnel will not place their hands near any of the hydraulic operated grab points that secure the drill rods during insertion/extraction.

Slips, trips, and falls control measures –

While working on an elevated platform removes the Driller/Driller's Helper from uneven, muddy and sometimes slippery ground surfaces. However, working on an elevated metal platform may also exacerbate these conditions.

- Rotosonic Drill Rig Operations - Insure that the rig and tender truck are equipped with suitable hand rail and stairs.
- Remove mud and any standing water that may accumulate on the deck.
- Use sand on the deck should it become slippery.

- Energized Systems – Overhead and underground. See Attachment II regarding Utility Locating and Excavation Clearance for minimal clearance distances.

- Lifting Hazards – Auger flights (>100 lbs) bags of Portland Cement (>90 lbs). Again this is a very common hazard within the drilling industry.

- Pressurized systems – This hazard occurs when workers are in the proximity of unguarded pressurized systems. An incident of this nature (high pressure line came loose and struck the driller) occurred within the last couple of years resulting in a near fatality. Therefore, extra efforts will be employed to insure fittings and connections are secure. Those fittings and connections near the operator or driller's helper that are not guarded will be secured by whatever means are necessary (i.e., pressurized line restraints). Pressurized hazards are also recognized while performing support functions such as decontamination. Pressurized water/heated pressurized water has accounted for burns and water lacerations.

Due to the severity and frequency [Incident (injury/illness) analysis] it is recommended that supervisory personnel (FOL and SHSO) should focus their attention conditions that could predispose personnel to these hazards.

- Traffic hazards – These sites are located within very active industrial areas and within the safety corridor of active runways. Field crews will have facility (pedestrian/vehicular/ and possible aircarft traffic) to contend with. Because of this diligent measures are required constructing and isolating work zones and thereby controlling facility traffic patterns away from the work zone as well as utilizing scheduling to coordinate efforts with the facility operations.

- Noise – The operating level of a standard rotosonic/DPT drill rigs varies between 92 and 94 dBA's when drilling. Impact noise levels while driving spoons are significantly higher, thereby presenting an excessive noise hazard. In addition, associated with this task is the decontamination process using pressure washer/steam cleaners. These items typically operate at 94-97 dBA when engaged. It is anticipated that this hazard will be made worse due to contributory noise levels associated with flight line operations.

Chemical hazards include

- Exposure to chemicals associated with well construction materials are also a concern. This includes sand, grout (containing Portland Cement), and Bentonite. Hazards associated with these chemicals include irritation of the eyes, alkali/chromium burns of contact points associated with wet cement, and respiratory irritation.

- Groundwater contamination – Previous analytical data indicates that personnel could be exposed to during the monitoring well installation through incidental exposure routes to

  - Varying levels of Trichloroethene (TCE) within the groundwater. It should be noted that soil samples were largely nondetects.

5.3 AQUIFER DEVELOPMENT/TESTING/SAMPLING

5.3.1 <u>Monitoring Well Development</u>

The development of the monitoring wells are intended to remove debris associated with installation and to condition the sand pack to facilitate contact with the surrounding aquifer. Monitoring well development is accomplished using surge blocks and pumps to force water in and out of the sand pack and formation and to remove this debris from the well. 1" inch Whale Pumps with 12-volt battery will typically be

employed for 2-inch wells to remove specified water volumes as well as any debris. Peristaltic pumps or waterra methods are to be employed for the pre-packed micro-wells.

See Section 5.3.3 for potential hazards.

5.3.2 Monitoring Well Sampling

The monitoring wells will be sampled using low-flow purging and sampling techniques. Peristaltic pumps will be used to purge and to collect the samples. Field measurements of pH, temperature, specific conductance, and turbidity will be made during purging using a direct reading instrument. These measurements will be taken at the start of purging and every 5 to 15 minutes until the parameters have stabilized. The wells will be purged until a sufficient predetermined amount of water has been removed and the water quality measurements are acceptable and stable. All tubing used for sampling will be dedicated and disposed of after the sample has been collected.

See Section 5.3.3 for potential hazards.

5.3.2.1 Natural Attenuation Sampling

Potentially as part of a round four effort Natural Attenuation Parameters will be monitored. As part of the sampling effort, sample aliquots will be remove once the sample has been collected that will be sent for chemical analysis. These sample aliquots will be subjected to a number of field tests to determine the natural degradation of the contaminant in question as well as the conditions which may support or retard this process. This process for the most part requires the addition of reagents to the sample. The reaction between the sample and the reagent will produce possibly a color change or other indicator identified.

See Section 5.3.3 for potential hazards.

5.3.3 Water Level Measurements

Multiple rounds of water level measurements will be taken at the existing and newly installed monitoring wells during this field investigation. The water levels will be taken with an electric water level indicator using the top of the well casing as the reference point for determining water depths. Water levels will be conducted upon completion of the newly installed wells and prior to and through the course of purging, development, and sampling.

Physical Hazards – The hazard types associated with the above tasks are similar in nature and therefore presented together. Physical hazards as it pertains to development, water level measurements, and sampling are as follows:

- Lifting, strains/sprains, associated with handling purge/development waters.

- Cuts, pricks, and lacerations – This hazard is possible when cutting tubing or when opening some of the glass reagent ampoules (during natural attenuation sampling). In addition when transporting glassware for sample collection or testing may present a problem should the glassware become broken

- Traffic hazards – These sites are located within active industrial areas. Some of the investigation locations may place personnel along travel thoroughfares. Both foot and vehicular traffic hazards are considered prevalent during certain phases of executing this scope of work.

- Electrical hazards – Remote but possible when handling and using a 12-volt battery as a power source for the Whale pumps.

Chemical Hazards - Chemical exposure during this activity maybe facilitated through

- Direct contact - Splash - Contaminant exposure based on direct interaction with contaminated media through possible splash.

- Inhalation – Some wells due to biological degradation may build off-gases. When a field crew member opens the well they maybe exposed to vapors/gases coming out of the well. This of course is based on the proximity of the field technician to the well head and the amount of time they remain at this potential source.

- Ingestion – Due to handling of equipment, sample media, and improper work hygiene could result in the ingestion of identified site contaminants or reagents employed in the site investigation.

- Sample preservatives/natural attenuation reagents/decontamination solutions – Certain chemicals will be brought on-site in support of this field investigation effort. These chemical hazard classes include corrosives, flammable, and oxidizers.

See Table 5-2 for potential health effect information due to chemical exposure. See also the Site Specific Hazard Communications Program for controlling hazards as it pertains to chemical substances brought on-site.

Natural Hazards include:

- Spiders/bees/nests are sometimes encountered in the protective casings of monitoring wells. When opening the casing or attempting to open the well may bring personnel within close proximity to these insects and spiders.

5.4 MULTI-MEDIA SAMPLING

5.4.1 Subsurface Soil Samples

Currently subsurface soil samples are to be collected to obtain geotechnical data. The sample will be collected using a MacroCore Sampler (DPT Operations) or using a core barrel during Rotosonic operations.

See monitoring well installation for potential hazards associated with this activity.

5.5 GEOGRAPHICAL SURVEYING

This activity is generally non-intrusive in nature. Vertical elevations and horizontal locations will be taken from the ground surface, top of the well casing, top of protective casing, ground surface. In addition, building corners, existing monitoring wells may also be shot to tie in the new survey information.

Physical Hazards associated with this task includes

- Traffic hazards – These sites are located within active industrial areas. Some of the investigation locations maybe along travel thoroughfares. Both foot and vehicular traffic hazards are considered prevalent during certain phases of executing this scope of work.

- Trips and Falls – This hazard is considered due to uneven ground (curb sides, hill sides) and potentially slippery surfaces.

Chemical hazards include

The surveyors will need to open the monitoring well to get a shot of the top of casing. Some wells due to biological degradation or groundwater contaminants may build off-gases within the monitoring well head space. When a Survey crew member opens the well they maybe exposed to vapors/gases coming out of the well. This of course is based on the proximity of the person to the well head and the amount of time they remain at this potential source.

Natural hazards may include

- Natural Hazards – This hazard is not considered prevalent during as this activity is to take place in light industrial areas. However, the possibility exists. In addition, many recordable injuries within the past years have been related to this type of hazard and therefore worth mentioning.

5.6 DECONTAMINATION

The equipment involved in the field activities for well installation and sampling will be decontaminated prior to, during and after the completion of on-site activities.

5.6.1 Heavy Equipment

Heavy equipment decontamination will be accomplished using a pressure washer and/or steam cleaner within an established temporary decontamination pad.
Procedural steps are as follows

1. Remove gross (visible) materials using scrapers, shovels as necessary (soils, etc.)
2. Use the pressure washer/steam cleaner remove remaining visible debris.
3. As necessary, follow up with scrub brushes with Alconox or Liquinox detergent wash.
4. Potable water rinse using pressure washer/steam cleaner as necessary
5. Air dry
6. Visual examination to insure cleanliness.

5.6.2 Sampling Equipment

All non-dedicated sampling equipment (i.e. stainless-steel hand augers, trowels, bowls, split spoons, etc.) will be decontaminated prior to the initiation of field sampling, between sample locations, and at the completion of the field activities. The following decontamination steps will be taken.

1. Remove heavy materials (soils, etc.)
2. Alconox or Liquinox detergent wash
3. Potable water rinse
4. Solvent rinse (Isopropanol)
5. DI water rinse
6. Air dry
7. Scan/screen articles using the PID to insure the removal of site contaminants as well as decontamination solvents.

All dedicated sampling and PPE equipment will be rinse to remove gross contamination and then disposed of as general refuse.

Physical Hazards associated with this activity include

- Water cuts/lacerations/burns – This is the primary and most severe hazard associated with this activity. Pressure washers operating at 3000 psi are sufficient to cause water lacerations of unprotected skin. Steam cleaners operating at much lower temperatures, not only has the capabilities of causing water lacerations but also burns due to the high water temperatures. Two years ago an individual using a steam cleaner place the tip of the cleaning wand on the top of his boot and accidentally engaged the trigger. The elevated temperatures in conjunction with the operating water pressure cut through the top of the individuals work boot resulting in severe burns. This single split second action cut through a leather work boot.

- Noise – Operating level of the pressure washer/steam cleaners typically operate at 94-97 dBA when engaged.

Chemical Hazards associated with this activity include

- Exposure to contaminated media
- Exposure to decontamination solvents

Natural hazards associated with this activity

None anticipated.

5.7 WASTE MANAGEMENT

This task includes the containerization, labeling, staging, monitoring, and final deposition of investigative derived wastes. These are as follows:

Containerization – Materials generated including soils, purge and development waters, decontamination fluids shall be collected and containerized in 55-gallon drums and staged in a centralized location at the trailer yard.

Labeling – All containers will be labeled as to their contents. The labels will include the following information

Site
Job Number
Location (SWMU)
Date – To be completed once filling the container begins
Drum # - Assign an inventory number to be added to a comprehensive log
Contents – Description
Volume – Final volume
Contact – This person should be available on base. To this end an up-dated inventory should be provided at the close of each shift to this person.
Emergency Number – Contact person provided above

Staging – All drums will be staged on pallets (4 to a pallet) with lid retention ring bolt accessible on the outside as well as the label. Pallet rows will maintain a minimum of 4 feet between rows for access and monitoring for leaks. Containers will be separated according to media and site.

Monitoring – During staging site personnel will examine containers to ensure they are not leaking.

Final Deposition – Waste materials will be separated as determined through sampling and disposed of through pre-determined routes.

Physical Hazards associated with this Waste Management activity include

- Caught between pinches and compressions. This occurs primarily when moving containers to transport vehicles and when staging the drums on pallets. The prevalent hazard is recognized when moving the drums and hands get caught between drums.

- Lifting – Drums of water can weigh upwards of 475 lbs. Drums of wet soil can weigh up to 750 lbs.

Chemical Hazards associated with this activity are considered negligible unless there is a spill from these closed containers.

Natural hazards associated with this activity

None anticipated.

For more detailed description of the associated tasks, refer to the Work Plan (WP) and/or the Quality Assurance Plan (QAP). The above listing represents a summarization of the tasks as they apply to the scope and application of this HASP.

5.8 GENERAL SAFE WORK PRACTICES

In addition to the task-specific safe work practices identified in Table 5-1 to be employed to minimize task specific hazards, the following general safe work practices will be employed. These safe work practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations.

- Refrain from eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. This is especially critical between breaks and prior to lunch and associated hand to mouth activities.
- Avoid contact with potentially contaminated substances by walking around puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Do not place monitoring equipment on potentially contaminated surfaces.
- Be familiar with and adhere to all instructions provided within this site-specific HASP.
- Be aware of the location of the nearest telephone and all emergency telephone numbers. See Section 2.0, Table 2-1.
- Attend briefings on anticipated hazards, equipment requirements, Safe Work Permits, emergency procedures, and communication methods before going on site.
- Plan and mark entrance, exit, and emergency escape routes. See Section 2.0.
- Rehearse unfamiliar operations prior to implementation.
- Use the “buddy system”.

- Maintain visual contact with each other and with other on-site team members by remaining in close proximity in order to assist each other in case of emergency.

- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.

- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone). Non-essential vehicles and equipment should remain within the Support Zone.

- Establish appropriate decontamination procedures for leaving the site.

- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the Site Health and Safety Officer (SHSO).

- Matches and lighters are restricted from entering in the Exclusion Zone or Contamination Reduction Zone. Smoking will only be permitted in specified areas at Site 95 and M-13.

- Observe coworkers for signs of toxic exposure and heat or cold stress.

- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.9 DRILLING SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when working in or around the HSA Drill Rig Operations.

5.9.1 Before Drilling

- Identify all underground utilities and buried structures before drilling. This service is provided by Sunshine State One-Call of Florida, Inc. 1(800) 432-4770. In addition, Tetra Tech NUS, Inc. personnel will use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment II. The typical sequence of events are as follows:

    1. A request is submitted for clearance of a location(s). Often times intersections, building numbers, or other location identifiers are provided. It is best to provide as much assistance as possible. Ensure that marks are on the ground using white paint or flagging. Sunshine One Call systems

then notifies members within this cooperative. This is sometimes where problems arise. Not all utilities are required to be members. Provisions to accommodate this shortfall are provided in the Tetra Tech NUS, Inc. Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment II.

2. Typical timeline for marking and providing clearances for commercial one call is 48-hrs. A ticket or ticket number will be provided referring to your clearance. This will have a timeline, generally 14-days. Again problems sometime arise here because site personnel allow their tickets to expire, then accidentally encounter a utility. Tickets must be maintained valid by asking for a re-issue or extension, when necessary, prior to expiration.

3. Another problem that occurs with time is that utility locations marked on the ground may not remain visible. The FOL is responsible for ensuring that utility locations/marks on the ground are maintained so they remain visible (repaint, pin flags, etc.), and to annotate maps with these locations so they may be incorporated into the EGIS system.

4. Lastly, once marks are placed on the ground and have been cleared, there is only a limited leeway (2-feet) exists to stray from the planned and approved intrusive locations.

- All drill rigs will be inspected by the SHSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment. All repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist for Drill Rigs provided in Attachment III. Inspection frequencies will be once every 10-day shift or following repairs.

- Check operation of the Kill Switch (initially, then periodically thereafter). See Section 5.2 concerning these testing of the emergency stop devices and the other required precautions.

- Ensure that all machine guarding is in place and properly adjusted.

- Block the drill rig and use levelers to prevent movement of the drill.

- The work area around the point of operation will be graded to the extent possible to remove any trip hazards near or surrounding operating equipment.

- The driller's helper will establish an equipment staging and laydown plan. The purpose of this is to keep the work area clear of clutter and slips, trips, and fall hazards. Mechanisms to secure heavy objects such as drill flights will be provided to avoid the collapse of stacked equipment.

5.9.2 During Drilling

- Minimize contact to the extent possible with contaminated tooling and environmental media. All potentially contaminated tooling will be placed on polyethylene sheeting for storage and wrapped for transport to the centrally located equipment decontamination area

- An individual must be designated with the primary responsibility of operating the kill switch mechanism. Also, the drill rig operator must verbally announce to all surrounding persons each time that he/she is about to activate the drilling mechanism.

- Support functions (sampling and screening stations) will be maintained a minimum distance from the drill rig of the height of the mast plus five feet or 40-feet whichever is greater (for Rotosonic rigs) and 25-feet for DPT rigs. These distances have been determined to restrict activities from within suspected physical hazard boundaries. Because work will be performed in areas accessible to the general facility population, these boundaries must be strictly enforced by site personnel.

- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the drill rig.

- During maintenance, use only manufacturer provided/approved equipment (i.e. auger flight connectors, etc.)

- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should be used to move auger flights and other heavy tooling.

- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted at all times.

5.9.3 After Drilling

- All equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the FOL and/or the SHSO to determine cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.

- All motorized equipment will be fueled prior to the commencement of the day's activities. During fueling operations all equipment will be shutdown and bonded to the fuel source.

- When not in use all drill rigs will be shutdown, and emergency brakes set and wheels will be chocked to prevent movement.

- All areas subjected to subsurface investigative methods will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area and the general population who may have access to these areas.

This page left blank intentionally.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment	Decontamination Procedures
Mobilization/ Demobilization This activity includes, but not limited to: - Equipment Preparation and Inspection - Resource acquisition and unpacking of supplies - Site clearance and preparation – Utility clearances, etc. - Establish and construct access routes to sample/work locations, where applicable. - Construct decontamination and IDW operation and storage facilities, as applicable.	***Chemical hazards:*** 1) Exposure to identified site contaminants are not anticipated during this activity. However, potential exposure to chemicals brought on-site should be considered. ***Physical hazards:*** 2) Lifting (strain/muscle pulls) 3) Cuts and lacerations 4) Pinches and compressions/Struck by 5) Slips, trips, and falls 6) Heavy equipment hazards (swinging booms, hydraulic lines, etc.) 7) Vehicular and foot traffic ***Natural hazards:*** 8) Ambient temperature extremes (heat/cold stress) 9) Insect and animal bites 10) Inclement weather	***Chemical hazards:*** 1) The on-site Hazard Communication Program (Section 5.0 TtNUS Health and Safety Guidance Manual) will be completed by the FOL and/or the SHSO. All chemicals brought onto the site by Tetra Tech NUS and subcontractor personnel will be inventoried with each applicable chemical having an MSDS on site, on file. This effort shall include: • Accurate Chemical Inventory List (Entries will match chemicals brought on-site, as the names appear on the MSDS and the label) This list, which also includes quantities and storage locations will be maintained in a centralized location and made available upon request. • MSDS's will be maintained in a central location, accessible to all personnel. • All containers will have labels specifying the following information: - Chemical Identity (As it appears on the label, MSDS, and Chemical Inventory List) - Appropriate Warning (i.e., Eye and skin irritation, flammable, etc.) - Manufacturer's Name Address and Phone Number All personnel will be required to review the appropriate MSDS's if they are not familiar with the hazards of the chemicals to be used, or the control measures necessary to prevent exposure or injury will review the MSDS prior to the use. Information regarding the hazards and PPE will be communicated on the Safe Work Permit for this task. Any specific provisions recommended by the MSDS shall be in place (i.e., eye wash, fire extinguisher, specified PPE, etc.) prior to using the chemical substance. ***Physical hazards:*** 2) **Lifting Hazards** – During mobilization/demobilization personnel are required to handle equipment, supplies, and resources in preparation for site activities. This hazard becomes more predominant in the early morning hours (prior to muscles becoming limber) and later in the day (as a result of fatigue). The following provisions shall be instituted in order to minimize hazards of this nature: • Use machinery or multiple personnel for heavy lifts, where possible. • Use proper lifting techniques - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are obtainable. - Minimize the horizontal distance to the center of the lift to your center of gravity. - Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. - Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. - Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. Other considerations associated with lifting injuries and muscle strains include: • Area available to maneuver the lift. • Area of the lift – Work place clutter, slippery surfaces – Correct these situations/conditions before attempting a lift. • Your overall physical condition 3) **Cuts and lacerations** – To prevent cuts and lacerations associated with unpacking or packing equipment and supplies, during site preparation (clearing access routes), the following provisions are required: • Always cut away from yourself and others, then, if a knife slips, you will not impale yourself or others. • Do not place items to be cut in your hand or on your knee. • Change out blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting instruments. If hand tools (brush hooks, machetes, etc.) are used to gain access to sample locations, the following precautions are recommended: • Insure handles are of good construction (no cracks, splinters, loose heads/cutting apparatus. • Insure all cutting tools are maintained. Blades shall be sharp without nicks and gouges in the blade. • When not in use the sheath will be placed on the blade. • A protective glove and arm guard should be worn on the non-knife hand if there is a chance of slipping. See Section 4.13 of the HSGM for additional safe work practices as it may pertain to cuts/lacerations. 4) **Pinches/Compressions/Struck By** - Do not modify tooling without manufacturer's expressed permission: • Keep any machine guarding in place, avoid moving parts. • Use tools or equipment where necessary to avoid placing hands in areas vulnerable to pinch points. • Adjust machine guarding as necessary to minimize distance between guards and point of operation. • When staging equipment, insure all stacked loads, shelving, are adequately secure to avoid creating a hazard from falling objects. 5) **Preview work locations for unstable/uneven terrain**: • Cover, guard and/or barricade all open pits, ditches, and work areas along embankments as necessary. Activities that will take place near ditches, embankments, etc. will maintain a safe distance from the edge(sufficient room should be allocated to permit accomplishing the planned task). • Ruts, roots, tools, and other tripping hazards should be eliminated to minimize trips and falls. • Maintain a clutter free work area. • As part of site control efforts construct fences or other means of demarcation (i.e. signs and postings) to control and isolate traffic in the work area. Means of demarcation shall also be constructed isolating resource and/or staging areas. 6) **Heavy Equipment Hazards** - All equipment will be: • Inspected in accordance with OSHA and manufacturer's design. • All equipment inspection will be documented on a Equipment Inspection Checklist as provided in (See Attachment III). • Operated by knowledgeable operators and ground crew. 7) **Vehicular and Foot Traffic Hazards** - As part of site preparation activities and zone construction, when preparing traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom or mast + 5 feet). • The mast will be lowered when moving the drill rig. • Foot and vehicular traffic routes shall be well defined. • Heavy equipment patterns shall be isolated using fences or other suitable barricades from pedestrian pathways. • Bumpers or other suitable traffic stops shall be placed in areas where it is desired that traffic approaching an drop offs or unprotected banks, etc.. • All self-propelled equipment with restricted vision moving backwards shall be equipped with back up warning systems. • The FOL and/or the SHSO as a precautionary measure shall conduct an initial site survey to remove or demarcate physical hazards, preview traffic routes (foot and vehicular) before the commitment of personnel and resources. • Traffic patterns controlled by airfield operations shall be done so using radio communications, lights or painted lines. Light patterns and signals are as follows: Blue lights – Outline taxiways, ramps and dispersal areas White lights – Outline runways Green lights – Threshold lights used to mark end of runways Red lights – Used to mark obstructions and construction work Amber lights – Used to mark the departure end of the runway Painted lines used to indicate airfield demarcation may also employ Yellow painted lines as the edge of the taxiway Solid white line edge of runway When lines are painted as a traffic control mechanism, this system is usually supported by radio communication. If radio communications are employed insure the direction repeats the request. For example – "Tower this TtNUS White Ford Pick-up requesting permission to cross 36R, Gate 2?" " TtNUS permission to cross 36R at Gate 2 granted, denied, or Hold." Vehicles operating on Taxiways and runways will be equipped with a flashing amber light to increase visual recognition. Drill rigs will not be allowed to remain in the airfield operation areas overnight – Plan, execute, and remove. The FOL will check in with airfield operations each day to insure clearance for a work location/area. The FOL will be responsible for pre-planning (which locations to work the weekend that could be impeded by airfield operations) upcoming field work with airfield operations.	Site and Operational Surveys - Visual observation of work practices by the FOL and/or the SHSO to minimize potential physical hazards (i.e., improper lifting, unsecured loads, cutting practices, etc.). The FOL and/or the SHSO will correct any deficiencies they identify and will discuss their findings as part of the daily tool box meeting. Monitoring for chemical hazards are not required during this activity.	***(Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)*** Level D - (Minimum Requirements) • Standard field attire (Sleeved shirt; long pants) • Safety shoes (Steel toe/shank) • *Snake chaps(for remote and unmaintained areas)* • *Safety glasses (for moving through brush and when involved in activities that could result in flying projectiles such as hammering or chopping and clearing brush)* • *Hardhat (when overhead hazards exists, or identified as a operation requirement)* • *Reflective vest for high traffic areas* • *Hearing protection for high noise areas (At the direction of the FOL and/or the SHSO).* As site conditions may change, the following equipment will be maintained during all on-site activities as prescribed in Section 2.0 of this HASP - Fire Extinguishers - First-aid kit ***Note:*** *The FOL and/or the SHSO will determine the number of fire extinguishers and first-aid kits to be made available based on the number of operations to be conducted at any given time.*	Not required. Good personal hygiene practices should be employed prior to breaks lunch or other period when hand to mouth contact occurs. This will minimize potential ingestion exposures.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment	Decontamination Procedures
		Natural hazards: 8) **Ambient Temperature Extremes** - Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat and cold stress is provided in Section 4.0 of the TtNUS Health and Safety Guidance Manual. 9) **Insect/Animal Bites and Stings** - This is not considered a predominant hazard as these activities are to be conducted in a well maintained area. To combat the potential impact of natural hazards, the following actions are recommended Insects and spiders • Wear light color clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control. • Tape pant legs to work boots to block direct access. This is especially critical when clearing or entering heavy brush and wooded areas. It should be noted that in extreme heat this action may compound the potential for heat stress. • Do not stick your hands or feet anywhere where you can't see. • When opening existing well heads be cautious of bees and spiders as these are preferred nesting locations. • Use repellents – Follow manufacturer's recommendations for use. Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. Repellants containing DEET can/should be applied directly to the skin. • If you leave your workboots at the trailer or office over your break make sure you shake them out before sticking your feet in them. 10) **Inclement Weather** - Suspend or terminate operations until directed otherwise by SHSO. See Section 4.0 of the TtNUS Health and Safety Guidance Manual for additional information concerning natural hazards.			

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Task/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)*	Decontamination Procedures
Monitoring Well Installation /Soil Borings will be completed using Rotosonic and DPT Drilling methods. The soil boring/sampling will be accomplished using split spoons/core barrel samplers.	***Chemical hazards:*** 1) It is not anticipated that previously identified contaminants of concern (Trichlorethylene) will be encountered in sufficient concentrations that would represent an inhalation hazard concern. Incidental exposure through hand to mouth contact and ingestion is however possible. Further information on this contaminant is presented in Section 6.1. 2) Transfer of contamination into clean areas or onto persons ***Physical hazards:*** 3) Heavy equipment hazards (pinch/compressions points, rotating equipment, hydraulic lines, etc.) 4) Noise in excess of 85 dBA 5) Energized systems (contact with underground or overhead utilities) 6) Lifting (strain/muscle pulls) 7) Slips, trips, and falls 8) Cuts and lacerations 9) Vehicular and foot traffic 10) Hot Work - Fire and Explosion For further information on these physical hazards, see Section 6.2 of this HASP or Section 4.0 of the HSGM. ***Natural hazards:*** 11) Inclement weather 12) Insect bites	***Chemical hazards:*** 1) Safe work practices and monitoring instruments will be employed as the first line of defense. As a general rule, avoiding contact with contaminated media (water, soils, etc.). In addition, good work hygiene practices including avoiding hand-to-mouth contact to the extent possible, washing hands and face or using hygienic wipes to remove potential contaminants from hands and face prior to breaks or lunch or other hand to mouth activities will restrict the most predominant route of exposure. ***Previously reported contaminants***. As indicated earlier the previously reported contaminants of concern were not in sufficient concentration to present an inhalation threat. However, as part of the evaluation method of these subsurface media, all samples will be scanned with a PID to determined potential source concentrations. 2) **Transfer of Contamination into Clean Areas or onto Persons** - Restrict the cross use of equipment and supplies between locations and activities without first going through a suitable decontamination. Work practices including establishing a rigid decontamination procedure will be employed for all equipment between locations and between clean and potentially dirty work. This provision along with dedicated sampling equipment will insure materials are not carried and deposited in unaffected areas. ***Physical hazards:*** 3) **Heavy Equipment Hazards** - All equipment will be: - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600.601.602), and manufacturer's design, as applicable. All inspections will be documented using the Equipment Inspection Checklist (for Drill Rigs) found in (See Attachment III***)*** of this HASP. - Operated and supported by knowledgeable operators and ground crew. - Used within safe work zones, with routes of approach clearly demarcated. All personnel not directly supporting this operation will remain at least 35 feet from the point of operation or the height of the mast plus 5-feet, whichever is greater. See Section 10.1.1 of this HASP. This will be the area identified as the exclusion zone. - All self-propelled equipment with restricted view moving backward shall be equipped with back up alarm warning system. - All personnel will be instructed in the location and operations of the emergency shut-off device(s). This device will be tested initially (and then periodically) to ensure its operational status. - One person (usually the driller) will be designated as the Emergency Shut Off Device Operator. - Prior to engaging the augers, the driller will announce, loud enough for all to hear that he is engaging the augers. He will visually confirm that all personnel are removed from the rotating equipment then engage the augers. - Areas will be inspected prior to the movement of the drill rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SHSO. - See additional safe work procedures for drilling in Section 5.9 of this HASP as well as in Section 4.0 of the HSGM. 4) **Noise in Excess of 85 dBA** - Hearing protection will be used during all subsurface activities using the Rotosonic and DPT Drill Rig or when noise levels are >85 dBA. (during operation). Previous accumulated data indicates an average 8 hour exposure working behind a Rotosonic Drill Rig averages between 87-92 dBA. Previous accumulated data indicates an average 8 hour exposure working behind a DPT Drill Rig averages between 89-94 dBA.. Controlling this hazard shall be accomplished employing two separate approaches as follows: - Boundaries will be established to limit the affect of the noise hazard. The height of the mast + 5 feet or 35 feet whichever is greater will remove personnel far enough from the noise source as not to present a noise exposure concern. - Hearing protection *Excessive noise levels (>85dBA) are being approach when you have to raise your voice to talk to someone within 2 feet of your location.* 5) **Energized Systems** - All drilling activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP in Attachment II of this HASP. All utility clearances will be obtained in writing, and locations identified and marked, prior to activities. If it is not obtainable/unknown or you location infringes within 3-feet of an underground utility advancement must proceed by hand until past the utility. The hand dug hole must at least represent the same diameter of the mechanized tooling that will be used. Utility clearance is being provided by Sunshine State One-Call of Florida, Inc. coordinated through City of Jacksonville and Jacksonville Port Authority contacts. 6) **Lifting Hazards** - Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques as described in Table 5-1 for mobilization/demobilization. Drill stems, auger flights, and well construction supplies are some of the common material that are handled and because of their weight will present a lifting strain hazard associated with this activity. 7) **Slips, Trips, and Falls** - Preview work locations for unstable/uneven terrain: - Cover, guard and barricade all open pits, ditches, and embankments near work areas, as necessary. - Ruts, roots, tools, and other tripping hazards should be eliminated to minimize trips and falls. - Maintain a clutter free work area. - As part of site control efforts construct fences or other means of demarcation (i.e. signs and postings) to control and isolate traffic in the work area. Means of demarcation shall also be constructed isolating resource and/or staging areas. 8) **Cuts and Lacerations** - To prevent cuts and lacerations, the following provisions are required: - Always cut away from yourself and others, then, if a knife slips, you will not impale yourself or others. - Do not place items to be cut in your hand or on your knee. - Change out blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting attachments. - Wear cut-resistant gloves (leather or heavy cotton) at least on the non-knife hand. 9) **Vehicular and Foot Traffic Hazards** - Use traffic-warning signs, flag persons, and high visibility vests as determined by the SHSO when working along traffic thoroughfares. In addition, use physical barricades, when working within normal traffic flow patterns/traffic lanes. - Establish safe zones of approach (i.e. Boom or mast + 5 feet). - All self-propelled equipment with restricted vision when moving backwards shall be equipped with back up alarms. - All activities are to be conducted consistent with the site requirements. - The FOL and/or the SHSO as a precautionary measure to remove or demarcate physical hazards shall preview traffic routes (foot and vehicular) before the commitment of personnel and resources. - Traffic patterns controlled by airfield operations shall be done so using radio communications, lights or painted lines. Light patterns and signals are as follows: Blue lights – Outline taxiways, ramps and dispersal areas White lights – Outline runways Green lights – Threshold lights used to mark end of runways Red lights – Used to mark obstructions and construction work Amber lights – Used to mark the departure end of the runway Painted lines used to indicate airfield demarcation may also employ Yellow painted lines as the edge of the taxiway	1) Monitoring shall be conducted to qualify and quantify estimated source concentrations of on-site contaminants in support of the prescribed worker protection levels. Monitoring shall be conducted using Photoionization Detector (PID) with 10.6eV lamp strength. **VOCs Monitoring/Action Level** – <50 ppm sustained in the workers breathing zone - continue to work; continue to monitor >50 ppm sustained in the workers breathing zone – Temporarily suspend site activities, Contact PHSO Sustained airborne concentrations above the identified action levels will result in ceasing the operation until airborne concentrations recede below acceptable (background) levels. Failure of these concentrations to diminish will require an upgrade in the level of protection or a change in the air monitoring scheme and therefore a modification of this HASP. Monitoring shall be conducted at the prescribed depths as indicated on the boring logs at the source (borehole) and drillers breathing zone. Monitoring shall also be conducted at the sampler's location to in the same prescribed frequency when handling samples. Hot Work Operations – The headspace of the casing will be monitored prior to adding the next length of casing to be welded to insure acceptable conditions exist to conduct hot work operations. **LEL/O2 Monitoring/Action Levels** Always measure oxygen, first Acceptable oxygen concentrations >19.5-<23.5% Continue to work, continue to monitor <19.5 or >23.5 – Plug the casing (Pipe Plug) evacuate headspace measure again. Acceptable headspace – add next string and weld. Remove pipe plug. Note: If oxygen concentrations are below 8-10%, the LEL readings will be unreliable due to oxygen deficiency. LEL (when instrument is calibrated to propane) LEL – Trichloroethylene (TCE) = 8.0% (10% of this concentration is 8000 ppm) <10% of the LEL - continue to work, periodically monitor to insure no changes in status. >10% of the LEL - Purge/inert; monitor to verify status, continue welding. Note: This monitoring is conducted in the headspace of the casing. It is imperative that breathing zone of the welder be monitored with the PID when excessive concentrations are detected in the headspace to insure	All soil boring operations and monitoring well installation will be initiated in Level D protection, including the following articles: Sampler/Oversight Personnel: - Standard field dress (long pants, Sleeved shirts) - Steel toe safety shoes or work boots - Hard hat(when within 35-feet of the drill rig) - Safety Glasses(when within 35-feet of the drill rig or when sampling) - Nitrile surgeon style inner gloves for sampling - Hearing protection(when within 35-feet of an operating drill rig) - *Impermeable boot covers* - *Reflective vest for traffic areas* **Driller and Driller Helper:** - Standard field attire including sleeved shirt and long pants - Safety shoes (Steel toe/shank) - Safety glasses - Nitrile inner and outer gloves or supported neoprene - Hearing protection - Hard hat - Impermeable aprons when handling contaminated auger flights and drill stems against the body. The apron will prevent soiling and saturation of work clothes - *Impermeable boot covers* **Hot Work Operation -** - Standard field attire including sleeved shirt and long pants - Safety shoes (Steel toe/shank) - Safety glasses - Welding gloves - Hard hat - Welding Hood (10-13 Filtration Rating) **Upgrades to Level C and B protection** are not anticipated. **Note:** Use of respiratory protection will require the implementation of the Tetra Tech NUS, Inc. Respiratory Protection Program provided in the Health and Safety Guidance Manual. The implementation of this program will require the modification of this HASP. As site conditions may change, the following equipment will be maintained during all on-site activities: - Fire Extinguishers - First-aid Kit - Eyewash unit (during well installation) **Note:** The Safe Work Permit(s) for this task (See Attachment IV of this HASP) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, impermeable apron, as applicable The sequential procedure is as follows: Stage 1: Equipment drop Decontamination personnel will clean hand tools as necessary. Stage 2: Soap/water wash and rinse of outer boots as applicable and gloves Stage 3: Soap/water wash and rinse of the impermeable apron, as applicable. Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands Note: For remote locations away from the centralized decontamination unit: - Bag and/or wrap all disposable and reusable equipment, respectively for transport back to the decontamination unit. - Hygienic wipes may be used for cleaning hands and face **Equipment Decontamination** - All heavy and sampling equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner or pressure washer as prescribed in Table 5-1 for that task. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will have restricted access to exclusion zones. Vehicles will have their wheels/tires cleaned or sprayed off as applicable as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity. The FOL or the SHSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Task/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)*	Decontamination Procedures
		Solid white line edge of runway When lines are painted as a traffic control mechanism, this system is usually supported by radio communication. If radio communications are employed insure the direction repeats the request. For example – "Tower this TtNUS White Ford Pick-up requesting permission to cross 36R, Gate 2?" " TtNUS permission to cross 36R at Gate 2 granted, denied, or Hold." The drill rig mast will be equipped with an orange and white checkered flag 3x3 with 1-foot checks. 10) Hot Work – To control the potential hazards associated with welding the casing strings the following measures will be conducted - Use and application of the Hot Work Permit provided in Attachment IV with the Safe Work Permit for this task. This permit will provide the monitoring, shielding, PPE as well as other control measures instruction to control the potential hazards associated with this activity. - Insure any oils or coatings are removed from the casing. Decontaminate to the extent possible. - If the tank or tank components had residual fuels it is recommended that an intrinsically safe means of cutting (pneumatic saw, water cooled) be used. - Prior to welding, monitor LEL and Oxygen levels, proceed with the welding prior acceptable airborne concentrations are obtained/maintained. - Insure Fire control measures and a fire watch are in place, prior to commencing any welding activity. ***Natural hazards:*** 11) **Inclement Weather** – To minimize hazards of this nature, the following provisions shall be employed: - Wear appropriate clothing for weather conditions. - Provide acceptable shelter and replacement liquids for field crews as relief from excessive ambient temperatures. - Under conditions of elevated levels of PPE, periods of acclimatization, excessive ambient temperature extremes, or if you believe someone is suffering from a heat/cold related disorder, it may be necessary to conduct heat/cold stress monitoring. - Electrical storms/high winds - Suspend or terminate operations until directed otherwise by SHSO. Follow the provisions as specified in Section 4.0 of the Tetra Tech NUS, Inc. Health and Safety Guidance Manual regarding the identification and evaluation of heat/cold stress related conditions. 12) **Insect bites**. See Multi-media sampling for protective measures. These hazards are not anticipated to be as predominant during this activity or in this area.	overexposure does not occur. It should be noted that under UV exposure TCE will convert to phosgene. Noise monitoring may be conducted at the discretion of the SHSO. Action Level - >85 dBA Require participation in the Project Hearing Conservation Program. As a general rule of thumb, if you have to raise your voice to communicate with someone who is within arm's length of you, then noise levels are probably over 85 dBA and hearing protection should be used.		

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Task/Operation/Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment	Decontamination Procedures
Multi-media sampling, including - Monitoring Well Development using whale pumps and surge blocks - Groundwater Sampling using peristaltic pumps - Subsurface soils – Split Spoon samplers, disposable trowels. This activity will primarily be addressed under soil boring and monitoring well installation. Hazards are anticipated to be similar in all of these activities.	***Chemical hazards:*** 1) It is not anticipated that previously identified contaminants of concern (Trichlorethylene) will be encountered in sufficient concentrations that would represent an inhalation hazard concern. Incidental exposure through hand to mouth contact and ingestion is however possible. Further information on this contaminant is presented in Section 6.1. Additional potential chemical exposure could occur • Sample preservatives provided by the analytical laboratory and natural attenuation reagents. 2) Transfer of contamination into clean areas. ***Physical hazards:*** 3) Slip, trip, and fall hazards 4) Strain/muscle pulls from manual lifting 5) Cuts and Lacerations 6) Ambient temperature extremes (heat/cold stress) 7) Site Characterization/ Evaluation 8) Flight line hazards ***Natural hazards:*** 9) Animal and insect bites and encounters 10) Inclement weather	***Chemical hazards:*** 1) Safe work practices will be employed as the first line of defense. As a general rule, avoid contact with contaminated media (water, soils, etc.) as a universal control measure. In addition, good work hygiene practices include avoiding hand-to-mouth contact to the extent possible, washing hands and face or using hygienic wipes to remove potential contaminants from hands and face prior to breaks or lunch or other hand to mouth activities. ***Previously reported contaminants***. An evaluation of data on previously reported contaminants indicate that they will not be encountered in concentrations that would represent an inhalation threat. However, as part of the evaluation method of these subsurface media, all samples will be scanned with a PID to determined potential source concentration. When sampling groundwater wells exposure potential is the greatest when opening a well that has been sealed and may have gases present in the confined headspace. As a precaution, approach and sample as follows: - At arms length, open the well and step away (upwind). Let the well off gas for a few minutes, while you prepare your equipment. Airborne concentrations will recede and you can continue with your task. Do not open the well with your face over the well head due to the exposure potential as well as the potential to be struck by a pressurized cap. **Sample preservatives/natural attenuation reagents** - Collect, review and maintain MSDSs for sample preservatives and reagents that are used. 2) **Transfer of Contamination into Clean Areas** - Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. See decontamination of heavy and sampling equipment for direction in this task. In addition, the bulk of sampling equipment (i.e., tubing, trowels are disposable therefore dedicated). 3) **Slip, Trip, and Fall Hazards** – These hazards shall be minimized by adherence to the practices listed below. This includes: - Maintain proper housekeeping in all work areas. - Preview and inspect work areas to identify and eliminate slip, trip, or fall hazards. - Cover, guard, barricade, and or place warning postings over/at holes or openings that personnel may fall or step into. - For traversing steep, slippery, or sloped terrain establish rope ladders to control ascent and descent to sampling areas or use alternative pathways. - Use multiple persons and pack small loads to remote locations. 4) **Strain/Muscle Pulls from Manual Lifting** - Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques (See Lifting Mobilization/Demobilization, Table 5-1). 5) **Cuts and Lacerations** – Employ the following measures to reduce and/or eliminate the potential for cuts and lacerations - When cutting items - always use a sharp knife and always cut away from your body. Do not place items to be cut in your opposite hand or on your knee. - When possible use a cut resistant glove on your non-knife hand. - Carry all glassware and items that present a potential for cuts, lacerations, or impalement such as machetes or brush hooks in protective packaging or sheathed to avoid breakage or exposure in the event of a slip, trip, and/or fall. Used natural attenuation reagent vials should also be placed in a hard sided container (such as an empty plastic water bottle) for carrying and disposal. 6) **Ambient Temperature Extremes (Heat/Cold Stress)** - Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat/cold stress is provided in Section 4.0 of the Health and Safety Guidance Manual. Care should be exercised when working outdoors due to harmful effects of the sun. To reduce the potential for sunburn and melanoma the following measures should be employed: - Wear a hat that shades the face, neck, and ears. - Apply sunscreen with a SPF of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every two hours, more if you are sweating a lot. - Plan/provide suitable equipment to offer shade to avoid the midday sun since the sun's ultraviolet rays are most intense between 10 A.M. and 4 P.M. and can damage your skin even on hazy days. - Wear wrap-around sunglasses to protect the eyes and delicate skin around them. 7) **Site Characterization/Evaluation** - Work areas will be surveyed prior to committing personnel or resources. The survey will be conducted by the FOL and/or the SHSO. The purpose is to identify physical and natural hazards that may impact the proposed work area. These hazards are to be identified, barricaded, or eliminated to the extent possible to minimize potential effect to field crew. Furthermore. The FOL and/or the SHSO shall also perform operational surveys to insure proper use and application of identified control measures. 8) See Mobilization/Demobilization, Table 5-1 for information concerning control measures for vehicle and traffic hazards as it pertains to accessing and working on taxiways and runways. 9) **Insect/Animal Bites and Stings** - This is not considered a predominant hazard as these activities are to be conducted in well maintained areas. To combat the potential impact of natural hazards, the following actions are recommended Insects and spiders: - Wear light color clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control. - Tape pant legs to work boots to block direct access. This is especially critical when clearing or entering heavy brush and wooded areas. - Do not stick your hands or feet anywhere where you can't see. - When opening existing well heads be cautious of bees and spiders as these are preferred nesting locations. - Use repellents – Follow manufacturer's recommendations for use. Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Apply insect repellants containing DEET directly to skin. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. - If you leave your workboots at the trailer or office over your break make sure you shake them out before sticking your feet in them. 10) Suspend or terminate operations during electrical storms. Return to work when directed by the FOL and/or the SHSO.	1) Monitoring shall be conducted to qualify and quantify estimated source concentrations of on-site contaminants in support of the prescribed worker protection levels. Monitoring shall be conducted using Photoionization Detector (PID) with 10.6eV lamp strength. TCE Action Level – <50 ppm sustained in the workers breathing zone - continue to work; continue to monitor >50 ppm sustained in the workers breathing zone – Temporarily suspend site activities, Contact PHSO Sustained airborne concentrations above the identified action levels will result in ceasing the operation until airborne concentrations recede below acceptable (background) levels. Failure of these concentrations to diminish will require an upgrade in the level of protection or a change in the monitoring scheme and therefore a modification of this HASP. Monitoring shall be conducted at the prescribed depths as indicated on the boring logs at the source (borehole) and drillers breathing zone. Monitoring shall also be conducted at the sampler's location to in the same prescribed frequency when handling samples. Noise monitoring may be conducted at the discretion of the SHSO. Action Level - >85 dBA Require participation in the Project Hearing Conservation Program. As a general rule of thumb, if you have to raise your voice to communicate with someone who is within arm's length of you, then noise levels are probably over 85 dBA and hearing protection should be used.	***(Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)*** Level D protection will be utilized for the following sampling activities: • Monitoring Well Development using whale pumps • Groundwater Sampling using peristaltic pumps • Subsurface soils – Split spoon Samplers, disposable trowels. Sampler/Oversight Personnel: • Standard field dress (long pants, Sleeved shirts) • Hardhat (when within the height of the mast + 5-feet or 35-feet whichever is greater) • Steel toe safety shoes or work boots • Safety Glasses(when within the height of the mast + 5-feet or 35-feet whichever is greater) • Nitrile surgeon style inner gloves for sampling • Hearing protection (when within the height of the mast + 5-feet or 35-feet whichever is greater) • Impermeable boot covers • Reflective vest for traffic areas Protective Measures as specified for drilling and soil boring will be employed for all subsurface soil sampling at the drill rig. **Upgrades to Level C and B protection** are not anticipated. **Note:** Use of respiratory protection will require the implementation of the Tetra Tech NUS, Inc. Respiratory Protection Program provided in the Health and safety Guidance Manual. This action will require this HASP to be modified for this elevated level of protection. **Note:** The Safe Work Permit(s) for this task (See Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** Upon completion of the sampling: - Dedicated trowels, tubing, PPE will be rinsed and bagged for disposal. - Handi-Wipes or similar product will be used to clean hands, prior to moving to the next location. **Equipment Decontamination** Decontamination of equipment (sampling and hand tools) will proceed as indicated in Table 5-1 of this HASP and/or the Workplan.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Tasks/Operation/Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment	Decontamination Procedures
Decontamination of Heavy Equipment Decontamination of sampling equipment. It is anticipated that this activity will take place at a temporary centralized location. Gross contamination will be removed to the extent possible at the site. Contaminated tooling then will be wrapped in polyethylene sheeting for transport to the centralized location for a full decontamination and evaluation. Heavy Equipment decontamination - 1) Remove gross (visible) materials using scrapers, shovels as necessary (soils, etc.) 2) Use the pressure washer/steam cleaner remove remaining visible debris. 3) As necessary, follow up with scrub brushes with Alconox or Liquinox detergent wash. 4) Potable water rinse using pressure washer/steam cleaner as necessary 5) Air dry 6) Visual examination to insure cleanliness. Sampling Equipment Decontamination – 1) Remove heavy materials (soils, etc.) 2) Alconox or Liquinox detergent wash 3) Potable water rinse 4) Solvent rinse (Isopropanol) 5) DI water rinse 6) Air dry 7) Scan/screen articles using the PID to insure the removal of site contaminants as well as decontamination solvents.	***Chemical hazards:*** 1) It is not anticipated that previously identified contaminants of concern (Trichlorethylene) will be encountered in sufficient concentrations that would represent an inhalation hazard concern. Incidental exposure through hand to mouth contact and ingestion is however possible. Further information on this contaminant is presented in Section 6.1. - Transfer of contamination into clean areas or onto persons 2) Decontamination fluids - Liquinox (detergent); isopropanol (decontamination solvent) ***Physical hazards:*** 3) Lifting (strain/muscle pulls) 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Falling hazards 7) Slips, trips, and falls ***Natural hazards:*** 8) Inclement weather	1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Control potential non-occupational exposures through good work hygiene practices (i.e., avoid hand to mouth contact; wash hands and face before breaks and lunch; minimize contact with contaminated media). Obtain and familiarize yourself with manufacturer's MSDS for any decontamination fluids used on-site. Solvents may only be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS or within this HASP. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication Program provided in Section 5.0 of the TtNUS Health and Safety Guidance Manual. 3) Use multiple persons where necessary for lifting and handling heavy equipment for decontamination purposes. • Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization. 4) Wear hearing protection when operating the pressure washer and/or steam cleaner. Sound pressure levels measured during the operation of similar pieces of equipment indicate a range of 87 to 93 dBA. 5) Use eye and face protective equipment when operating the pressure washer and/or steam cleaner. Restrict nonessential personnel from the area. In addition to minimize hazards associated with this operation (flying projectiles, water lacerations and burns), the following controls will be implemented: • A Fan Tip 25° or greater will be used on pressurized systems over 3,000 psi. This will reduce the possibility of water lacerations or punctures. • Do not point the wand at persons or place against any part of your body. • Thermostat control will be in place and operational to control the temperature levels of the water where applicable. • Inspect hoses and fittings for structural defects • Construct deflection screens as necessary to control overspray and to guard against dispersion of contaminants. 6) Ensure wash and drying racks are of suitable construction to prevent heavier items such as outer casings and core rods from falling and striking someone during the decontamination process. 7) The decontamination pad should be constructed to contain wash waters generated during decontamination procedures. Temporary decontamination pads are usually 10-30 mil polyethylene or polyvinyl chloride tarp construction. Although these items when used as a liner offer containment, they also present a slipping hazard. When these temporary liners are employed, it is recommended that a light coating of sand be spread over the walking surface to provide traction: • In addition, adequate slope should be provided to the pad to permit drainage away from the object being cleaned. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks. • Hoses should be gathered when not in use to eliminate potential tripping hazards. 8) Suspend or terminate operations until directed otherwise by SHSO.	Use visual observation and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried. Monitoring instrumentation will be employed to determine If contaminants and all of the decontamination solvent (isopropanol, where use is applicable) has been removed through the rinse process. Any positive indication/results greater than background require the article that has been decontaminated to be re-rinsed and scanned again. If necessary this process should be repeated until no measurable indication of contaminants and/or the decontamination solvent exists.	For Heavy Equipment This applies to pressure washing and/or steam cleaning operations and soap/water wash and rinse procedures. ***(Items in italics are deemed optional as conditions or the FOL or SHSO dictate.)*** Level D Minimum requirements: • Hard hat with splash shield • Standard field attire (Long sleeve shirt; long pants) • Safety shoes (Steel toe/shank) • Chemical resistant boot covers • Nitrile or neoprene gloves • Safety glasses underneath a splash shield • Hearing protection (plugs or muffs) • *Hooded PVC Rainsuits or PE or PVC coated Tyvek.* Impermeable aprons may be used instead of coveralls if they offer adequate protection against overspray and back splash. **For sampling equipment** (trowels, split spoons,, etc.), the following PPE is required **Note**: Consult MSDS for PPE guidance. Otherwise, observe the following. Level D Minimum requirements: • Standard field attire (Long sleeve shirt; long pants) • Safety shoes (Steel toe/shank) • Nitrile outer gloves over nitrile inner gloves • Safety glasses • *Impermeable apron* **Note:** The Safe Work Permit(s) for this task (See Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; personnel will wash hand tools and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit or apron as applicable Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands **Equipment Decontamination** - All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SHSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Tasks/Operation/**Locations**	**Anticipated Hazards**	**Recommended Control Measures**	**Hazard Monitoring - Type And Action Levels**	**Personal Protective Equipment**	**Decontamination Procedures**
Surveying – Geographical The locations identified to be surveyed are largely within improved and well maintained areas. Therefore, the necessity to cut clear lines from vertical and horizontal control monuments is not anticipated.	***Chemical hazards:*** Significant exposure to site contaminants is not anticipated during this task. ***Physical hazards:*** 1) Slips, trips, and falls 2) Traffic hazards ***Natural hazards:*** 3) Inclement weather 4) Insect/animal bites or stings, poisonous plants, etc.	***Chemical hazards:*** Exposure to site contaminants are not anticipated during this activity. However, the Rod Man will be required to open monitoring well to take a Top of Casing shot. Exposure potential is the greatest when opening a well that has been sealed and may have gases present in the confined headspace. As a precaution, approach and open as follows: - At arms length, open the well and step away (upwind). Let the well off gas for a few minutes, while you prepare your equipment. Airborne concentrations will recede and you can continue with your task. Do not open the well with your face over the well head due to the exposure potential as well as the potential to be struck by a pressurized cap. ***Physical hazards:*** 1) Preview work locations and site lines for uneven and unstable terrain. A review of accident/injury statistics associated with land surveying identifies slips, trips, and falls as the number one injury cause, followed by cuts and lacerations, and animal/insect bites. 2) Vehicular traffic hazards: - Wear high visibility vests when working in traffic patterns. - Provide signage in areas where traffic patterns will be altered (Survey crew working; lane restriction, etc.). - See Mobilization/Demobilization, Table 5-1 for information concerning control measures for vehicle and traffic hazards as it pertains to accessing and working on taxiways and runways. ***Natural hazards:*** 4) Electrical storms or high winds - Suspend or terminate operations until directed otherwise by SHSO. Harmful effects of the Sun - Care should be exercised when working outdoors due to harmful effects of the sun. To reduce the potential for sunburn and melanoma the following measures should be employed: - Wear a hat that shades the face, neck, and ears. - Apply sunscreen with a SPF of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every two hours, more if you are sweating a lot. - To the extent possible, plan/provide suitable equipment to offer shade to avoid the midday sun since the sun's ultraviolet rays are most intense between 10 A.M. and 4 P.M. and can damage your skin even on hazy days. - Wear wrap-around sunglasses to protect the eyes and delicate skin around them. 5) **Insect/Animal Bites and Stings** - This is not considered a predominant hazard as these activities are to be conducted in maintained areas. However, to combat the potential impact of natural hazards, the following actions are recommended as neccessary: Insects and spiders - Wear light color clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control. - Tape pant legs to work boots to block direct access. This is especially critical when clearing or entering heavy brush and wooded areas. - Use repellents – Follow manufacturer's recommendations for use. Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Apply repellants containing DEET directly on skin surfaces. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. - Upon exiting the high brush and wooded areas perform a close body inspection to remove any ticks or other insects that have attached to your clothing or skin. - Do not stick your hands or feet anywhere where you can't see. - When opening existing well heads be cautious of bees and spiders as these are preferred nesting locations. See Section 4.0 of the TtNUS Health and Safety Guidance Manual for additional information concerning natural hazards.	Air monitoring is not required given the unlikelihood that airborne contaminants will be present. The potential for exposure to site contaminants during this activity is considered minimal.	*(Items In Italics Are Deemed Optional As Conditions Or The FOL Or the SHSO Dictate.)* Surveying activities shall be performed in Level D protection Level D Protection consists of the following: - Standard field dress including sleeved shirt and long pants - Shoes rugged lug sole for traction - Work gloves shall be worn when clearing brush. - *Safety glasses, hard hats (if working near machinery, overhead hazards, or clearing brush)* - *Snake chaps for heavily wooded area where encounters are likely.* - *Tyvek coveralls may be worn to provide additional protection against poisonous plants and insects, particularly ticks.* - *Reflective or blaze orange vests should be worn when working along traffic thoroughfares.* **Note:** The Safe Work Permit(s) for this task (See Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** - A structured decontamination is not required as the likelihood of encountering contaminated media is considered remote. However, survey parties should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to stop the transfer of these insects into vehicles, homes, and offices. In addition, early detection shall provide for early removal.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES NASCF, JACKSONVILLE, FLORIDA

Tasks/Operation/**Locations**	**Anticipated Hazards**	**Recommended Control Measures**	**Hazard Monitoring - Type And Action Levels**	**Personal Protective Equipment**	**Decontamination Procedures**
IDW Management and Handling This activity includes the following tasks: - Containerization - Labelling - Staging - Monitoring of IDW generated in support of site activities.	***Chemical hazards:*** The only anticipated chemical hazard associated with IDW management is the potential for a spill. In situations such as that the spill containment program identified in Section 10.0 of this HASP will be employed. ***Physical hazards:*** 1) Strains and sprains 2) Back injuries 3) Compressions 4) Loading bulk transport containers	***Chemical hazards:*** It is not anticipated that chemical hazards will be significant during this operation, as the IDW will be in sealed containers. It is anticipated that the IDW will represent a limited chemical hazard, if the container is breached. Control measures in this case will represent PPE and good work hygiene practices to control potential exposures during the implementation of the Spill Containment Program (See Section 10.0 of this HASP). ***Physical hazards:*** 1 & 2) **Strains and sprains (lifting hazards)/Back Injuries** – The predominant hazard associated with this activity is the movement of full or partially full 55-gallon drums of soils and/or water. To minimize hazards of this nature the following provisions shall be incorporated as applicable: - Use machinery (preferred method) or multiple personnel for heavy lifts. - Use proper lifting techniques: a. Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are available. b. Minimize the horizontal distance to the center of the lift to your center of gravity. c. Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. d. Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. e. Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. f. Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. In determining whether you can lift or move an item several factors must be considered, these are as follows: - Area available to maneuver the lift. - Area of the lift – Work place clutter, slippery surfaces, rough terrain - Your overall physical condition **3) Compressions** – Another hazard frequently associated with this task is the compression of hands and fingers when placing the containers on pallets. This typically occurs when rolling and lowering the container in its place. To combat this hazard, the following provision shall be employed: Material handling devices shall be used for moving drums within the satellite storage area. This includes drum dollies with pneumatic tires, drum grapplers, etc. to handle drums of IDW. These pieces of equipment are engineered to allow placement of these containers while keeping hands from pinch/compression points. **Reminder:** The drums you are attempting to move, lift and/or relocate may weigh on the average of: - 55-Gallon container of purge or decontamination waters = 475 lbs. (including the container) - 55-Gallon container of soils (moist) = 750 lbs. (including the container) Satellite Storage Area – Emphasis has been placed on the physical surroundings and how they can influence the potential hazards associated with material handling aspects of this task. To further reduce material handling hazards, support spill containment and control, and sampling when necessary, the IDW storage area should be structured as follows: - Maximum 4-drums to a pallet with retaining ring bolt and label on the outside for easy access/reference. - Maintain a minimum of 4-feet between each row of pallets. This is the minimum distance necessary to wheel drums on a drum dolly - If the site is not secured, the satellite storage area shall be fenced and signs placed indicating the following: a. Primary Point of Contact (Preferably someone at the Base, and make sure they know they been identified as the Primary Point of Contact). b. Phone Number c. Emergency Contact (If different from the Primary) - Provide a Drum/Container Inventory to the Primary Point of Contact and to Emergency Services, if they deem it necessary. The inventory should contain: a. Each drum shall be assigned a unique identification number. This number shall be placed on the label and drum shell using a paint marker (Note: Do not paint the number on the lid as these have a tendency to get exchanged from time to time.) b. Types of waste materials (Subsurface soils, drill cuttings; purge/development waters, etc.) c. Volumes (Full or level associated with the container after completion of the project location) d. Where it was derived from (IDW should be separated by SWMU and media) e. Dates (For all filled containers and at the completion of work for that area or SWMU) f. Contact – For more information Note: All drums should be labeled with the same information.	None Required, unless spill containment provisions are invoked. Then monitoring will proceed as described in the activity associated with the task when the materials were generated such as Soil boring or well installation.	*(Items In Italics Are Deemed Optional As Conditions or The FOL or the SHSO Dictate.)* Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Leather or canvas work gloves - *Safety glasses (When utilizing cables or slings to move the containers)* - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* PPE changes may be made with the implementation of the Spill Containment Program. This represents the only anticipated modification to this level of protection.	Not required, unless the implementation of the Spill Containment Program is required due to a spill and/or release. At that point the decontamination procedures for those activities such as soil borings and/or well installation. The reference reflects the tasks conducted when the materials were generated.

6.0 HAZARD ASSESSMENT AND CONTROLS

This section provides reference information regarding the chemical, physical, and natural hazards which may be associated with activities to be conducted as part of the scope of work. Table 6-1 provides specific information related to some of the various chemical hazards that may be present or generated at the planned project areas within NAS Cecil Field. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data are discussed in the table.

6.1 CHEMICAL HAZARDS

Buildings 324/1845 Area

Previous investigations results have indicated Trichloroethylene (TCE) in groundwater. Other contaminants were found only in trace levels to non-detects. Previous soil sample results have also indicated that concentrations of contaminants to be in trace levels or non-detects.

Chlorinated Solvents – These solvents generally express symptoms including

- Irritating at all points of contact. Chronic or elevated concentrations directly contacting the skin may result in dermatitis.
- Inhalation of high concentrations (not anticipated in an outdoor environment) can result in CNS effects including dizziness, blurred vision, overexcitement, narcotic effects, and unconsciousness. Systemic effects through inhalation can also result in altered (erratic) heart beat and possible cardiac arrest.

See Table 6-1 for more information concerning this contaminant.

6.2 PHYSICAL HAZARDS

The physical hazards that may be present during the performance of site activities are summarized below:

- Lifting
- Noise in excess 85 dBA
- Flying projectiles
- Vehicular and foot traffic
- Ambient temperature extremes
- Slips, trips, and falls

These physical hazards are discussed in Table 5-1 as applicable to each site task. Further, most of these hazards are discussed in detail in Section 4.0 of the Health and Safety Guidance Manual.

TABLE 6-1

CHEMICAL/PHYSICAL/TOXICOLOGICAL PROPERTIES

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Trichloroethylene	79-01-6	**PID:** I.P. 9.45 eV, 0.54 correction factor using a 10.6eV Lamp **FID:** 70% Response with FID.	Air sample using charcoal tube; carbon disulfide desorption; Sampling and analytical protocol shall proceed in accordance with OSHA Method #07, or NIOSH Method #1022 or #1003.	**OSHA:** 50 ppm 200 ppm (Ceiling) **ACGIH:** 50 ppm 100 ppm STEL **NIOSH:** 25 ppm **IDLH:** 1000 ppm	**Inadequate** - Odor threshold 82 ppm. APRs with organic vapor/acid gas cartridges may be used for escape purposes. Exceedances over the exposure limits require the use of positive pressure-demand supplied air respirator. **Recommended gloves:** PV Alcohol unsupported >16.00 hrs; Silver shield >6.00 hrs; Teflon >24.00 hrs; or Viton >24.00 hrs; Nitrile (Useable time limit 0.5 hr, complete submersion for the nitrile selection)	**Boiling Pt:** 188°F; 86.7°C **Melting Pt:** -99°F; -73°C **Solubility:** 0.1% @ 77°F; 25°C **Flash Pt:** 90°F; 32°C **LEL/LFL:** 8% @ 77°F; 25°C **UEL/UFL:** 10.5 @ 77°F; 25°C **Vapor Density:** 4.53 **Vapor Pressure:** 100 mmHg @ 90° F; 32°C **Specific Gravity:** 1.46 **Incompatibilities:** Strong caustics and alkalis, chemically active metals (barium, lithium, sodium, magnesium, titanium, and beryllium) **Appearance and Odor:** Colorless liquid with a chloroform type odor. Combustible liquid, however, burns with difficulty.	Central nervous system effects including euphoria, analgesia, anesthesia, paresthesia, headaches, tremors, vertigo, and somnolence. Damage to the liver, kidneys, heart, lungs, and skin have also been reported. Contact may result in irritation to the eyes, skin, and mucous membranes. Ingestion may result in GI disturbances including nausea, and vomiting NIOSH lists this substance a potential human carcinogen.

6.3 NATURAL HAZARDS

6.3.1 Insect/Snake Bites and Stings, Poisonous Plants, etc.

As the majority of the activities will take place within a light industrial area/along the flight line predominant natural hazards of this type are considered negligible, however, are not out of the realm of possibility. Where field personnel may encounter these hazards are as follows:

- Protective casings – Preferred nesting location for bees and spiders.

- Items providing ground cover – Snakes will hide under articles providing ground cover especially in areas not disturbed (such as the maintenance storage yard). If you must pick up an article on the ground to gain access to a sample location or for whatever reason:
  - Do Not stick your hands or feet in areas where you cannot see, use a hand tool.
  - Always when picking up an article providing ground cover, always pull it towards yourself so it may serve as a shield should there be something underneath.

- Well Pads – Snakes often prefer the concrete pads for sunning themselves. In addition, fire ants find these locations as prime nesting areas.

6.3.1.1 Fire Ants

Various insects and animals may be present and should be considered. For example, fire ants present a unique situation when working outdoors in Florida. Their aggressive behavior and their ability to sting repeatedly can pose a unique health threat. The sting injects venom (formic acid) that causes an extreme burning sensation. Pustules form which can become infected if scratched. Allergic reactions of people sensitive to the venom include dizziness, swelling, shock and in extreme cases unconsciousness and death. People exhibiting such symptoms should see a physician. Fire ants can be identified by their habitat. They build mounds in open sunny areas sometimes supported by a wall or shrub. The mound has no external opening. The size of the mound can range from a few inches across to some which are in excess of two feet or more in height and diameter. When disturbed they defend it by swarming out and over the mound, even running up grass blades and sticks.

All site personnel who are allergic to stinging insects such as bees, wasps, hornets, and ants must be particularly careful since severe illness and death may result from allergic reactions. As with any medical

condition or allergy, information regarding the condition must be listed on the Medical Data Sheet and the FOL and SHSO notified.

6.3.1.2 Tick Borne Illnesses

During warm months (spring through early fall), tick-borne Lyme's Disease and STARI (Southern Tick-Borne Associated Rash Illness) may pose a potential health hazards for field personnel. The longer a disease carrying tick remains attached to the body, the greater the potential for contracting these diseases.

Prevention is typically facilitated through taping pants to boots and using insect repellant as well as performing frequent body checks to prevent long term attachment. Site first aid kits should be equipped with medical forceps and rubbing alcohol to assist in tick removal. For information regarding tick removal procedures, and symptoms of exposure consult Section 4.0 of the HSGM.

6.3.1.3 Mosquito-Borne Illness

Mosquitoes may carry diseases including St. Louis encephalitis, Eastern equine encephalitis, La Crosse encephalitis and West Nile virus.

Although mosquito-borne viral illnesses are rare in humans, a Kill Devil Hills, N.C., woman recently died after she came down with Eastern equine encephalitis from an infected mosquito.

Mosquitoes become infected after biting infected birds. The symptoms for mosquito-borne illnesses may include headache, moderate to high fever, stiff neck and confusion. In serious cases coma, seizures or paralysis can result. Symptoms usually appear between 5 to 15 days after exposure to infected mosquitoes. Mosquito-borne illnesses may be mild or serious and can lead to death.

West Nile Virus

Encephalitis is an inflammation of the brain and can be caused by bacteria and viruses. West Nile encephalitis is caused by a virus transmitted to humans by mosquitoes. West Nile virus is commonly found in Africa, West Asia, and the Middle East. It is closely related to St. Louis encephalitis virus found in the United States. The West Nile-like virus that has been found in United States is genetically related to West Nile virus, but because of genetic differences it may be a new subtype of West Nile virus.

The mosquito becomes infected by feeding on birds infected with the West Nile virus. Infected mosquitoes then transmit the West Nile virus to humans and animals when biting (or taking a blood-meal).

West Nile encephalitis is NOT transmitted from person-to-person. There is no evidence that a person can get the virus from handling live or dead infected birds. However, avoid bare-handed contact when handling any dead animals, including dead birds. Ticks have not been implicated as vectors of West Nile-like virus.

Mild infections are common and include fever, headache, and body aches, often with skin rash and swollen lymph glands. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions, paralysis and, rarely, and death (especially in the elderly and very young). The incubation period of West Nile encephalitis is usually 3 to 12 days.

No cases have previously been reported in the U.S. prior to September 1999 (in New York). To date seven deaths in New York have been attributed to West Nile Virus.

Eastern Equine Encephalitis (EEE)

The Florida Department of Health and Rehabilitative Services (HRS) in 1991 confirmed five human cases of eastern equine encephalitis (EEE) in elderly residents of Bradford, Duval, and Washington counties in northern Florida. Dates of illness onset were in mid-June and early July. One patient partially recovered and has residual neurologic deficits, two patients remain comatose, and the other two patients died.

Eastern Equine Encephalitis is spread to horses and humans though the bite of an infected mosquito. The mosquito becomes infected after biting an infected bird. EEE can cause severe complications and even death. Symptoms for EEE in humans begin with high fever, chills, soar throat, nausea and vomiting. The illness can affect the central nervous system, cause sudden fever, severe headache, mental confusion, seizures and coma. Symptoms usually appear between 5 to 15 days after exposure to infected mosquitoes. There is no cure for EEE in humans.

Precautions include:

- Limit outdoor activities during peak mosquito times – at dusk and dawn.
- Avoid standing water
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Apply insect repellent according to manufacturers instruction to exposed skin. An effective repellent will contain 20% to 30% DEET (N,N-diethyl-meta-toluamide). Avoid products containing more than 30% DEET.
- Spray clothing with repellents containing permethrin (such as Permanone) or DEET, mosquitoes may bite through thin clothing.

6.3.2 Ambient Temperature Extremes (Heat Stress)

Given the geographic location of the site and the project schedule, overexposure to high ambient temperatures (heat stress) may exist during performance of this work depending on the project schedule. Work performed when ambient temperatures exceed 70 °F may result in varying levels of heat stress (heat rash, heat cramps, heat exhaustion, and/or heat stroke) depending on variables such as wind speed, humidity, and percent sunshine, as well as physiological factors such as metabolic rate and skin moisture content. Additionally, work load and level of protective equipment will affect the degree of exposure. Site personnel will be encouraged to drink plenty of fluids to replace those lost through perspiration. Additional information such as Work-Rest Regimens and personnel monitoring may be found in section 4.0 of the Health & Safety Guidance Manual.

Temperature extremes are considered inclement weather. Steps should be taken to the extent possible protect site personnel from the effects of heat stress and the sun. Control measures include

- Watch for signs of heat stress/exhaustion, See Heat Strain SymptomsTable below.
- Provide fluid replacement
- Provide adequate number of breaks within a cooler environment.

Care should be exercised when working outdoors due to harmful effects of the sun. To reduce the potential for sunburn and melanoma the following measures should be employed

- Wear a hat that shades the face, neck, and ears.
- Apply sunscreen with a SPF of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every two hours, more if you are sweating a lot.
- Plan/provide suitable equipment to offer shade to avoid the midday sun since the sun's ultraviolet rays are most intense between 10 A.M. and 4 P.M. and can damage your skin even on hazy days. Portable canopies over the sample station are an example of this.
- Wear wrap-around sunglasses to protect the eyes and delicate skin around them.

HEAT STRAIN SYMPTOMS

STOP WORK if any worker demonstrates any of the following

Heart Rate	Sustained (several minutes) heart rate minus worker's age > than 180 beats per minute (bpm) measured at any time.
Body Core Temperature	> 101.3°F (38.5° C)
Recovery Heart Rate	> 110 bpm (Measured 1 minute after peak work effort)
Other symptoms	Sudden and sever fatigue, nausea, dizziness, or headache

Individuals May Be At Greater Risk of Heat Stress If:

Profuse sweating is sustained over hours
Weight loss over a shift is > 1.5% of beginning body weight
24-hour urinary sodium excretion is less than 50 nmoles

6.3.3 Inclement Weather

Project tasks under this Scope of Work will be performed outdoors and near water. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, hurricanes, etc.), the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

Tropical Storms and Hurricanes

As Florida is a tropical storm, hurricane prone area, the following information is supplied to explain the potential severity of these natural hazards. The decision to curtail operations and evacuate the area should be made by the FOL, PM, and the HSM.

During the early summer to late fall months, typically from the first of June through the end of November, disturbances migrating off the West Coast of Africa move into the Atlantic Ocean and develop into tropical cyclones known as tropical storms and hurricanes. Many of these cyclones become strong enough to threaten life and property along the Eastern Seaboard and Gulf Coast. There are three main threats associated with tropical storms and hurricanes:

- High winds
- Excessive rainfall
- Storm surge

The impacts of high winds and excessive rainfall occur hours, maybe days, before the tropical storm or hurricane makes landfall. However, the storm surge accompanies the storm or hurricane at the time that landfall occurs.

High Winds

Sustained winds vary greatly from storm to storm, but can range from 39 to 73 miles per hour (wind speeds associated with a tropical storm) to greater than 74 miles per hour (minimal wind speed for a Category 1 hurricane). Table 6-2 compares the type of storm or hurricane and the corresponding wind speed.

Table 6-2

Tropical Storm/Hurricane Rating Scale

TYPE	CATEGORY*	WINDS (MPH)
Tropical Depression	NA	>35-38
Tropical Storm	NA	39 – 73
Hurricane	1	74 – 95
Hurricane	2	96 – 110
Hurricane	3	111 – 130
Hurricane	4	131 – 155
Hurricane	5	>155

Based on the Saffir-Simpson scale

NA – Not Applicable

In addition to strong winds, there is the threat of debris (i.e. building material, trees, etc.) becoming airborne projectiles as they are carried by the high winds. Thunderstorms and tornadoes embedded within the tropical storm or hurricane can further increase the wind speeds on a localized level.

In preparation for high winds and storms –

- Secure all loose articles – Lash empty drums or associated containers together contained within storage areas.
- During electrical storms/high winds lower mast evacuate to a safe refuge location.

Excessive Rainfall

Heavy rains associated with tropical storms and hurricanes also vary greatly from storm to storm. On average, an inch of rainfall an hour is not uncommon with major hurricanes, somewhat lesser amounts

with tropical storms. However, the primary threat is not the intensity of rain, but the duration of rainfall. Since many tropical storms and hurricanes are slow-movers, they are capable of producing sustained heavy rainfall over a long period of time. It is not uncommon for an area to receive nearly 20 inches of rain in 24 hours. Under these conditions, street; stream and creek flooding is inevitable only to be exacerbated by locally heavier rains from thunderstorms.

Storm Surge

The storm surge is an abnormal rise in sea level accompanying a hurricane or tropical storm. The height of the storm surge (usually measured in feet) is the difference in sea level from the observed level (during the storm) and the level that would have occurred in the absence of the storm or hurricane. The more intense the storm or hurricane the higher the storm surge. Storm surges become even higher if they occur during periods of high tide. Table 6-3 defines some of the terminology and possible calls to action regarding tropical cyclones:

Table 6-3
TROPICAL STORM/HURRICANE
WATCH AND WARNING

STORM DESCRIPTION	DEFINITION	CALL TO ACTION
Tropical Storm Watch	Tropical storm conditions are possible in the specified area of the watch, usually within 36 hours	Weather conditions should be monitored for further advisories. Prepare for possible evacuation by local officials
Tropical Storm Warning	Tropical storm conditions are expected in the specified area of the warning, usually within 24 hours.	Work should be suspended in areas where lightning, high winds and rainfall could pose a threat to life. Mandatory evacuations may be enforced by local officials.
Hurricane Watch	Hurricane conditions are possible in the specified area of the watch, usually within 36 hours.	Weather conditions should be monitored for further advisories. Prepare for possible evacuation by local officials
Hurricane Warning	Hurricane conditions are expected in the specified area of the warning, usually within 24 hours.	Mandatory evacuations will most likely be enforced by local officials.

A NOAA Weather Radio is the best means to receive watches and warnings from the National Weather Service. The National Weather Service continuously broadcasts updated hurricane advisories that can be received by widely available NOAA Weather Radios.

7.0 AIR MONITORING

A direct reading instrument such as a PID will be used at the site to detect and measure the presence and concentration of airborne site contaminants.

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points including boreholes, well heads, drum openings and worker breathing zone areas, while observing instrument action levels. Action levels are discussed in each Table 5-1 as they may apply to a specific task or location.

7.1.1 Photoionization Detector

A Photoionization Detector (PID) with a 10.6 eV (or equivalent) lamp will be used to monitor potential sources areas and to screen collected samples and breathing zones of employees during sampling activities. All results are compared to the reference calibration standard of isobutylene. The correction factor for Trichloroethene is 0.54. So if your result is 100 ppm, multiply that result by 0.54 which gives you the actual airborne concentration of 54 ppm. The action level provided in Table 5-1 and on the Safe Work Permits have already incorporated this correction factor. Prior to the commencement of any field activities, the background level of the site must be determined and noted. Daily background readings must be taken away from areas of potential contamination to obtain accurate results. These readings, and any influencing conditions (i.e., weather, temperature, humidity) and location will also be documented in the Health and Safety Logbook as a matter of reference.

7.1.2 LEL/O_2 Meter

A LEL/O2 Meter will be employed during Hot Work Operations. During the installation of the casing (for the deep wells), the casing will be threaded and tack welded during installation. Prior to welding these joints the piping casing will be monitored for the presence of combustible gases. The action level as it pertains to this task is provided in Table 5-1 for well installation.

7.1.3 Hazard Monitoring Frequency

Table 5-1 presents the frequencies that hazard monitoring will be performed as well as the action levels that will initiate the use of personnel retreat or the need for elevated levels of protection. The SHSO may decide to increase these frequencies based on instrument responses and site observations. The frequency at which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the TtNUS Equipment Manager. Operational checks and field calibration will be performed on all instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedures which are provided with each instrument. All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that all of the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number
- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NAS Cecil Field
SITE NAME: Building 324/1845 Area
PROJECT No.: N8925

INSTRUMENT NAME/MODEL:
MANUFACTURER:
SERIAL NUMBER:

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	
			0.0ppm 100 ppm	0.0ppm 100 ppm	ppm ppm	ppm ppm	Lot #: Exp. Date:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NAS Cecil Field
SITE NAME: Building 324/1845 Area
PROJECT No.: N8925

INSTRUMENT NAME/MODEL: LEL/O2 Meter
MANUFACTURER:
SERIAL NUMBER:

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	
			O2 - 19.5/23.5% LEL 0/10%	O2 - 19.5/23.5% LEL 0/10%	% (O2) %(LEL)	% (O2) %(LEL)	Lot #: Exp. Date:	

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

This section is included to specify health and safety training and medical surveillance requirements for TtNUS and subcontractor personnel participating in site activities.

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

All TtNUS and subcontractor personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the NAS Cecil Field. TtNUS and subcontractor personnel who have had introductory training more than 12 months prior to site work, must have completed 8 hours of refresher training within the past 12 months before being cleared for site work. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120(e)(4) will be required for site supervisory personnel.

Documentation of TtNUS and subcontractor introductory, supervisory, and refresher training as well as site-specific training will be maintained at the site. Copies of certificates or other official documentation will be used to fulfill this requirement.

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to all TtNUS and subcontractor personnel who will perform work on this project. Site-specific training will include:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Medical surveillance requirements
- Safe use of engineering controls and equipment
- Contents of the Health and Safety Plan
- Signs and symptoms of overexposure to site contaminants
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Emergency response procedures (evacuation and assembly points)
- Associated hazards and restricted areas within the NAS Cecil Field.

Site-specific training documentation will be established through the use of Figure 8-2.

8.2.1 Ramp Training (Air Side) at NASCF

All personnel who will require access to the taxi-ways and/or runways will be required to attend a Ramp School. This training is intended to provide facility specific direction for activities within these areas. Ramp Training is provided by Mr. David Dollarhide, Jacksonville Airport Authority, Operations Technician (904) 573-1610 (Business); (904) 219-6699 (Cell). Coordination for training will be coordinated through Mr. Dollarhide. All personnel successful completing the training will be provided a card attesting to such. Copies should be provided to the FOL and/or the SHSO for retention in a central file.

8.3 MEDICAL SURVEILLANCE

All TtNUS and subcontractor personnel participating in project field activities will have had a physical examination meeting the requirements of 1910.120(f). Documentation for medical clearances will be maintained at the project site.

8.3.1 Requirements for All Field Personnel

Each field team member, including subcontractors and visitors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet found in Section 7.0 of the TtNUS Health and Safety Guidance Manual. See also Attachment V. This shall be completed and provided to the SHSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with any additional information you would wish them to have should you become incapacitated, but would be necessary in order to administer medical attention.

FIGURE 8-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing remedial investigation activities at NAS Cecil Field, Jacksonville, Florida, and that I have received site-specific training which included the elements presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review of contents of relevant Material Safety Data Sheets
- Review of Safe Work Permits
- Emergency response procedures (evacuation and assembly points)
- Associated hazards and restricted areas within the NAS Cecil Field.

I have been given the opportunity to ask questions and that all of my questions have been answered to my satisfaction. The date of my training (introductory, refresher, and supervisory, as applicable) and my medical surveillance requirements are accurate and correct to the best of my knowledge.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam

9.0 SITE CONTROL

This section outlines the general means by which TtNUS will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a fractured three-zone approach will be used during work at this site. This three zone approach will utilize an exclusion zone, a contamination reduction zone, and a support zone. It is also anticipated that this control measure will be used to control access to site work areas. Use of such controls will restrict the general public, minimize the potential for the spread of contaminants, and protect individuals who are not cleared to enter work areas.

9.1 EXCLUSION ZONE

9.1.1 Exclusion Zone Dimensions/Boundaries

Exclusion Zone boundaries are as follows:

Rotosonic Drilling Operations – The Exclusion Zone boundary for this operation will be set at the height of the mast plus 5 feet or 40-feet whichever is greater. It is determined at this distance, non-essential personnel will be removed from potential physical hazards associated with this operation. This determination would include catastrophic failure of the boom and associated cables. In addition, it has been determined that at this distance will remove personnel from areas impacted by noise levels associated with these types of rigs.

DPT Operations – The height of the fully extended mast plus 5 feet or 25 feet, whichever is greater. This boundary demarcation has been selected based on removal of personnel from hazards associated with this operation. In this case our primary concern is physical hazards, pressurized lines and systems and noise. By establishing the line at least at 25 feet will provide a sufficient distance for protection from flying projectiles associated with pressurized systems, as well as, providing sufficient distance thereby reducing potential for excessive noise exposure.

Groundwater sampling/Aquifer Testing/Well Development – 8 feet surrounding the well and discharge receptacle container.

Soil sampling – See Rotosonic/DPT operations above.

Decontamination – Using pressure washers/steam cleaners 25 feet surrounding the point of operation or 15 feet surrounding a constructed pad.

All persons working inside these demarcated areas will adhere to the protective requirements indicated in Table 5-1, Safe Work Permits (Attachment IV) for that operation.

9.1.1.1 Flying Objects and Debris (FOD)

FOD can best be defined as loose debris/articles that can be sucked into an aircrafts engine/turbine causing significant degree of damage, as well as, safety hazards associated with the engine disintegrating. To control hazards associated with the potential transfer of FOD the following exclusion zone activities will be incorporated

- Equipment tires will be checked prior to entering taxiways/runways to ensure they (tires) does not track or carry in stones and associated debris.
- All equipment entering the Air Side will travel over the FOD racks to shake out any loose debris or articles.
- Non-essential equipment will be secured prior to entering areas where FOD is considered a problem.
- All equipment used in FOD sensitive areas will be accounted for.
- All exclusion zones will be closed by the FOL and/or the SHSO to ensure the area has been restored and all articles considered potential FOD has been removed.

9.1.1.2 Hot Work

The installation of some of the wells will require the permanent installation of casing to the top of rock. During this installation, the casing will be threaded and spot welded using shielded metal arc welding methods. This work will be at the borehole as the 20-feet lengths of casing are installed. The work will be conducted in accordance with the provisions identified on the Hot Work Permit provided in Attachment IV, along with the Monitoring Well Installation/Soil Boring Safe Work Permit. It will be the responsibility of the FOL and/or SHSO to incorporate any facility requirements as dictated by the Area Manager (Land Side or Air Side).

9.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone will be split to represent two separate functions. The first function will be a control/supply point for supporting Exclusion Zone activities. The second function, which may take place a sufficient distance from the Exclusion Zone, is the decontamination of personnel and heavy equipment.

In order to move from the Exclusion Zone to a separate location the following activities will be used:

Rotosonic/DPT Operations

- Potentially contaminated tooling will be wrapped, when necessary, for transport to the decontamination area.
- All tooling will be pressure washed and/or steam cleaned and chemically decontaminated, per the work plan.
- All tooling will be evaluated by the FOL and/or the SHSO prior to being released for service at a new location. This evaluation will consist of
  - Visual inspection to ensure all debris (i.e., mud, dirt, any apparent sheen) has been removed through the soap and water washing process.
  - Instrument scan using a PID. This will be performed to ensure removal of all contaminants of concern, as well as, identified decontamination solvent (isopropanol) used on equipment that may contact the sample media. If positive results above background are achieved, the identified pieces will require rinsing to be repeated.

Groundwater Sampling/Aquifer Testing/Well Development

- As samplers move from location to location during sampling activities, dedicated sampling devices and PPE will be flushed with clean water, separated, and bagged for disposal. Personnel will use hygienic wipes, such as Handy Wipes, as necessary to clean hands and face until they can access soap and water.

- Muddy over-boots and gloves may be required to go through a gross contamination wash at the Exclusion Zone or be bagged until they can be cleaned at a central decontamination location.

- Potentially contaminated tooling will be wrapped, when necessary, for transport to the decontamination area.

- Upon completion of the assigned tasks all personnel will move through the central decontamination area to clean reusable PPE and field equipment.

9.3 SUPPORT ZONE

The support zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. In all cases, the support zones

will be established at areas of the sites where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies.

9.4 SAFE WORK PERMITS

All exclusion zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task-by-task and site-by-site basis. An example of the Safe Work Permit to be used is illustrated in Figure 9-1. Partially completed Permits for the work to be performed will be are included as Attachment IV of this HASP. The daily meetings conducted at the sites will further support these work permits. This will ensure all site-specific considerations and changing conditions are incorporated into the planning effort. All permits will require the signature of the FOL and SHSO.

Use of these permits will provide the communication line for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The work permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

9.5 SITE VISITORS

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel [i.e., Department of Defense (DOD), Florida Department of Environmental Protection (FDEP), Environmental Protection Agency (EPA), OSHA)
- Southern Division Navy Personnel
- Other authorized visitors (City of Jacksonville, Jacksonville Port Authority)
- All non-DOD personnel working on this project are required to gain initial access to the base by coordinating with the TtNUS FOL or designee and following established base access procedures.

Once access to the base is obtained, all personnel who require site access into areas of ongoing operations will be required to obtain permission from the FOL and the Base Contact.

Upon gaining access to the site, **all site visitors wishing to observe operations in progress will be escorted by a TtNUS representative** and shall be required to meet the minimum requirements discussed below:

All site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), the entity which they represent, and the purpose of the visit.

All site visitors will be required to produce the necessary information supporting clearance to the site. This shall include information attesting to applicable training and medical surveillance as stipulated in Section 8.0 of this document. In addition, to enter the site operational zones during planned activities, all visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

Once the site visitors have completed the above items, they will be permitted to enter the operational zone. All visitors are required to observe the protective equipment and site restrictions in effect at the site at the time of their visit. All visitors entering the exclusion zones during ongoing operations will be accompanied by a TtNUS representative. Any and all visitors not meeting the requirements, as stipulated in this plan, for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause the termination of all on site activities until the unauthorized visitor is removed from the premises. Removal of unauthorized visitors will be accomplished with support from the Base Contact. If necessary, the Base Contact will be notified of any unauthorized visitors.

9.6 SITE SECURITY

Site security at this facility will reflect four separate security contingencies. They are as follows:

Contingency 1

Access to the facility is regulated and controlled by the City of Jacksonville, Florida. This is also referred to as the “Land Side”. No approval is typically required to gain access to the facility, however, a Guard is posted at the Main Gate. When and if entering the facility you will need to make sure you have your

- Driver’s License or some other form of Photo Identification
- Proof of Vehicle Insurance (If operating a Motor Vehicle)

City of Jacksonville Liaison: Mr. Ralph Hogan (904) 771-6397
Cecil Field Facilities Manager – Ms. Diana Stone: (904) 573-1604

Contingency 2

The areas of operation identified in the scope of work approaches and encroaches on areas determined to be part of the “Air Side”, which is operated under the control of the City of Jacksonville Port Authority (JPA). Access to these areas will require the following

- A one month notice is required to be provided to the JPA for activities on or near runways/taxiways.
- A 2-week notice is required to be provided to the JPA for activities on aprons or areas approaching runways/taxiways.
- Ramp training is required.

This notification is to be provided in a letter stating who?, what?, when?, where?, and how?. This letter is to be addressed to Mr. Rusty Chandler (904) 573-1613 (JPA Facility Manager). Copy Ms. Diana Stone (Cecil Field Facilities Manager) (904) 573-1604. Currently, all letters requesting access to NASCF Air Side should be process through Mr. Mervin Dale (Tetra Tech NUS, Inc. Access/Security Liaison at the Jacksonville Office (904) 636-6125.

Hours of Operation of the Tower is 8:00 a.m. through 6:00 p.m. Monday through Friday. Air Command operates the runways during the weekend. Early start or weekend work must seek prior approval through the identified notification process.

Contingency 3

Within the areas controlled by the JPA is tenant property, who within some of the operational areas exercise security control. The process is as follows:

A letter to the Facility Manager (1 weeks notice is required). In addition, to the previous indicated letter content, the letter must state all personnel are US Citizens. Again the letter will be coordinated through Mr. Mervin Dale (Tetra Tech NUS, Inc. Access/Security Liaison) at the Jacksonville Office (904) 636-6125.

Contingency 4

This contingency will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas once access and operations are established.

FIGURE 9-1
SAMPLE SAFE WORK PERMIT

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Decontamination of MacroCore Samplers (or similar equipment) drive rods, associated sampling equipment typically occurs within 5-gallon buckets (soap and water wash and rinse). Typically only the acetate liner and the cutting shoe actually contact the sample media. Decontamination of heavy equipment and machinery (i.e., drill rigs and flights) will occur using pressure washers and/or steam cleaning units. This will be accomplished at a constructed temporary decontamination pad at the work site.

II. Primary Hazards: Potential hazards associated with this task include lifting (strain/muscle pulls lifting heavy drilling equipment); Flying projectiles propelled by the force of the pressure washer/stream cleaner; noise in excess of 85 dBA; Burns/water lacerations; Stacked equipment - falling hazards; slips, trips, and falls – slippery surfaces. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards. It should be noted that not every situation can be anticipated. Site personnel will therefore have to conduct on-site hazard assessments on a per task basis and employ controls as necessary.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☒ Yes ☐ No Initials of Inspector _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: None anticipated

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
Liquinox (soap)	None Required	None	Eye irritant/flush with clean water
VOCs/PAHs	No monitoring required	None	Exposure not anticipated

Primary Route of Exposure/Hazard: Soap – Contact - eye irritant; ingestion- nausea possible vomiting, diarrhea; VOCs/PAHs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Chronic or repeated exposures may result in defatting of the skin and dermatitis.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☐ Yes	☒ No
Splash Shield	☒ Yes	☐ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type – Nitrile)	☒ Yes	☐ No
Impermeable apron	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☒ Yes	☐ No
High Visibility vest	☐ Yes	☒ No	Tape up/use insect repellent	☐ Yes	☒ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: Impermeable aprons may be used to control splashing/overspray. If this is inadequate replace with rainsuit or PE coated Tyvek. Hard hat, splash shield, and hearing protection will be worn when working near operating equipment or during pressure washer/steam cleaner operation. Gloves – Nitrile (surgeons style) or nitrile type outer gloves for deconning associated sampling equipment. Overboots will be used when working in the temporary decontamination pad.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Suspend site activities in the event of inclement weather (storms, high winds,etc.). Employ proper lifting techniques as described on Table 5-1 for Mobilization/Demobilization. Construct pad as per Table 5-1 Decontamination. Use washing/drying racks to secure heavy equipment to prevent items from falling during washing and drying. In addition, do NOT point the wand at other people or place it against any part of your body. Accidental compression of the trigger can cause water lacerations or burns. All hoses and fittings will be inspected to insure structural integrity prior to use. For pressure washers or steam cleaners in excess of 3,000 psi, a fan tip of 25° or greater will be used to control potential for water cuts or lacerations. A light coating of sand should be applied to the plastic liner should the surface becomes too slippery to prevent slips. Keep hoses gathered to prevent trips and falls. A site control boundary for this activity is 25-feet surrounding the point of operation. Follow directions provided in the MSDSs for any decontamination solvents/solutions used in the decontamination procedure.

Permit Issued by:_____ Permit Accepted by:_____

9.7 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map may be generated for each field event and adjusted as site conditions change. These maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

9.8 BUDDY SYSTEM

Personnel engaged in on-site activities will practice the "buddy system" to ensure the safety of all personnel involved in site operations.

9.9 CHEMICAL INVENTORY/MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

The FOL and/or the SHSO will develop a chemical inventory list of all chemicals used on site. A sample is provided in the HSGM. For each chemical listed on the inventory list, TtNUS and subcontractor personnel will provide MSDSs for all chemicals brought on the sites. The contents of these documents will be reviewed by the SHSO to insure these documents are complete, accurate, and current. Users of the chemical substances will be required to review the MSDSs prior to any actual use or application of the substances on site, if they are unfamiliar with the hazards of the chemical substances and/or the recommended control measures. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

9.10 COMMUNICATION

As personnel will not always be working in proximity to one another during field activities, a supported means of communication between field crews members will be necessary. Two way radios will be used to accomplish this means of communication.

In addition, communications with the tower may be required should operations need to encroach upon taxi-ways and/or runways. Currently, the Jacksonville Office (Mervin Dale) has two radios programmed to the necessary frequency to permit communications with the tower. If required additional radios may be purchased and programmed alike.

External communication will be accomplished by using cellular phones or telephones at predetermined and approved locations.

9.11 SANITATION AND BREAK AREAS

This section will address the following items:

- Toilets
- Potable water
- Showers and change rooms
- Break Areas

9.11.1 Toilets

One toilet will be provided for every 20 people. All toilets will be unisex and will have locking doors. The toilet provided will either be a chemical toilet and service provider or the flush toilet readily accessible at a predetermined approved location.

9.11.2 Potable Water

Potable water, as well as, electrolyte balance sports drinks such as Gatorade® will be provided to the field crews for fluid replacement, as it is necessary under conditions of ambient temperature extremes. Storage and dispensing will proceed as follows:

- All containers will be clean and replenished daily.
- All containers will clearly marked as to their contents (Potable Water – Drinking Water Only; Gatorade, etc.).
- Dispensing locations will be placed in identified break areas within the support zone. The most likely location will be a break trailer or support vehicle.
- If larger containers are used, dispensing cups will be provided.
- The coolers used for storage of potable drinks and cups will be stored in plastic bags away from potentially contaminating materials when not in use.

Fluid intake recommendations will be made based on the medical evaluations conducted at the end of the decontamination process, as necessary based on ambient conditions.

9.11.3 Showers and Change Rooms

Based on this scope and duration of this project shower facilities and locker rooms will not be provided.

9.11.4 Break Areas

Given the size of the project and nature of the tasks to be conducted structured suitable locations for work breaks and warming/cooling regimens will not be necessary. It is recommended that some means of shade be provided such as canopies or umbrellas to control direct exposure to the sun. Addition, break areas can take place at the site vehicles in the Support Zone.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is anticipated that the following quantities of potentially hazardous materials will be handled during the site activities conducted as part of the scope of work. These are as follows:

- 2-500 gallon storage tanks to receive purge/development waters from the Building 324 and 1845 Work Areas. Significant quantities of waste water (decontamination, purge and development) are anticipated.
  - From the 40-newly installed wells ~800 Gallons of development waters
  - Purge water from the 40-newly installed wells ~ 80 gallons of purge water
  - 3 Existing wells ~25 gallons of purge water
  - 4 SPECAP Tests ~ 60 gallons
  - 200 gallons decontamination water

Note: Estimations are based on 2-inch wells.

- 55-gallon Drums (U.N.1A2 Configuration) soil cuttings ~ Estimated 6-8 drums

These materials will be collectively referred to as Investigative-Derived Wastes (IDW). With the exception of the free product, it is not anticipated, however, that spillage of these materials would constitute a significant danger to human health or the environment.

At the termination of field efforts composite samples of soil cuttings will be collected and analyzed to characterize the material and determine appropriate disposal measures. All purge and development waters will be profiled based on the information derived from the sampling data. Once characterized they can be removed from the staging area and disposed of in accordance with Federal, State and local regulations.

Disposable items such as PPE (gloves, Tyvek™), disposable tubing, and trowels will be rinsed of visible materials, bagged, and disposed of as standard refuse.

If it is determined that the sample results indicate that sample media to be not hazardous:

- Soil cutting shall be spread over the ground surface at the site designated site by NASCF Representative/City of Jacksonville/Jacksonville Port Authority.

- Waters shall be pumped to the nearest identified sanitary outlet as identified by the NASCF Representative/City of Jacksonville/Jacksonville Port Authority..

If it is determined that the sample results indicate that sample media to be hazardous:

- All materials associated with that site will be disposed of in accordance with Federal, State and local regulations through a licensed contractor.

10.2 POTENTIAL SPILL AREAS

Potential spill areas will be monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, there are several areas vulnerable to this hazard including

- The area used for central staging and decontamination
- Transportation vessels and containers
- Resource Deployment

10.3 CONTAINMENT AREAS

In order to facilitate leak and spill inspection and response, and to minimize potential hazards which may impact the integrity of the storage containers, the staging area for these substances will be structured as follows:

10.3.1 Waste Storage

- 55 Gallon Drums (United Nations 1A2 configurations) – 4 Drums to a Pallet; labels and the retaining ring bolt and nut on the outside of each drum to facilitate easy access; Minimum 4-feet between each row of pallets. The decision to construct a bermed and lined area will be the decision of project management .

The area will be identified as a Satellite Storage Area with proper signage, points of contact in the event of an emergency, alternate contacts, and identification of stored material (i.e, Purge or decontamination waters, soil cuttings, etc.).

An Inventory Log will be maintained by the FOL regarding types of waste materials and estimated volumes generated. An updated Inventory List will be provided by the FOL to the designated Emergency Response Agency or Facility Contact during days off and between shifts or phases of operations.

10.3.2 Flammable/POL Storage

Flammable Storage [i.e., fuels, decontamination solvents (Isopropanol)] and Petroleum/oil/lubricants (POL) will require proper dispensing containers and necessary storage for cumulative volumes in excess of 25 gallons. Storage and dispensing will comply with the following requirements:

- All fuels, which will be stored and dispensed from portable containers, will utilize safety cans.
- All portable hand held storage containers will be labeled per Hazard Communication requirements.
- All dispensing locations will be supported by a Fire Extinguisher.

10.4 MATERIALS HANDLING

To minimize the hazards associated with moving drums and containers (i.e, lifting, pinch and compression points) material handling will be supported in the following manner:

- The Driller will be responsible for moving soils to the satellite storage area.
- Well Development waters will be transfer from portable containers to storage tanks.
- Where possible machinery will be employed to move containers of IDW.
- A drum cart with pneumatic tires will be required, if drums are used for waste storage that must be manually moved or positioned. This cart will be used to relocate drums within the staging and satellite storage location.

Other means of material handling are acceptable and may be presented to the SHSO for evaluation based on their ability to minimize or eliminate material handling hazards.

10.5 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by personnel staging or disposing of containers will be conducted at least once each day during working hours, to visually determine that containers are not leaking. All inspections will be documented in the Project Logbook.

10.6 PERSONNEL TRAINING AND SPILL PREVENTION

All personnel will be instructed on the procedures for spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL or SHSO will serve as the Spill Response Coordinator for this operation should the need arise.

10.7 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment that will be maintained at the staging areas at all times for the purpose of supporting this Spill Containment/Control Plan.

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Extra Drums (55 gallon U.N. 1A2) should the need to transfer material from leaking containers arise.
- Pumps (Gas or Electric necessary for transferring liquids from leaking containers)/tubing
- Drum Repair Kit
- Shovels, rakes, and brooms
- Container labels
- PPE
  - Nitrile outer gloves
  - Splash Shield
  - Impermeable over-boots
  - Rain suit or impermeable apron

10.8 SPILL CONTAINMENT/CONTROL RESPONSE PLAN

This section describes the procedures the TtNUS field personnel will employ upon the detection of a spill or leak.

- Notify the SHSO or FOL immediately upon detection of a leak or spill.

- The FOL or the SHSO shall assess the leak and make a determination as to whether the response measure required is within the capabilities of the field crew or whether it is necessary to notify designated emergency response units.

Within the capabilities of the Field Crew:

- Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.

- Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.

- Recontainerize spills, including 2 inch of top cover (if over soils) impacted by the spill. Await test results for treatment or disposal options.

Outside of the Capabilities of the Field Crew/Notify Emergency Response Units:

- Activate emergency alerting procedures for that area to remove all non-essential personnel.

- Take defensive measures such as
  - Spread the absorbent material in the area of the spill, covering it completely.
  - Raising the leak to the highest point in the vessel.

- Establish site security, direct emergency crews to the area of the leak from the Safe Place of Refuge identified in section 2.0 of this HASP.

It is not anticipated that a spill would occur that the field crew cannot handle. Should this occur, notification of the appropriate Emergency Response agencies will be carried out by the FOL or SHSO in accordance with the procedures specified in Section 2.0 of this HASP.

11.0 CONFINED-SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces**.

A confined space means a space that:

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

A Permit-Required Confined Space means a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential to engulf an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual (Section 8.0) or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed.

12.0 MATERIALS AND DOCUMENTATION

The TtNUS FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for all chemicals brought on-site, including decon solution, fuels, sample preservations, calibration gases, etc.
- A full size OSHA Job Safety and Health Poster
- Tetra Tech NUS, Inc. Health and Safety Policy
- Training/Medical Surveillance Documentation Form (blank)
- Emergency Reference Form (Section 2.0, extra copy for posting)

12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting these documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

Chemical Inventory Listing (maintained/posted) - This list represents all chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc... This list should be posted in a central area.

Material Safety Data Sheets (MSDS) (maintained) - The MSDSs should also be in a central area accessible to all site personnel. These documents should match all the listings on the chemical inventory list for all substances employed on-site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster (posted) - this poster, as directed by 29 CFR 1903.2 (a) (1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaces, altered, or covered by other material. See Attachment II of this HASP,

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-2). This list identifies all site personnel, dates of training (including site-specific training), and medical surveillance. The lists indicate not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) (posted) - This list of numbers and directions will be maintained at all phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to all personnel to be carried on their person.

Hearing Conservation Standard (29 CFR 1910.95) (posted) - this standard will be posted anytime hearing protection or other noise abatement procedures are employed.

Personnel Monitoring (posted/maintained) - All results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

Placards and Labels (maintained) - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using DOT placards and acceptable (Hazard Communication 29 CFR 1910.1200(f)) labels.

The purpose is to allow site personnel quick access to this information. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

13.0 ACRONYMS/ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
CFR	Code of Federal Regulations
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
DOD	Department of Defense
DOT	Department of Transportation
DPT	Direct Push Technology
EPA	Environmental Protection Agency
eV	electron Volts
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
N/A	Not Available
NIOSH	National Institute Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PID	Photo Ionization Detector
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
SAP	Sampling and Analysis Plan
SHSO	Site Health and Safety Officer
STEL	Short Term Exposure Limit
TCE	Trichloroethylene
TOM	Task Order Manager
VOCs	Volatile Organic Compounds

ATTACHMENT I

INJURY/ILLNESS PROCEDURE AND REPORT FORM

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

WHAT YOU SHOULD DO IF YOU ARE INJURED OR DEVELOP AN ILLNESS AS A RESULT OF YOUR EMPLOYMENT:

- Stop work as needed to ensure no further harm is done.
- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room. Check with your office location or project health and safety plan for specific instructions.
- If incident involves an injury, illness, or chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Duffy at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours of the injury. You will be required to complete an Injury/Illness Report. You may also be required to participate in a more detailed investigation with the Health Sciences Department.
- In the event of a serious near-miss incident, a "Serious Near Miss Report" (Form AR-2, available online at https://go2.tetratech.com under "Departments", "Health and Safety", "Accident Reporting Procedures", hyperlink for "Serious Near Miss Report") must be completed and faxed to the Corporate Health and Safety Manager within 48 hours.
- If further medical treatment is needed, our insurance carrier, ACE, will provide information on the authorized providers customized to the location of the injured employee. You can find this information by accessing the website of ACE's claims handler, ESIS, at : **www.esis.com**. These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work.

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

Contact your local Human Resources representative (Marilyn Duffy), Corporate Health and Safety Manager (Matt Soltis), or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries pay premiums on behalf of their employees. This program is based on a no-fault system, and benefits are provided for covered events as an exclusive remedy to the injured employee regardless of fault. The types of injuries or illnesses covered and the amount of

benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

WHO IS COVERED:

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits from the first day of work. All employees must follow the above injury/illness reporting procedures. If you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

Consultants, independent contractors, and employees of subcontractors and employees from temporary employment agencies are not covered by Tetra Tech's Worker's Compensation plan.

WHAT IS COVERED:

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: _____
Subsidiary Health and Safety Representative

cc: _____
Workers Compensation Administrator

Project name: _____

Project number: _____

Prepared by: _____

Position: _____

Office: _____

Telephone number: _____

Fax number: _____

Information Regarding Injured or Ill Employee

Name: _____

Home address: _____

_____

Home telephone number: _____

Occupation (regular job title): _____

Department: _____

Office: _____

Gender: M ☐ F ☐ No. of dependents: _____

Marital status: _____

Date of birth: _____

Social security number: _____

Date of Accident: _____

Time Employee Began Work: _____

Time of Accident: _____ a.m. ☐ p.m. ☐

☐ Check if time cannot be determined

Location of Incident

Street address: _____

City, state, and zip code: _____

County: _____

Was place of accident or exposure on employer's premises? Yes ☐ No ☐

Information About the Incident

What was the employee doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the employee was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from hand sprayer"; "Daily computer key-entry"

What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time"

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

What was the injury or illness? Describe the part(s) of the body affected and how it was affected. Be more specific than "hurt," "pain," or "sore." Examples "Strained back"; "Chemical burn, right hand"; "Carpal tunnel syndrome, left wrist"

Describe the Object or Substance that Directly Harmed the Employee: Examples: "Concrete floor"; "Chlorine"; "Radial arm saw." If this question does not apply to the incident, write "Not applicable."

Did the employee die? Yes ☐ No ☐ Date of death: _____

Was employee performing regular job duties? Yes ☐ No ☐

Was safety equipment provided? Yes ☐ No ☐ Was safety equipment used? Yes ☐ No ☐

Note: Attach any police reports or related diagrams to this report.

Witness (Attach additional sheets for other witnesses.)

Name: _____

Company: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Medical Treatment Required? ☐ Yes ☐ No ☐ First aid only

Name of physician or health care professional: _____

If treatment was provided away from the work site, provide the information below.

Facility name: _____

Street address: _____

City: _____ State:_____ Zip code: _____

Telephone number: _____

Was the employee treated in an emergency room? ☐ Yes ☐ No

Was the employee hospitalized over night as an in-patient? ☐ Yes ☐ No

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Corrective Action(s) Taken by Unit Reporting the Accident:

Corrective Action Still to be Taken (by whom and when):

Name of Tetra Tech employee the injury or illness was first reported to: _____

Date of Report: _____ **Time of Report:** _____

I have reviewed this investigation report and agree, to the best of my recollection, with its contents.

_____ _____

Printed Name of Injured Employee Telephone Number

_____ _____

Signature of Injured Employee Date

The signatures provided below indicate that appropriate personnel have been notified of the incident.

Title	Printed Name	Signature	Telephone Number	Date
Office Manager				
Project Manager				
Site Safety Coordinator or Office Health and Safety Representative				

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:

☐ Injury ☐ Illness

Result of Incident:

☐ First aid only

☐ Days away from work

☐ Remained at work but incident resulted in job transfer or work restriction

☐ Incident involved days away and job transfer or work restriction

☐ Medical treatment only

No. of days away from work _____

Date employee left work _____

Date employee returned to work _____

No. of days placed on restriction or job transfer: _____

OSHA Recordable Case Number _____

To Be Completed by Human Resources

Social security number: _____

Date of hire: _____ Hire date for current job: _____

Wage information: $ _____ per ☐ Hour ☐ Day ☐ Week ☐ Month

Position at time of hire: _____

Current position: _____ Shift hours: _____

State in which employee was hired: _____

Status: ☐ Full-time ☐ Part-time Hours per week: _____ Days per week: _____

Temporary job end date: _____

To Be Completed during Report to Workers Compensation Carrier

Date reported: _____ Reported by: _____

Confirmation number: _____

Name of contact: _____

Field office of claims adjuster: _____

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

ATTACHMENT II

STANDARD OPERATING PROCEDURE
FOR
UTILITY LOCATING
AND
EXCAVATION CLEARANCE

TABLE OF CONTENTS

SECTION **PAGE**

1.0 PURPOSE **2**

2.0 SCOPE **2**

3.0 GLOSSARY **2**

4.0 RESPONSIBILITIES **3**

5.0 PROCEDURES **3**

5.1 BURIED UTILITIES 3
5.2 OVERHEAD POWER LINES 5

6.0 UNDERGROUND LOCATING TECHNIQUES **5**

6.1 GEOPHYSICAL METHODS 5
6.2 PASSIVE DETECTION SURVEYS 6
6.3 INTRUSIVE DETECTION SURVEYS 6

7.0 INTRUSIVE ACTIVITIES SUMMARY **7**

8.0 REFERENCES **8**

ATTACHMENTS

1 Listing of Underground Utility Clearance Resources 9
2 Frost Line Penetration Depths by Geographic Location 11
3 Utility Clearance Form 12
4 OSHA Letter of Interpretation 13

1.0 PURPOSE

Utilities such as electric service lines, natural or propane gas lines, water and sewage lines, telecommunications, and steam lines are very often in the immediate vicinity of work locations. Contact with underground or overhead utilities can have serious consequences including employee injury/fatality, property and equipment damage, substantial financial impacts, and loss of utility service to users.

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility locating services. It is the policy of Tetra Tech NUS, Inc. (TtNUS) to provide a safe and healthful work environment for the protection of our employees. The purpose of this Standard Operating Procedure (SOP) is to aid in achieving the objectives of this policy, to present the acceptable procedures pertaining to utility locating and excavation clearance activities, and to present requirements and restrictions relevant to these types of activities. This SOP must be reviewed by any employee potentially involved with underground or overhead utility locating and avoidance activities.

2.0 SCOPE

This procedure applies to all TtNUS field activities where there may be potential contact with underground or overhead utilities. This procedure provides a description of the principles of operation, instrumentation, applicability, and implementability of typical methods used to determine the presence and avoidance of contact with utility services. This procedure is intended to assist with work planning and scheduling, resource planning, field implementation, and subcontractor procurement. Utility locating and excavation clearance requires site-specific information prior to the initiation of any such activities on a specific project. This SOP is not intended to provide a detailed description of methodology and instrument operation. Specialized expertise during both planning and execution of several of the methods presented may also be required.

3.0 GLOSSARY

Electromagnetic Induction (EMI) Survey - A geophysical exploration method whereby electromagnetic fields are induced in the ground and the resultant secondary electromagnetic fields are detected as a measure of ground conductivity.

Magnetometer – A device used for precise and sensitive measurements of magnetic fields.

Magnetic Survey – A geophysical survey method that depends on detection of magnetic anomalies caused by the presence of buried ferromagnetic objects.

Metal Detection – A geophysical survey method that is based on electromagnetic coupling caused by underground conductive objects.

Vertical Gradiometer – A magnetometer equipped with two sensors that are vertically separated by a fixed distance. It is best suited to map near surface features and is less susceptible to deep geologic features.

Ground Penetrating Radar – Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture.

4.0 RESPONSIBILITIES

Project Manager (PM)/Task Order Manager (TOM) - Responsible for ensuring that all field activities are conducted in accordance with this procedure.

Site Manager (SM)/Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved SOPs or as otherwise directed by the approved project plan(s).

Site Health & Safety Officer (SHSO) – Responsible to provide technical assistance and verify full compliance with this SOP. The SHSO is also responsible for reporting any deficiencies to the Corporate Health and Safety Manager (HSM) and to the PM/TOM.

Health & Safety Manager (HSM) – Responsible for preparing, implementing, and modifying corporate health and safety policy and this SOP.

Site Personnel – Responsible for performing their work activities in accordance with this SOP and the TtNUS Health and Safety Policy.

5.0 PROCEDURES

This procedure addresses the requirements and technical procedures that must be performed to minimize the potential for contact with underground and overhead utility services. These procedures are addressed individually from a buried and overhead standpoint.

5.1 Buried Utilities

Buried utilities present a heightened concern because their location is not typically obvious by visual observation, and it is common that their presence and/or location is unknown or incorrectly known on client properties. This procedure must be followed prior to beginning any subsurface probing or excavation that might potentially be in the vicinity of underground utility services. In addition, the Utility Clearance Form (Attachment 3) must be completed for every location or cluster of locations where intrusive activities will occur.

Where the positive identification and de-energizing of underground utilities cannot be obtained and confirmed using the following steps, the PM/TOM is responsible for arranging for the procurement of a qualified, experienced, utility locating subcontractor who will accomplish the utility location and demarcation duties specified herein.

1. A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.

2., A visual site inspection must be performed to compare the site plan information to actual field conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation or other subsurface activities must be marked at the site in white paint or pin flags to identify those locations of the proposed intrusive activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, electrical service vaults/panels, asphalt/concrete scares and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional information regarding utility

locations shall be added to project maps upon completion of this exercise and returned to the PM/TOM.

3. If the planned work is to be conducted on private property (e.g., military installations, manufacturing facilities, etc.) the FOL must identify and contact appropriate facility personnel (e.g., public works or facility engineering) before any intrusive work begins to inquire about (and comply with) property owner requirements. It is important to note that private property owners may require several days to several weeks advance notice prior to locating utilities.

4. If the work location is on public property, the state agency that performs utility clearances must be notified (see Attachment 1). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign a "ticket" number to the particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who then mark their respective lines within the specified time frame. It should be noted that most military installations own their own utilities but may lease service and maintenance from area providers. Given this situation, "one call" systems may still be required to provide location services on military installations.

5. Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other accepted means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

white	excavation/subsurface investigation location
red	electrical
yellow	gas, oil, steam
orange	telephone, communications
blue	water, irrigation, slurry
green	sewer, drain

6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using safe and effective methods such as passive and intrusive surveys, or the use of non-conductive hand tools. Also, in situations where such hand tools are used, they should always be used in conjunction with suitable detection equipment, such as the items described in Section 6.0 of this SOP. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in some states, initial excavation is required by hand to a specified depth.

7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment, and where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed using a device such as a tile probe which is made of non-conductive material such as fiberglass. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.

8. All utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

5.2 Overhead Power Lines

If it is necessary to work within the minimum clearance distance of an overhead power line, the overhead line must be de-energized and grounded, or re-routed by the utility company or a registered electrician. If protective measures such as guarding, isolating, or insulating are provided, these precautions must be adequate to prevent employees from contacting such lines directly with any part of their body or indirectly though conductive materials, tools, or equipment.

The following table provides the required minimum clearances for working in proximity to overhead power lines.

Nominal Voltage	Minimum Clearance
0 -50 kV	10 feet, or one mast length; whichever is greater
50+ kV	10 feet plus 4 inches for every 10 kV over 50 kV or 1.5 mast lengths; whichever is greater

6.0 UNDERGROUND LOCATING TECHNIQUES

A variety of supplemental utility locating approaches are available and can be applied when additional assurance is needed. The selection of the appropriate method(s) to employ is site-specific and should be tailored to the anticipated conditions, site and project constraints, and personnel capabilities.

6.1 Geophysical Methods

Geophysical methods include electromagnetic induction, magnetics, and ground penetrating radar. Additional details concerning the design and implementation of electromagnetic induction, magnetics, and ground penetrating radar surveys can be found in one or more of the TtNUS SOPs included in the References (Section 8.0).

Electromagnetic Induction

Electromagnetic Induction (EMI) line locators operate either by locating a background signal or by locating a signal introduced into the utility line using a transmitter. A utility line acts like a radio antenna, producing electrons, which can be picked up with a radiofrequency receiver. Electrical current carrying conductors have a 60HZ signal associated with them. This signal occurs in all power lines regardless of voltage. Utilities in close proximity to power lines or used as grounds may also have a 60HZ signal, which can be picked up with an EM receiver. A typical example of this type of geophysical equipment is an EM-61.

EMI locators specifically designed for utility locating use a special signal that is either indirectly induced onto a utility line by placing the transmitter above the line or directly induced using an induction clamp. The clamp induces a signal on the specific utility and is the preferred method of tracing since there is little chance of the resulting signals being interfered with. A good example of this type of equipment is the Schonstedt® MAC-51B locator. The MAC-51B performs inductively traced surveys, simple magnetic locating, and traced nonmetallic surveys.

When access can be gained inside a conduit to be traced, a flexible insulated trace wire can be used. This is very useful for non-metallic conduits but is limited by the availability of gaining access inside the pipe.

Magnetics

Magnetic locators operate by detecting the relative amounts of buried ferrous metal. They are incapable of locating or identifying nonferrous utility lines but can be very useful for locating underground storage tanks (UST's), steel utility lines, and buried electrical lines. A typical example of this type of equipment is the Schonstedt® GA-52Cx locator. The GA-52Cx is capable of locating 4-inch steel pipe up to 8 feet deep.

Non-ferrous lines are often located by using a typical plumbing tool (snake) fed through the line. A signal is then introduced to the snake that is then traced.

Ground Penetrating Radar

Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture. In general, an object which is harder than the surrounding soil will reflect a stronger signal. Utilities, tunnels, UST's, and footings will reflect a stronger signal than the surrounding soil. Although this surface detection method may determine the location of a utility, this method does not specifically identify utilities (i.e., water vs. gas, electrical vs. telephone); hence, verification may be necessary using other methods. This method is somewhat limited when used in areas with clay soil types or with a high water table.

6.2 Passive Detection Surveys

Acoustic Surveys

Acoustic location methods are generally most applicable to waterlines or gas lines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing (at joints, leaks, etc.) or to sounds introduced into the water main using a transducer. Acoustics may also be applicable to determine the location of plastic gas lines.

Thermal Imaging

Thermal (i.e., infrared) imaging is a passive method for detecting the heat emitted by an object. Electronics in the infrared camera convert subtle heat differentials into a visual image on the viewfinder or a monitor. The operator does not look for an exact temperature; rather they look for heat anomalies (either elevated or suppressed temperatures) characteristic of a potential utility line.

The thermal fingerprint of underground utilities results from differences in temperature between the atmosphere and the fluid present in a pipe or the heat generated by electrical resistance. In addition, infrared scanners may be capable of detecting differences in the compaction, temperature and moisture content of underground utility trenches. High-performance thermal imagery can detect temperature differences to hundredths of a degree.

6.3 Intrusive Detection Surveys

Vacuum Excavation

Vacuum excavation is used to physically expose utility services. The process involves removing the surface material over approximately a 1' x 1' area at the site location. The air-vacuum process proceeds with the simultaneous action of compressed air-jets to loosen soil and vacuum extraction of the resulting

debris. This process ensures the integrity of the utility line during the excavation process, as no hammers, blades, or heavy mechanical equipment comes into contact with the utility line, eliminating the risk of damage to utilities. The process continues until the utility is uncovered. Vacuum excavation can be used at the proposed site location to excavate below the "utility window" which is usually 8 feet.

Hand Excavation

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other methods, borings and excavations may be cleared via the use of non-conductive hand tools. This should always be done in conjunction with the use of detection equipment. This would be required for all locations where there is a potential to impact buried utilities. The minimum hand-excavation depth that must be reached is to be determined considering the geographical location of the work site. This approach recognizes that the placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 2 presents frost line depths for the regions of the contiguous United States. At a minimum, hand excavation depths must be at least to the frost line depth (see Attachment 2) plus two (2) feet, but never less than 4 feet below ground surface (bgs). For hand excavation, the hole created must be reamed large enough to be at least the diameter of the drill rig auger or bit prior to drilling. For soil gas surveys, the survey probe shall be placed as close as possible to the cleared hand excavation. It is important to note that a post-hole digger must not be used in this type of hand excavation activity.

Tile Probe Surveys

For some soil types, site conditions, and excavation requirements, non-conductive tile probes may be used. A tile probe is a "T"-handled rod of varying lengths that can be pushed into the soil to determine if any obstructions exist at that location. Tile probes constructed of fiberglass or other nonconductive material are readily-available from numerous vendors. Tile probes must be performed to the same depth requirements as previously specified. As with other types of hand excavating activities, the use of a non-conductive tile probe, should always be in conjunction with suitable utility locating detection equipment.

7.0 INTRUSIVE ACTIVITIES SUMMARY

The following list summarizes the activities that must be performed prior to beginning subsurface activities:

1. Map and mark all subsurface locations and excavation boundaries using white paint or markers specified by the client or property owner.

2. Notify the property owner and/or client that the locations are marked. At this point, drawings of locations or excavation boundaries shall be provided to the property owner and/or client so they may initiate (if applicable) utility clearance.

   Note: Drawings with confirmed locations should be provided to the property owner and/or client as soon as possible to reduce potential time delays.

3. Notify "One Call" service. If possible, arrange for an appointment to show the One Call representative the surface locations or excavation boundaries in person. This will provide a better location designation to the utilities they represent. You should have additional drawings should you need to provide plot plans to the One Call service.

4. Implement supplemental utility detection techniques as necessary and appropriate to conform utility locations or the absence thereof.

5. Complete Attachment 3, Utility Clearance Form. This form should be completed for each excavation location. In situations where multiple subsurface locations exist within the close proximity of one another, one form may be used for multiple locations provided those locations are noted on the Utility Clearance Form. Upon completion, the Utility Clearance Form and revised/annotated utility location map becomes part of the project file.

8.0 REFERENCES

OSHA Letter of Interpretation, Mr. Joseph Caldwell, Attachment 4
OSHA 29 CFR 1926(b)(2)
OSHA 29 CFR 1926(b)(3)
TtNUS Utility Locating and Clearance Policy
TtNUS SOP GH-3.1; Resistivity and Electromagnetic Induction
TtNUS SOP GH-3.2; Magnetic and Metal Detection Surveys
TtNUS SOP GH-3.4; Ground-penetrating Radar Surveys

ATTACHMENT 1
LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES

American Public Works Association
2345 Grand Boulevard, Suite 500, Kansas City, MO 64108-2625
Phone (816) 472-6100 • Fax (816) 472-1610
Web www.apwa.net • E-mail apwa@apwa.net

ONE-CALL SYSTEMS INTERNATIONAL CONDENSED DIRECTORY

Alabama
Alabama One-Call
1-800-292-8525

Alaska
Locate Call Center of Alaska, Inc.
1-800-478-3121

Arizona
Arizona Blue Stake
1-800-782-5348

Arkansas
Arkansas One Call System, Inc.
1-800-482-8998

California
Underground Service Alert North
1-800-227-2600
Underground Service Alert of Southern California
1-800-227-2600

Colorado
Utility Notification Center of Colorado
1-800-922-1987

Connecticut
Call Before You Dig
1-800-922-4455

Delaware
Miss Utility of Delmarva
1-800-282-8555

Florida
Sunshine State One-Call of Florida, Inc.
1-800-432-4770

Georgia
Underground Protection Center, Inc.
1-800-282-7411

Hawaii
Underground Service Alert North
1-800-227-2600

Idaho
Dig Line Inc.
1-800-342-1585
Kootenai County One-Call
1-800-428-4950
Shoshone - Benewah One-Call
1-800-398-3285

Illinois
JULIE, Inc.
1-800-892-0123
Digger (Chicago Utility Alert Network)
312-744-7000

Indiana
Indiana Underground Plant Protection Service
1-800-382-5544

Iowa
Iowa One-Call
1-800-292-8989

Kansas
Kansas One-Call System, Inc.
1-800-344-7233

Kentucky
Kentucky Underground Protection Inc.
1-800-752-6007

Louisiana
Louisiana One Call System, Inc.
1-800-272-3020

Maine
Dig Safe System, Inc.
1-888-344-7233

Maryland
Miss Utility
1-800-257-7777
Miss Utility of Delmarva
1-800-282-8555

Massachusetts
Dig Safe System, Inc.
1-888-344-7233

Michigan
Miss Dig System, Inc.
1-800-482-7171

Minnesota
Gopher State One Call
1-800-252-1166

Mississippi
Mississippi One-Call System, Inc
1-800-227-6477

Missouri
Missouri One-Call System, Inc.
1-800-344-7483

Montana
Utilities Underground Protection Center
1-800-424-5555
Montana One Call Center
1-800-551-8344

Nebraska
Diggers Hotline of Nebraska
1-800-331-5666

Nevada
Underground Service Alert North
1-800-227-2600

New Hampshire
Dig Safe System, Inc.
1-888-344-7233

New Jersey
New Jersey One Call
1-800-272-1000

New Mexico
New Mexico One Call System, Inc.
1-800-321-2537
Las Cruces- Dona Ana Blue Stakes
1-888-526-0400

New York
Dig Safely New York
1-800-962-7962
New York City- Long Island One Call Center
1-800-272-4480

North Carolina
The North Carolina One-Call Center, Inc.
1-800-632-4949

North Dakota
North Dakota One-Call
1-800-795-0555

Ohio
Ohio Utilities Protection Service
1-800-362-2764
Oil & Gas Producers Underground Protect'n Svc
1-800-925-0988

Oklahoma
Call Okie
1-800-522-6543

Oregon
Oregon Utility Notification Center/One Call Concepts
1-800-332-2344

Pennsylvania
Pennsylvania One Call System, Inc.
1-800-242-1776

Rhode Island
Dig Safe System, Inc.
1-888-344-7233

South Carolina
Palmetto Utility Protection Service Inc.
1-888-721-7877

South Dakota
South Dakota One Call
1-800-781-7474

Tennessee
Tennessee One-Call System, Inc.
1-800-351-1111

ATTACHMENT 1 (Continued)

Texas
Texas One Call System
1-800-245-4545
Texas Excavation Safety System, Inc.
1-800-344-8377
Lone Star Notification Center
1-800-669-8344

Utah
Blue Stakes of Utah
1-800-662-4111

Vermont
Dig Safe System, Inc.
1-888-344-7233

Virginia
Miss Utility of Virginia
1-800-552-7001
Miss Utility (Northern Virginia)
1-800-257-7777

Washington
Utilities Underground Location Center
1-800-424-5555
Northwest Utility Notification Center
1-800-553-4344
Inland Empire Utility Coordinating Council
509-456-8000

West Virginia
Miss Utility of West Virginia, Inc.
1-800-245-4848

Wisconsin
Diggers Hotline, Inc.
1-800-242-8511

Wyoming
Wyoming One-Call System, Inc.
1-800-348-1030
Call Before You Dig of Wyoming
1-800-849-2476

District of Columbia
Miss Utility
1-800-257-7777

Alberta
Alberta One-Call Corporation
1-800-242-3447

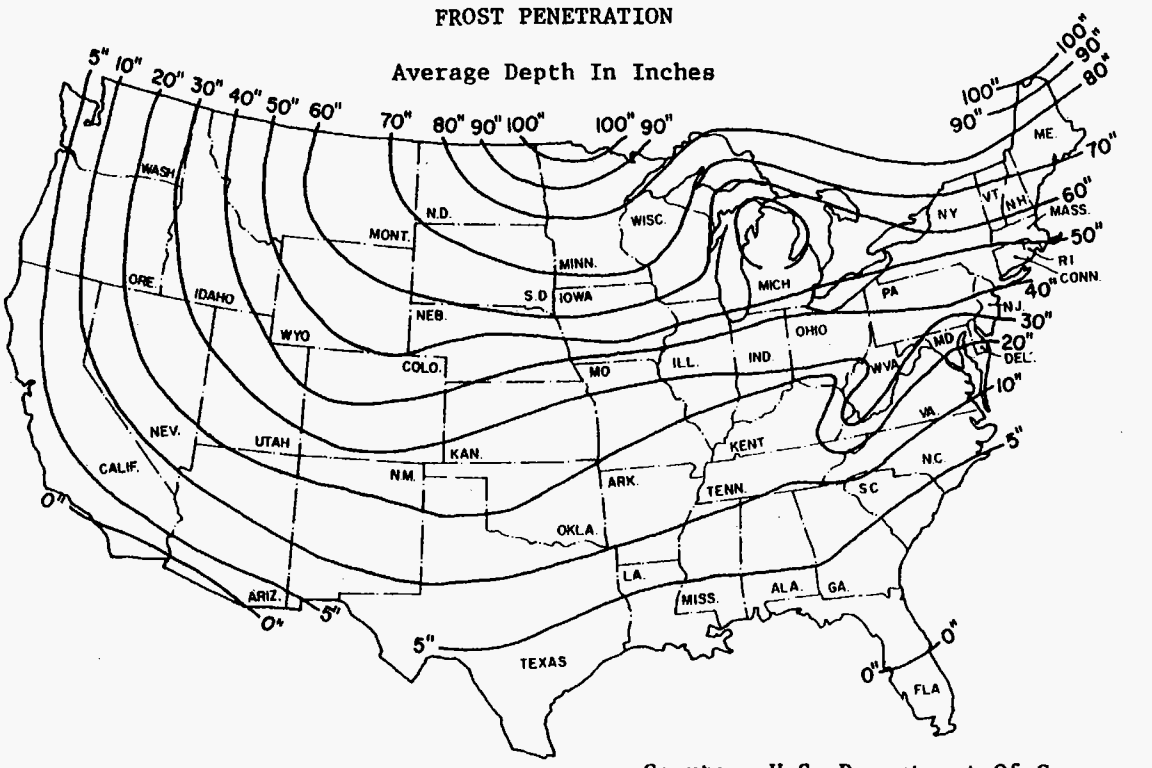
British Columbia
BC One Call
1-800-474-6886

Ontario
Ontario One-Call System
1-800-400-2255

Quebec
Info-Excavation
1-800-663-9228

ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

ATTACHMENT 3
UTILITY CLEARANCE FORM

Client: _____ Project Name: _____

Project No.: _____ Completed By: _____

Location Name: _____ Work Date: _____

Excavation Method/Overhead Equipment: _____

1. Underground Utilities — Circle One

a)	Review of existing maps?	yes	no	N/A
b)	Interview local personnel?	yes	no	N/A
c)	Site visit and inspection?	yes	no	N/A
d)	Excavation areas marked in the field?	yes	no	N/A
e)	Utilities located in the field?	yes	no	N/A
f)	Located utilities marked/added to site maps?	yes	no	N/A
g)	Client contact notified Name _____ Telephone: _____ Date: _____	yes	no	N/A
g)	State One-Call agency called? Caller: _____ Ticket Number: _____ Date: _____	yes	no	N/A
h)	Geophysical survey performed? Survey performed by: _____ Method: _____ Date: _____	yes	no	N/A
i)	Hand excavation performed (with concurrent use of utility detection device)? Completed by: _____ Total depth: _____ feet Date: _____	yes	no	N/A
j)	Trench/excavation probed? Probing completed by: _____ Depth/frequency: _____ Date: _____	yes	no	N/A

2. Overhead Utilities — Present Absent

a)	Determination of nominal voltage	yes	no	N/A
b)	Marked on site maps	yes	no	N/A
c)	Necessary to lockout/insulate/re-route	yes	no	N/A
d)	Document procedures used to lockout/insulate/re-route	yes	no	N/A
e)	Minimum acceptable clearance (SOP Section 5.2): _____			

3. Notes:

_____

_____

_____

Approval:

_____ _____

Site Manager/Field Operations Leader Date

c: PM/Project File
Program File

ATTACHMENT 4
OSHA LETTER OF INTERPRETATION

Mr. Joseph Caldwell
Consultant
Governmental Liaison
Pipeline Safety Regulations
211 Wilson Boulevard
Suite 700
Arlington, Virginia 22201

Re: Use of hydro-vacuum or non-conductive hand tools to locate underground utilities.

Dear Mr. Caldwell:

In a letter dated July 7, 2003, we responded to your inquiry of September 18, 2002, regarding the use of hydro-vacuum equipment to locate underground utilities by excavation. After our letter to you was posted on the OSHA website, we received numerous inquiries that make it apparent that aspects of our July 7 letter are being misunderstood. In addition, a number of industry stakeholders, including the National Utility Contractors Association (NUCA), have provided new information regarding equipment that is available for this work.

To clarify these issues, we are withdrawing our July 7 letter and issuing this replacement response to your inquiry.

Question: *Section 1926.651 contains several requirements that relate to the safety of employees engaged in excavation work. Specifically, paragraphs (b)(2) and (b)(3) relate in part to the safety of the means used to locate underground utility installations that, if damaged during an uncovering operation, could pose serious hazards to employees.*

Under these provisions, what constitutes an acceptable method of uncovering underground utility lines, and further, would the use of hydro-vacuum excavation be acceptable under the standard?

Answer

Background

Two sections of 29 CFR 1926 Subpart P (Excavations), 1926.651(Specific excavation requirements), govern methods for uncovering underground utility installations. Specifically, paragraph (b)(2) states:

> When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours * * * or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used. (emphasis added).

Paragraph (b)(3) provides:

ATTACHMENT 4 (Continued)

> When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. (emphasis added).

Therefore, "acceptable means" must be used where the location of the underground utilities have not been identified by the utility companies and detection equipment is not used.

Subpart P does not contain a definition of either "other acceptable means" or "safe and acceptable means." The preambles to both the proposed rule and the final rule discussed the rationale behind the wording at issue. For example, the preamble to the proposed rule, 52 Fed. Reg. 12301 (April 15, 1987), noted that a 1972 version of this standard contained language that specified "careful probing or hand digging" as the means to uncover utilities. The preamble then noted that an amendment to the 1972 standard later deleted that language "to allow other, *equally effective means* of locating such installations." The preamble continued that in the 1987 proposed rule, OSHA again proposed using language in section (b)(3) that would provide another example of an acceptable method of uncovering utilities that could be used *where the utilities have not been marked and detection equipment is not being used* – "probing with hand-held tools." This method was rejected in the final version of 29 CFR 1926. As OSHA explained in the preamble to the final rule, 54 Fed. Reg. 45916 (October 31, 1989):

> OSHA received two comments * * * and input from ACCSH [OSHA's Advisory Committee on Construction Safety and Health] * * * on this provision. All commenters recommended dropping 'such as probing with hand-held tools' from the proposed provision, because this could create a hazard to employees by damaging the installation or its insulation.

In other words, the commenters objected to the use of hand tools being used unless detection equipment was used in conjunction with them. OSHA then concluded its discussion relative to this provision by agreeing with the commentators and ultimately not including any examples of "acceptable means" in the final provision.

Non-conductive hand tools are permitted

This raises the question of whether the standard permits the use of hand tools alone -- without also using detection equipment. NUCA and other industry stakeholders have recently informed us that non-conductive hand tools that are appropriate to be used to locate underground utilities are now commonly available.

Such tools, such as a "shooter" (which has a non-conductive handle and a snub nose) and non-conductive or insulated probes were not discussed in the rulemaking. Since they were not considered at that time, they were not part of the class of equipment that was thought to be unsafe for this purpose. Therefore, we conclude that the use of these types of hand tools, when used with appropriate caution, is an "acceptable means" for locating underground utilities.

ATTACHMENT 4 (Continued)

Hydro-vacuum excavation

It is our understanding that some hydro-vacuum excavation equipment can be adjusted to use a minimum amount of water and suction pressure. When appropriately adjusted so that the equipment will not damage underground utilities (especially utilities that are particularly vulnerable to damage, such as electrical lines), use of such equipment would be considered a "acceptable means" of locating underground utilities. However, if the equipment cannot be sufficiently adjusted, then this method would not be acceptable under the standard.

Other technologies

We are not suggesting that these are the only devices that would be "acceptable means" under the standard. Industry stakeholders have informed us that there are other types of special excavation equipment designed for safely locating utilities as well.

We apologize for any confusion our July 7 letter may have caused. If you have further concerns or questions, please feel free to contact us again by fax at: U.S. Department of Labor, OSHA, Directorate of Construction, Office of Construction Standards and Compliance Assistance, fax # 202-693-1689. You can also contact us by mail at the above office, Room N3468, 200 Constitution Avenue, N.W., Washington, D.C. 20210, although there will be a delay in our receiving correspondence by mail.

Sincerely,

Russell B. Swanson, Director
Directorate of Construction

NOTE: OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA=s interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov.

ATTACHMENT III

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION FOR DRILL RIGS

COMPANY:_____ **UNIT NO.**_____
FREQUENCY: Inspect at the initiation of the project, after repairs, once every 10-day shift.

Inspection Date: ____/____/____ Time: _____ Equipment Type:_____
(e.g., **Drill Rigs** Hollow Stem, Mud Rotary, Direct Push)

	Good	Need Repair	N/A
Emergency Stop Devices (At points of operation)	❒	❒	❒
Tires (Tread) or tracks	❒	❒	❒
Hoses and belts	❒	❒	❒
Cab, mirrors, safety glass	❒	❒	❒
- Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	❒	❒	❒
- Is the equipment equipped with audible back-up alarms and back-up lights?	❒	❒	❒
Horn and gauges	❒	❒	❒
Brake condition (dynamic, park, etc.)	❒	❒	❒
Fire extinguisher (Type/Rating -_____)	❒	❒	❒
Fluid Levels:			
- Engine oil	❒	❒	❒
- Transmission fluid	❒	❒	❒
- Brake fluid	❒	❒	❒
- Cooling system fluid	❒	❒	❒
- Windshield wipers	❒	❒	❒
- Hydraulic oil	❒	❒	❒
Oil leak/lube	❒	❒	❒
Coupling devices and connectors	❒	❒	❒
Exhaust system	❒	❒	❒
Mast condition (Mast Height_____)	❒	❒	❒
Access-ways: Frame, hand holds, ladders, walkways (non-slip surfaces), guardrails?	❒	❒	❒
Steering (standard and emergency)	❒	❒	❒
Power cable and/or hoist cable	❒	❒	❒
➢ Hooks			
- Safety Latch	❒	❒	❒
- Wear in excess of 10% original dimension	❒	❒	❒
- A bend or twist exceeding 10% from the plane of an unbent hook	❒	❒	❒
- Increase in throat opening exceeding 15% from new condition	❒	❒	❒
- Excessive nicks and/or gouges	❒	❒	❒
➢ Wire Rope (Hoist Mechanism)			
- Reduction in Rope diameter (5/16 wire rope>1/64 reduction nominal size -replace) (3/8 to 1/2 wire rope>1/32 reduction nominal size-replace) (9/16 to 3/4 wire rope>3/64 reduction nominal size-replace)	❒	❒	❒
- Number of broken wires (12 randomly broken wires in one rope lay) (4 broken wires in one strand)	❒	❒	❒
- Number of wire rope wraps left on the Running Drum at nominal use (≥3 required)	❒	❒	❒
- Lead (primary) sheave is centered on the running drum	❒	❒	❒
- Lubrication of wire rope (adequate?)	❒	❒	❒

	Good	Needs Repaired	N/A
- Number of U-Type (Crosby) Clips (5/16 – 5/8 = 3 clips minimum) (3/4 – 1 inch = 4 clips minimum) (1 1/8 – 1 3/8 inch = 5 clips minimum)	❒	❒	❒
➢ Kinks, bends – Flattened to > 50% diameter	❒	❒	❒
➢ Hemp/Fiber rope (Cathead/Split Spoon Hammer)			
- Minimum ¾;maximum 1inch rope diameter (Inspect for physical damage)	❒	❒	❒
- Rope to hammer is securely fastened	❒	❒	❒

Safety Guards:

	Yes	No
Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?_____	❒	❒
Hot pipes and surfaces exposed to accidental contact?_____	❒	❒
All emergency shut offs have been identified and communicated to the field crew?_____	❒	❒
Are any structural members bent, rusted, or otherwise show signs of damage?_____	❒	❒
Are fueling cans used with this equipment approved type safety cans?_____	❒	❒
Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use?_____	❒	❒

Cleanliness:

Overall condition (was the decontamination performed prior to arrival on-site considered acceptable)?_____

Where was this equipment used prior to its arrival on site?_____
Site Contaminants of concern at the previous site?_____
Inside debris (coffee cups, soda cans, tools and equipment) blocking free access to foot controls?_____
Flammable solvents stored in the operators cab?_____

Operator Qualifications (as applicable for all heavy equipment):

Does the operator have proper licensing where applicable, (e.g., CDL)?_____
Does the operator, understand the equipment's operating instructions?_____
Is the operator experienced with this equipment? _____
Is the operator 21 years of age or more?_____

ADDITIONAL INSPECTION REQUIRED PRIOR TO USE ON-SITE

	Yes	No
Does equipment emit noise levels above 90 decibels?	❒	❒
If so, has an 8-hour noise dosimetry test been performed?	❒	❒

Results of noise dosimetry:_____
Defects and repairs needed:_____
General Safety Condition: _____
Operator or mechanic signature:_____

Site Safety Officer Signature:_____

Approved for Use: ❒ Yes ❒ No

ATTACHMENT IV

SAFE WORK PERMITS

SAFE WORK PERMIT
DECONTAMINATION ACTIVITIES
NASCF, JACKSONVILLE, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Decontamination of heavy equipment and machinery (i.e., drill rigs and flights) will occur using pressure washers and/or steam cleaning units. This will be accomplished at a constructed temporary decontamination pad at the work site or centralized location. Sampling equipment will be decontaminated using buckets, brushes and spray bottles at the work site.

II. Primary Hazards: Potential hazards associated with this task include lifting (strain/muscle pulls lifting heavy drilling equipment); Flying projectiles propelled by the force of the pressure washer/stream cleaner; noise in excess of 85 dBA; Burns/water lacerations; Stacked equipment - falling hazards; slips, trips, and falls – slippery surfaces. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: None anticipated

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
Liquinox (soap)	None Required	None	Eye irritant/flush with clean water
Isopropanol	Follow decon procedures	Above background	Repeat decon sequence, rescreen
Residual Contaminants	Follow decon procedures	Above background	Repeat decon sequence, rescreen

Primary Route of Exposure/Hazard: Soap – Contact - Eye irritant; ingestion- nausea possible vomiting, diarrhea; Isopropanol – Flammable liquid; Irritating to the eyes, skin, and mucous membranes of the digestive and respiratory tracts; Systemic – CNS depression, abdominal pain, vomiting, depression, low blood pressure, rapid heart rate. Target Organs – Eyes, skin, respiratory system, liver.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes or No)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☐ Yes	☒ No
Splash Shield	☒ Yes	☐ No	Barricades	☒ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type – Nitrile)	☒ Yes	☐ No
Impermeable apron	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☒ Yes	☐ No
High Visibility vest	☐ Yes	☒ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☒ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: Impermeable aprons to control splashing/overspray. If this is inadequate replace with rainsuit or PE coated Tyvek. Hard hat, splash shield, hearing protection will be worn for pressure washer/steam cleaner operation. Gloves – Nitrile (surgeons style) or Nitrile style outer gloves for deconning sampling (hand) tools, nitrile or neoprene supported gloves for steam cleaner/pressure washer operation. Overboots will be used when working in the temporary decontamination pad.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Suspend site activities in the event of inclement weather (storms, high winds, etc.). Employ proper lifting techniques as described on Table 5-1 for Mobilization/Demobilization. Construct pad as per Table 5-1 Decontamination. Use washing/drying racks to secure heavy equipment to prevent items from falling during washing and drying. In addition, do NOT point the wand at other people or place it against any part of your body. Accidental compression of the trigger can cause water lacerations or burns. All hoses and fittings will be inspected to insure structural integrity prior to use. For pressure washers or steam cleaners in excess of 3,000 psi, a fan tip of 25° or greater will be used to control potential for water cuts or lacerations. A light coating of sand should be applied to the plastic liner should the surface become slippery to prevent slips. Keep hoses gathered to prevent trips and falls. A site control boundary for this activity is 25-feet surrounding the point of operation. Follow directions provided in the MSDSs for any decontamination solvents/solutions used in the decontamination procedure.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
MOBILIZATION/DEMOBILIZATION ACTIVITIES
NASCF, JACKSONVILLE, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** Mobilization and demobilization activities. These activities include site reconnaissance/site characterization, site preparation including the layout of sampling locations, securing the necessary utility clearances, and identifying/isolating physical hazards; Secure, construct, or equip decontamination facilities to support the field activities; Secure, construct, or equip IDW storage facilities to support the field activities.

II. **Primary Hazards:** Potential hazards associated with this task are primarily physical in nature including lifting, cuts and lacerations, pinches and compressions; flying projectiles; slips, trips, and falls; insect and animal bites. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required**
Level D ☒ Level B ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: None anticipated

VI.

Chemicals of Concern	**Hazard Monitoring**	**Action Level(s)**	**Response Measures**
None anticipated	Not applicable	Not applicable	Not applicable

Primary Route of Exposure/Hazard: Pre-entry site surveys; Visual observation to identify potential physical and natural hazards

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes or No)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – Leather/Cotton)	☐ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☒ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☒ No
High Visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: If there is a potential for Flying projectiles– Safety glasses and/or splash shield (i.e., hammering, power tool operation); If you have to raise your voice to be heard by someone within 2-feet of you hearing protection is required (i.e., equipment/power tool operation); If overhead hazards or bump hazards or you are working near operating equipment hard hats will be employed. If you are working in or near traffic patterns then wear High Visibility Vests; If you are working within an area where snakes are a potential hazard then snake chaps are required.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Suspend site activities in the event of inclement weather (storms, high winds, etc.). Employ proper lifting techniques as described on Table 5-1 for this task.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
MULTI-MEDIA SAMPLING ACTIVITIES
NASCF, JACKSONVILLE, FLORIDA

Permit No._____ Date:_____Time: From_____ to_____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Multi-media sampling including monitoring well development, groundwater sampling using 1-inch Whale pumps/surge blocks and peristaltic pumps, respectively. Note: Surface and subsurface soil sampling using split spoons/similar devices will be covered under the drilling and well installation activity.

II. Primary Hazards: Potential hazards associated with this task include lifting (buckets of purge waters and moving drums), cuts and lacerations (cutting tubing), pinches and compressions; and contact with contaminated media. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Inspector Initials _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Inspector Initials _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	**Hazard Monitoring**	**Action Level(s)**	**Response Measures**
Volatile Organics Compounds (VOCs)	PID 10.6eV lamp	<50 ppm	Continue to work/continue to monitor
Volatile Organics Compounds (VOCs)	PID 10.6eV lamp	>50 ppm	Temp. Suspend Site activity/Contact PHSO

Primary Route of Exposure/Hazard: Exposure to chemical contaminants are not anticipated via inhalation given the reported source concentration. However, incidental exposure through ingestion and dermal contact is a possibility. The information provided pertains to the general categories of compounds we will be screening against. VOCs (Chlorinated solvents) – Generally these compounds are irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Irregular heartbeats, possible cardiac arrest. It should be noted that specific compounds may result in far different symptoms.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes or No)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☐ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type – Nitrile surgeons)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☐ No	Work/rest regimen	☐ Yes	☐ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☐ No
High Visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: Hard hat, hearing protection, and safety glasses for sampling at the drill rig. See monitoring well installation for more information; High Visibility Vests for high traffic areas.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Cleared and Established	☐	☐	☐
Physical Hazards Barricaded and Isolated	☐	☐	☐
Emergency Equipment Staged	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Spiders and bees prefer well protective casings as nesting areas use caution when opening; Open wells and allow to vent/off gas 3-5 minutes while preparing your equipment from an upwind position. Personal sampling at remote locations will bag contaminated PPE and reusable sampling tools and use hygienic wipes for hands and face until persons can reach the structured decontamination unit. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather (storms, high, winds, etc.). Employ proper lifting techniques as described on Table 5-1 for mobilization/demobilization. For remote locations pack glass ware in hard sided containers to prevent falls breakage of glassware and possible lacerations. Natural attenuation reagent ampoules should be placed in hard sided containers (empty water bottle) for carrying and disposal. Provisions for protection against the sun should be provided to site personnel including shade providing devices requirements for hats, sun block, wrap around sun glasses.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
MONITORING WELL INSTALLATION/SOIL BORING ACTIVITIES
NASCF, JACKSONVILLE, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used Monitoring well installation – Installation will be accomplished using Rotosonic/DPT Drill Rigs. Rotosonic – A core rod and outer casing will be advanced (through vibratory/rotating/hydraulic pressure).The well will be installed once the core rods are removed inside the outer casing. In some cases, as the outer casing is extracted sand is added to 2-feet above the screen, then a 2-foot bentonite seal, finished then with grout to the surface. In other cases, a casing will form a seal to the top of rock and remain as part of the well construction. DPT installation will consist of driving a 2-inch tube to a desired depth. The disposable tip will be knocked out and a pre-packed well will be inserted. The outer casing will be removed placing sand above the screen interval, betonite seal, and allow trhe natural formation to collapse around the well. The surface preparation will be the same for all of the wells.

II. Primary Hazards: Potential hazards associated with this task include lifting (bags of sand, grout, auger flights and moving drums of soil), cuts and lacerations (cutting bags, well riser, etc.), pinches and compressions opening split spoons (wrenches slipping) and handling containers; pressurized systems (hydraulic lines); contact with contaminated media. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Inspector Initials _____ TtNUS

Equipment Inspection required ☒ Yes ☐ No Inspector Initials _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required

Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required

Yes ☐ See Reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	**Hazard Monitoring**	**Action Level(s)**	**Response Measures**
Volatile Organics Compounds (VOCs)	PID 10.6eV lamp	<50 ppm	Continue to work/continue to monitor
Volatile Organics Compounds (VOCs)	PID 10.6eV lamp	>50 ppm	Temp. Suspend Site activity/Contact PHSO

Hot Work – Welding outer casing strings – Monitoring will be conducted in the headspace of the casing. If excessive concentrations are measured, then concurrent monitoring with the PID in the welders breathing zone is necessary to control potential overexposure. Note: TCE in the presence of UV light (welding) is converted to phosgene. It is critical to insure these concentrations are minimized to the extent possible.

Oxygen Levels	LEL/O2 Meter	19.5 to 23.5%	Continue to work/continue to monitor
Oxygen Levels	LEL/O2 Meter	<19.5/>23.5%	Use casing plug/evacuate headspace to control % LEL gases, rescreen atmosphere concentration
LEL (Combustible Gases)	LEL/O2 Meter	<10%(8000 ppm)	Continue to work/continue to monitor LEL
LEL (Combustible Gases)	LEL/O2 Meter	>10%(8000 ppm)	Use casing plug/evacuate headspace to control % LEL gases, rescreen atmosphere concentration

Primary Route of Exposure/Hazard: VOCs – Generally these compounds are irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Irregular heartbeats, possible cardiac arrest. It should be noted that specific compounds may result in far different symptoms. Particulates (Dusts) – Based on the concentrations inhaled can evoke an irritant, toxic, or an allergic response.; Sand, bentonite, grout may cause irritation (eyes) as well as potential alkali burns; respiratory irritation.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes or No)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☒ No	Barricades	☒ Yes	☐ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – See Note)	☒ Yes	☐ No
Impermeable apron	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☐ No
High Visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☒ Yes	☐ No
Safety Shower/Eyewash	☒ Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: High Visibility Vests for high traffic areas; Tape up and use insect repellent to combat insect bites as necessary; Fire extinguisher for all vehicles in excess of 1-ton; Nitrile or neoprene supported gloves and impermeable aprons for handling contaminated auger flights.

VIII. Site Preparation	**Yes**	**No**	**NA**
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Cleared and Established	☐	☐	☐
Physical Hazards Barricaded and Isolated	☐	☐	☐
Emergency Equipment Staged	☐	☐	☐

IX. Additional Permits required (Utility Locating and Excavation Clearance – Attachment II). . ☒ Yes ☐ No

If yes, SHSO complete permit or contact Health Sciences, Pittsburgh Office(412) 921-7090

X. Special instructions, precautions: Follow the safe work practices for drilling specified in Section 5.9 of this HASP. Use proper lifting techniques defined in Table 5-1 for mobilization/demobilization. Test all emergency stop devices initially then periodically to insure operational status. Identify a person on the field crew as the Emergency Stop Operator. Visually insure all persons are removed from rotating apparatus. Verbally alert all persons as to the activation of the rotating equipment. Remove jewelry, loose clothing and other potential entanglement hazards. Personnel decontamination will consist of disposing of single use PPE and washing hands and face prior to breaks or meals. The potential for exposure can occur only through mechanical dispersion (inhalation) or hand to mouth contact (ingestion) through poor work hygiene practices. Utility clearance will proceed all subsurface installation. All project devices (drill masts) will have an orange and white checkered flag (specs 3x3x1foot checks) on top. All support vehicles will be equipped with flashing orange lights to enhance visibility while operating on the taxiways and runways. All vehicles intending on crossing a runway or taxiway will have a radio linked to the tower to obtain permission. All personnel working in the area of the taxiways and/or runways will have attended Ramp Training. All personnel entering the taxiway and runway areas will inspect their vehicles for FOD. The FOL will be responsible for closing work areas. Thjs will entail inspecting the area to insure it has been restored adequately and to all insure that all potential FOD has been picked up. During permanent casing installation all Hot Work will be accomplished following the direction provided in the Hot Work Permit.

Permit Issued by:_____ Permit Accepted by:_____

HOT WORK PERMIT

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope (To be filled in by person performing work)

I. Work limited to the following (description, area, equipment used): Spot Tacking (welding) threaded casing strings during monitoring well installation.

II. Names: _____

III. On-site Inspection conducted ☐ Yes ☐ No Inspector Initials _____ TtNUS
Equipment Inspection required ☒ Yes ☐ No Inspector Initials _____ TtNUS

Equipment Preparation

IV. Equipment Preparation Checklist

	Yes	No	NA
Equipment drained/depressured	☐	☐	☐
Equipment purged/cleaned	☐	☐	☐
Atmosphere Inerted (Inerting Gas -)	☐	☐	☐
Isolation checklist completed	☐	☐	☐
Electrical lockout required/field switch tested	☐	☐	☐
Blinds/misalignments/blocks & bleeds in place	☐	☐	☐
Hazardous materials on walls/behind liners considered	☐	☐	☐
Paints and/or Coatings	☐	☐	☐

Chemicals of Concern

V. Chemicals of Concern	**LEL – UEL (Range)**	**Correction Factor**	**Instrument Response** Reading
Trichloroethylene	8 to 10.5%		

Atmospheric Testing

Hazard Tested	**Acceptable Range**	**Reading**	**Acceptable?**
% Oxygen	19.5 - 23.5%	_____	Yes ☐ No ☐
% LEL/LFL	Less than 10 %	_____	Yes ☐ No ☐
Toxic_____	PEL/TLV = 50 ppm	_____	Yes ☐ No ☐

Fire Prevention/Protection

Method	**Type/Rating**	**Acceptable?**
Fire Extinguisher		Yes ☐ No ☐
Water Hose	None Required	Yes ☐ No ☐
Flammable Liquid Storage	UL Approved Safety Cans	Yes ☐ No ☐
Shielding/Heat Barriers	Maintain minimum 50-feet from flammable stores	Yes ☐ No ☐
Area Wetting (Dry grasses/timber)	None Required	Yes ☐ No ☐

SECTION II: General Safety Requirements (To be filled in by permit issuer)

VI. Protective equipment required
Level D ☐ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: _____

VII. Additional Safety Equipment/Procedures

Hardhat	☒ Yes	☐ No		Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No	☒ N/A
Safety Glasses	☒ Yes	☐ No		Safety belt/harness	☐ Yes	☐ No	☒ N/A
Chemical/splash goggles	☐ Yes	☒ No		Radio	☐ Yes	☐ No	☒ N/A
Splash Shield	☐ Yes	☒ No		Barricades	☒ Yes	☐ No	☐ N/A
Splash suit/coveralls	☐ Yes	☒ No		Gloves (Type - Welding)	☒ Yes	☐ No	☐ N/A
Steel toe/shank Workboots	☒ Yes	☐ No		Work/rest regimen	☐ Yes	☒ No	☐ N/A
Welding Hood(F.R.= 10 to 13)	☒ Yes	☐ No		Burning Goggles (F.R.=)	☐ Yes	☐ No	☒ N/A
Welding Screens/shields	☒ Yes	☐ No		Heat Resistant Aprons( )	☐ Yes	☐ No	☒ N/A
Heat Resistant Jacket or Sleeves)	☐ Yes	☐ No		Blow back Protection/Flash Arrestors	☐ Yes	☐ No	☒ N/A

Modifications/Exceptions: Welding screens are to be placed around the welder during the welding to protect others from the flash.

VIII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☐	Emergency alarms	☐	☐
Procedure for safe job completion per HASP	☐	☐	Evacuation routes	☐	☐
Contractor tools/equipment inspected	☐	☐	Assembly points	☐	☐

IX. Special instructions, precautions: Fire watch to monitor operation

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
GEOGRAPHICAL SURVEYING ACTIVITIES
NASCF, JACKSONVILLE, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Geographical surveying within a light industrial area. These activities include site preparation including the layout of control station as well as shooting vertical and horizontal control and sample locations .

II. Primary Hazards: Potential hazards associated with this task are primarily physical in nature including lifting, cuts and lacerations, pinches and compressions; flying projectiles; slips, trips, and falls; insect and animal bites The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

IV. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: None anticipated

VI. Chemicals of Concern	**Hazard Monitoring**	**Action Level(s)**	**Response Measures**
None anticipated	Not applicable	Not Applicable	Not Applicable

Primary Route of Exposure/Hazard: Primarily concern as it pertains to this task is physical hazards. However, as the rod man will need to open the well to take the vertical elevation shot, he/she should open the well from upwind; permit the well to off-gas as necessary; then take the shot from upwind.

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes or No)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☒ No
Safety Glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – Leather/Cotton)	☐ Yes	☐ No
Impermeable apron	☐ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☐ No
High Visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: If working in areas where snakes are a threat, wear snake chaps to protect against bites. Surveyors working along highways and traffic pathways shall wear high visibility vests to increase visual recognition. Hard hats, safety glasses, leather or cotton work gloves when/if cutting brush. Tape pant legs and use insect repellants as necessary.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Suspend site activities in the event of inclement weather. Employ proper lifting techniques as described on Table 5-1 for this task. Employ sharp tools for cutting brush, when not in use keep the sheath on the blade.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
IDW MANAGEMENT ACTIVITIES
NASCF, JACKSONVILLE, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** IDW management activities includes containerization, staging, monitoring for leaks of IDW accumulated wastes. Wastes types include soil cutting, purge and decontamination wash waters.

II. **Primary Hazards:** Potential hazards associated with this task are primarily physical in nature including lifting, pinches and compressions; flying projectiles; slips, trips, and falls. The direction provided in this HASP, Table 5-1 and this Safe Work Permit are directed at controlling these hazards.

V. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: None anticipated

VI.

Chemicals of Concern	**Hazard Monitoring**	**Action Level(s)**	**Response Measures**
None anticipated	Not Applicable	Not Applicable	Not Applicable

Primary Route of Exposure/Hazard: None

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes or No)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☒ No
Safety Glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – Leather/Cotton)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☒ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☐ No
High Visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☒ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: If you are using pneumatic/electric power to open drums – Safety glasses are required; If power equipment is employed to move drums or you are working near operating equipment hard hats will be employed.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Suspend site activities in the event of inclement weather. Employ proper lifting techniques as described on Table 5-1 for this task. When/where possible use heavy equipment to move and place containers. When placing drums – Place the label and retention ring nut on the outside where it is readily visible. Place 4-drums to a pallet. Maintain a minimum distance of 4-feet between pallet rows. An IDW inventory shall be generated to provide the number of drums, contents, and volumes. This inventory should be provided to the facility contact

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT V

MEDICAL DATA SHEET

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by all on-site personnel and kept in a central location during the execution of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project _____

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Name of Next Kin _____

Drug or other Allergies _____

_____

Particular Sensitivities _____

_____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals _____

_____

_____

_____

What medications are you presently using? _____

_____

_____

_____

Do you have any medical restrictions? _____

_____

_____

_____

Name, Address, and Phone Number of personal physician: _____

_____

_____

I am the individual described above. I have read and understand this HASP.

_____ _____

Signature Date

ATTACHMENT VI

HEARING CONSERVATION

TETRA TECH NUS, INC.

HEARING CONSERVATION PROGRAM

HEARING CONSERVATION
TABLE OF CONTENTS

SECTION		PAGE
1.0	**PURPOSE**	**1**
2.0	**SCOPE**	**1**
3.0	**RESPONSIBILITIES**	**1**
4.0	**MONITORING AND ESTABLISHING HIGH-NOISE AREAS**	**1**
5.0	**HEARING PROTECTION**	**2**
6.0	**TRAINING PROGRAM**	**2**
7.0	**RECORDKEEPING**	**2**
8.0	**ATTACHMENT**	**3**
8.1	29 CFR 1910.95 Occupational Noise Exposure	4
8.1.1	Code of Federal Regulations, Subsection 1910.95	5

TETRA TECH NUS, INC.
HEARING CONSERVATION PROGRAM

1.0 PURPOSE

To establish general and site-specific hearing conservation procedures and guidelines.

2.0 SCOPE

Applies to all hazardous waste and other field activities where exposure to high levels of noise may occur. This program is designed to comply with OSHA General Industry Standard 29 CFR 1910.95.

3.0 RESPONSIBILITIES

Project Health and Safety Officer (PHSO) - The PHSO shall ensure that hearing conservation measures are adequately addressed in the Site Specific Health and Safety Plan.

Site Safety Officer (SSO) - The SSO is responsible for establishing and implementing a hearing conservation program. The SSO also ensures that adequate procedures are followed to prevent excessive exposure of individuals to high levels of noise.

Project Manager (PM) - The PM will ensure that sufficient information has been provided to the PHSO to prepare adequate procedures for inclusion in the site-specific Health and Safety Plan (HASP). The PM is also ultimately responsible for the effective compliance with these requirements.

4.0 MONITORING AND ESTABLISHING HIGH-NOISE AREAS

4.1 The SSO, as necessary, will perform and initial noise survey on Tetra Tech NUS and Subcontractors operations and work areas by the use of a sound meter and/or dosimetry. All monitoring will be done in accordance with 29 CFR 1910.95. Areas and operations which are expected to reach or exceed 85 decibels (dBA) will be required to adhere to the requirements for this program.

4.2 The HASP will set policy on mandatory use of hearing protection in affected areas, and while performing certain operations. The FOL and/or SSO will notify all Tetra Tech NUS and Subcontractor personnel of high noise areas and operations prior to work initiation.

The FOL and/or the SSO will be responsible for implementation and enforcement of the site-specific Hearing Conservation elements.

4.3 The FOL and/or the SSO will post or otherwise identify areas of operations which exceed 85 dBA. If significant changes in noise levels occur (such as a shutdown in an operating unit, change in procedures), the noise levels shall be re-evaluated by the SSO to determine if hearing protection will be worn.

5.0 HEARING PROTECTION

Each employee will have the opportunity to choose from a variety of hearing protection devices. Hearing protectors shall be replaced as necessary. The SSO will evaluate the attenuation factors of hearing protection devices and will select appropriate types based on sound level monitoring or personal dosimetry.

6.0 TRAINING PROGRAM

The Health Sciences Department will institute and maintain an initial training program for new employees and provide an annual training program for employees who may be exposed to noise sources 85 dBA or greater. The annual training will be incorporated with the refresher health and safety training curricula. All affected employees will be involved in the program and their participation documented.

6.1 The training program shall include the effects of noise on hearing. It will also include the purpose of hearing protectors; the advantages, disadvantages, and attenuation factors of the various types. Instruction shall be given on issue points, selection, fitting, use and care of hearing protectors.

6.2 A copy of the OSHA Noise Standard and applicable informational and training material will be available to all employees.

7.0 RECORDKEEPING

Exposure measurements, related records will be kept at the site. Record retention will be done in accordance with the time periods stated in 29 CFR 1910.95 and 1910.20.

8.0 ATTACHMENTS

8.1 29 CFR 1910.95 Occupational Noise Exposure

8.1.1 Code of Federal Regulations, Subsection 1910.95

This page left intentionally blank.

ATTACHMENT 8.1

29 CFR 1910.95 OCCUPATIONAL NOISE EXPOSURE

Site:		**Type of Audio Monitoring Equipment:**		**Date:**
Employee Name	**Operation**	**Hearing Protection Type Attenuation Factor**	**Noise Levels Measured**	**Duration of Use**

Forward completed table (with backup noise monitoring data) to the Manager, Health Sciences.

ATTACHMENT 8.1.1

CODE OF FEDERAL REGULATIONS, SUBSECTION 1910.95

FR 5322, Feb. 10, 1984; 55 FR 32015, Aug. 6, 1990; 58 FR 35308, June 30, 1993]

§ 1910.95 Occupational noise exposure.

(a) Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table G-16 when measured on the A scale of a standard sound level meter at slow response. When noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined as follows:

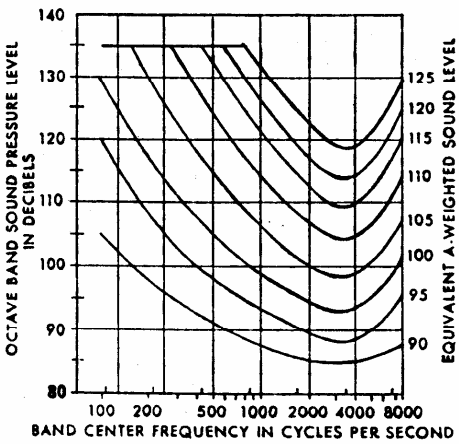


FIGURE G-9

Equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level by plotting them on this graph and noting the A-weighted sound level corresponding to the point of highest penetration into the sound level contours. This equivalent A-weighted sound level, which may differ from the actual A-weighted sound level of the noise, is used to determine exposure limits from Table 1.G-16.

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

(2) If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered continuous.

TABLE G-16—PERMISSIBLE NOISE EXPOSURES [1]

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

[1] When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: $C_1/T_1 + C_2/T_2$ C_n/T_n exceeds unity, then, the mixed exposure should be considered to exceed the limit value. *Cn* indicates the total time of exposure at a specified noise level, and *Tn* indicates the total time of exposure permitted at that level.

Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

(c) *Hearing conservation program.* (1) The employer shall administer a continuing, effective hearing conservation program, as described in paragraphs (c) through (o) of this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with appendix A and Table G-16a, and without regard to any attenuation provided by the use of personal protective equipment.

(2) For purposes of paragraphs (c) through (n) of this section, an 8-hour time-weighted average of 85 decibels or a dose of fifty percent shall also be referred to as the action level.

(d) *Monitoring.* (1) When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program.

(i) The sampling strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.

(ii) Where circumstances such as high worker mobility, significant variations in sound level, or a significant

component of impulse noise make area monitoring generally inappropriate, the employer shall use representative personal sampling to comply with the monitoring requirements of this paragraph unless the employer can show that area sampling produces equivalent results.

(2)(i) All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.

(ii) Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

(3) Monitoring shall be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

(i) Additional employees may be exposed at or above the action level; or

(ii) The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.

(e) *Employee notification.* The employer shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.

(f) *Observation of monitoring.* The employer shall provide affected employees or their representatives with an opportunity to observe any noise measurements conducted pursuant to this section.

(g) *Audiometric testing program.* (1) The employer shall establish and maintain an audiometric testing program as provided in this paragraph by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.

(2) The program shall be provided at no cost to employees.

(3) Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

(4) All audiograms obtained pursuant to this section shall meet the requirements of Appendix C: *Audiometric Measuring Instruments.*

(5) *Baseline audiogram.* (i) Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

(ii) *Mobile test van exception.* Where mobile test vans are used to meet the audiometric testing obligation, the employer shall obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees shall wearing hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.

(iii) Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.

(iv) The employer shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

(6) *Annual audiogram.* At least annually after obtaining the baseline audiogram, the employer shall obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

(7) *Evaluation of audiogram.* (i) Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift as defined in paragraph (g)(10) of this section has oc-

curred. This comparison may be done by a technician.

(ii) If the annual audiogram shows that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.

(iii) The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. The employer shall provide to the person performing this evaluation the following information:

(A) A copy of the requirements for hearing conservation as set forth in paragraphs (c) through (n) of this section;

(B) The baseline audiogram and most recent audiogram of the employee to be evaluated;

(C) Measurements of background sound pressure levels in the audiometric test room as required in Appendix D: Audiometric Test Rooms.

(D) Records of audiometer calibrations required by paragraph (h)(5) of this section.

(8) *Follow-up procedures.* (i) If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift as defined in paragraph (g)(10) of this section has occurred, the employee shall be informed of this fact in writing, within 21 days of the determination.

(ii) Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a standard threshold shift occurs:

(A) Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them.

(B) Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

(C) The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if the employer suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.

(D) The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

(iii) If subsequent audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, the employer:

(A) Shall inform the employee of the new audiometric interpretation; and

(B) May discontinue the required use of hearing protectors for that employee.

(9) *Revised baseline.* An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram:

(i) The standard threshold shift revealed by the audiogram is persistent; or

(ii) The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

(10) *Standard threshold shift.* (i) As used in this section, a standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

(ii) In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram according to the procedure described in Appendix F: *Calculation and Application of Age Correction to Audiograms.*

(h) *Audiometric test requirements.* (1) Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.

(2) Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that

meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969.

(3) Pulsed-tone and self-recording audiometers, if used, shall meet the requirements specified in Appendix C: *Audiometric Measuring Instruments.*

(4) Audiometric examinations shall be administered in a room meeting the requirements listed in Appendix D: *Audiometric Test Rooms.*

(5) *Audiometer calibration.* (i) The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration.

(ii) Audiometer calibration shall be checked acoustically at least annually in accordance with Appendix E: *Acoustic Calibration of Audiometers.* Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.

(iii) An exhaustive calibration shall be performed at least every two years in accordance with sections 4.1.2; 4.1.3.; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

(i) *Hearing protectors.* (1) Employers shall make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors shall be replaced as necessary.

(2) Employers shall ensure that hearing protectors are worn:

(i) By an employee who is required by paragraph (b)(1) of this section to wear personal protective equipment; and

(ii) By any employee who is exposed to an 8-hour time-weighted average of 85 decibels or greater, and who:

(A) Has not yet had a baseline audiogram established pursuant to paragraph (g)(5)(ii); or

(B) Has experienced a standard threshold shift.

(3) Employees shall be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by the employer.

(4) The employer shall provide training in the use and care of all hearing protectors provided to employees.

(5) The employer shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

(j) *Hearing protector attenuation.* (1) The employer shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. The employer shall use one of the evaluation methods described in Appendix B: *Methods for Estimating the Adequacy of Hearing Protection Attenuation.*

(2) Hearing protectors must attenuate employee exposure at least to an 8-hour time-weighted average of 90 decibels as required by paragraph (b) of this section.

(3) For employees who have experienced a standard threshold shift, hearing protectors must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or below.

(4) The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. The employer shall provide more effective hearing protectors where necessary.

(k) *Training program.* (1) The employer shall institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and shall ensure employee participation in such program.

(2) The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

(3) The employer shall ensure that each employee is informed of the following:

(i) The effects of noise on hearing;

(ii) The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and

(iii) The purpose of audiometric testing, and an explanation of the test procedures.

(l) *Access to information and training materials.* (1) The employer shall make available to affected employees or their representatives copies of this standard and shall also post a copy in the workplace.

(2) The employer shall provide to affected employees any informational materials pertaining to the standard that are supplied to the employer by the Assistant Secretary.

(3) The employer shall provide, upon request, all materials related to the employer's training and education program pertaining to this standard to the Assistant Secretary and the Director.

(m) *Recordkeeping*—(1) *Exposure measurements.* The employer shall maintain an accurate record of all employee exposure measurements required by paragraph (d) of this section.

(2) *Audiometric tests.* (i) The employer shall retain all employee audiometric test records obtained pursuant to paragraph (g) of this section:

(ii) This record shall include:

(A) Name and job classification of the employee;

(B) Date of the audiogram;

(C) The examiner's name;

(D) Date of the last acoustic or exhaustive calibration of the audiometer; and

(E) Employee's most recent noise exposure assessment.

(F) The employer shall maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

(3) *Record retention.* The employer shall retain records required in this paragraph (m) for at least the following periods.

(i) Noise exposure measurement records shall be retained for two years.

(ii) Audiometric test records shall be retained for the duration of the affected employee's employment.

(4) *Access to records.* All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary. The provisions of 29 CFR 1910.20 (a)-(e) and (g)-(i) apply to access to records under this section.

(5) *Transfer of records.* If the employer ceases to do business, the employer shall transfer to the successor employer all records required to be maintained by this section, and the successor employer shall retain them for the remainder of the period prescribed in paragraph (m) (3) of this section.

(n) *Appendices.* (1) Appendices A, B, C, D, and E to this section are incorporated as part of this section and the contents of these appendices are mandatory.

(2) Appendices F and G to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

(o) *Exemptions.* Paragraphs (c) through (n) of this section shall not apply to employers engaged in oil and gas well drilling and servicing operations.

(p) *Startup date.* Baseline audiograms required by paragraph (g) of this section shall be completed by March 1, 1984.

(Approved by the Office of Management and Budget under control number 1218-0048)

APPENDIX A TO § 1910.95—NOISE EXPOSURE COMPUTATION

This Appendix is Mandatory

I. Computation of Employee Noise Exposure

(1) Noise dose is computed using Table G-16a as follows:

(i) When the sound level, L, is constant over the entire work shift, the noise dose, D, in percent, is given by: $D=100\ C/T$ where C is the total length of the work day, in hours, and T is the reference duration corresponding to the measured sound level, L, as given in Table G-16a or by the formula shown as a footnote to that table.

(ii) When the workshift noise exposure is composed of two or more periods of noise at different levels, the total noise dose over the work day is given by:

$$D=100\ (C_1/T_1+C_2/T_2+\ldots+C_n/T_n),$$

where C_n indicates the total time of exposure at a specific noise level, and T_n indicates the reference duration for that level as given by Table G-16a.

(2) The eight-hour time-weighted average sound level (TWA), in decibels, may be computed from the dose, in percent, by means of the formula: $TWA=16.61\ \log_{10}\ (D/100)+90$. For an eight-hour workshift with the noise level constant over the entire shift, the TWA is equal to the measured sound level.

(3) A table relating dose and TWA is given in Section II.

TABLE G-16a

A-weighted sound level, L (decibel)	Reference duration, T (hour)
80	32
81	27.9
82	24.3
83	21.1
84	18.4
85	16
86	13.9
87	12.1
88	10.6
89	9.2
90	8
91	7.0
92	6.1
93	5.3
94	4.6
95	4
96	3.5
97	3.0
98	2.6
99	2.3
100	2
101	1.7
102	1.5
103	1.3
104	1.1
105	1
106	0.87
107	0.76
108	0.66
109	0.57
110	0.5
111	0.44
112	0.38
113	0.33
114	0.29
115	0.25
116	0.22
117	0.19
118	0.16
119	0.14
120	0.125
121	0.11
122	0.095
123	0.082

TABLE G-16a—Continued

A-weighted sound level, L (decibel)	Reference duration, T (hour)
124	0.072
125	0.063
126	0.054
127	0.047
128	0.041
129	0.036
130	0.031

In the above table the reference duration, T, is computed by

$$T = \frac{8}{2^{(L-90)/5}}$$

where L is the measured A-weighted sound level.

II. Conversion Between "Dose" and "8-Hour Time-Weighted Average" Sound Level

Compliance with paragraphs (c)-(r) of this regulation is determined by the amount of exposure to noise in the workplace. The amount of such exposure is usually measured with an audiodosimeter which gives a readout in terms of "dose." In order to better understand the requirements of the amendment, dosimeter readings can be converted to an "8-hour time-weighted average sound level." (TWA).

In order to convert the reading of a dosimeter into TWA, see Table A-1, below. This table applies to dosimeters that are set by the manufacturer to calculate dose or percent exposure according to the relationships in Table G-16a. So, for example, a dose of 91 percent over an eight hour day results in a TWA of 89.3 dB, and, a dose of 50 percent corresponds to a TWA of 85 dB.

If the dose as read on the dosimeter is less than or greater than the values found in Table A-1, the TWA may be calculated by using the formula: $TWA=16.61\ \log_{10}\ (D/100)+90$ where TWA=8-hour time-weighted average sound level and D=accumulated dose in percent exposure.

TABLE A-1—CONVERSION FROM "PERCENT NOISE EXPOSURE" OR "DOSE" TO "8-HOUR TIME-WEIGHTED AVERAGE SOUND LEVEL" (TWA)

Dose or percent noise exposure	TWA
10	73.4
15	76.3
20	78.4
25	80.0
30	81.3
35	82.4
40	83.4
45	84.2
50	85.0
55	85.7
60	86.3
65	86.9
70	87.4
75	87.9
80	88.4
81	88.5
82	88.6
83	88.7
84	88.7
85	88.8
86	88.9
87	89.0
88	89.1
89	89.2
90	89.2
91	89.3
92	89.4
93	89.5
94	89.6
95	89.6
96	89.7
97	89.8
98	89.9
99	89.9
100	90.0
101	90.1
102	90.1
103	90.2
104	90.3
105	90.4
106	90.4
107	90.5
108	90.6
109	90.6
110	90.7
111	90.8
112	90.8
113	90.9
114	90.9
115	91.1
116	91.1
117	91.1
118	91.2
119	91.3
120	91.3
125	91.6
130	91.9
135	92.2
140	92.4
145	92.7
150	92.9
155	93.2
160	93.4
165	93.6
170	93.8
175	94.0

TABLE A-1—CONVERSION FROM "PERCENT NOISE EXPOSURE" OR "DOSE" TO "8-HOUR TIME-WEIGHTED AVERAGE SOUND LEVEL" (TWA)—Continued

Dose or percent noise exposure	TWA
180	94.2
185	94.4
190	94.6
195	94.8
200	95.0
210	95.4
220	95.7
230	96.0
240	96.3
250	96.6
260	96.9
270	97.2
280	97.4
290	97.7
300	97.9
310	98.2
320	98.4
330	98.6
340	98.8
350	99.0
360	99.2
370	99.4
380	99.6
390	99.8
400	100.0
410	100.2
420	100.4
430	100.5
440	100.7
450	100.8
460	101.0
470	101.2
480	101.3
490	101.5
500	101.6
510	101.8
520	101.9
530	102.0
540	102.2
550	102.3
560	102.4
570	102.6
580	102.7
590	102.8
600	102.9
610	103.0
620	103.2
630	103.3
640	103.4
650	103.5
660	103.6
670	103.7
680	103.8
690	103.9
700	104.0
710	104.1
720	104.2
730	104.3
740	104.4
750	104.5
760	104.6
770	104.7
780	104.8
790	104.9
800	105.0
810	105.1

TABLE A-1—CONVERSION FROM "PERCENT NOISE EXPOSURE" OR "DOSE" TO "8-HOUR TIME-WEIGHTED AVERAGE SOUND LEVEL" (TWA)—Continued

Dose or percent noise exposure	TWA
820	105.2
830	105.3
840	105.4
850	105.4
860	105.5
870	105.6
880	105.7
890	105.8
900	105.8
910	105.9
920	106.0
930	106.1
940	106.2
950	106.2
960	106.3
970	106.4
980	106.5
990	106.5
999	106.6

APPENDIX B TO § 1910.95—METHODS FOR ESTIMATING THE ADEQUACY OF HEARING PROTECTOR ATTENUATION

This Appendix is Mandatory

For employees who have experienced a significant threshold shift, hearing protector attenuation must be sufficient to reduce employee exposure to a TWA of 85 dB. Employers must select one of the following methods by which to estimate the adequacy of hearing protector attenuation.

The most convenient method is the Noise Reduction Rating (NRR) developed by the Environmental Protection Agency (EPA). According to EPA regulation, the NRR must be shown on the hearing protector package. The NRR is then related to an individual worker's noise environment in order to assess the adequacy of the attenuation of a given hearing protector. This appendix describes four methods of using the NRR to determine whether a particular hearing protector provides adequate protection within a given exposure environment. Selection among the four procedures is dependent upon the employer's noise measuring instruments.

Instead of using the NRR, employers may evaluate the adequacy of hearing protector attenuation by using one of the three methods developed by the National Institute for Occupational Safety and Health (NIOSH), which are described in the "List of Personal Hearing Protectors and Attenuation Data," HEW Publication No. 76-120, 1975, pages 21-37. These methods are known as NIOSH methods #1, #2 and #3. The NRR described below is a simplification of NIOSH method #2. The most complex method is NIOSH method #1, which is probably the most accurate method since it uses the largest amount of spectral information from the individual employee's noise environment. As in the case of the NRR method described below, if one of the NIOSH methods is used, the selected method must be applied to an individual's noise environment to assess the adequacy of the attenuation. Employers should be careful to take a sufficient number of measurements in order to achieve a representative sample for each time segment.

NOTE: The employer must remember that calculated attenuation values reflect realistic values only to the extent that the protectors are properly fitted and worn.

When using the NRR to assess hearing protector adequacy, one of the following methods must be used:

(i) When using a dosimeter that is capable of C-weighted measurements:

(A) Obtain the employee's C-weighted dose for the entire workshift, and convert to TWA (see appendix A, II).

(B) Subtract the NRR from the C-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(ii) When using a dosimeter that is not capable of C-weighted measurements, the following method may be used:

(A) Convert the A-weigh ed dose to TWA (see appendix A).

(B) Subtract 7 dB from the NRR.

(C) Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(iii) When using a sound level meter set to the A-weighting network:

(A) Obtain the employee's A-weighted TWA.

(B) Subtract 7 dB from the NRR, and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(iv) When using a sound level meter set on the C-weighting network:

(A) Obtain a representative sample of the C-weighted sound levels in the employee's environment.

(B) Subtract the NRR from the C-weighted average sound level to obtain the estimated A-weighted TWA under the ear protector.

(v) When using area monitoring procedures and a sound level meter set to the A-weighing network.

(A) Obtain a representative sound level for the area in question.

(B) Subtract 7 dB from the NRR and subtract the remainder from the A-weighted sound level for that area.

(vi) When using area monitoring procedures and a sound level meter set to the C-weighting network:

(A) Obtain a representative sound level for the area in question.

(B) Subtract the NRR from the C-weighted sound level for that area.

APPENDIX C TO § 1910.95—AUDIOMETRIC MEASURING INSTRUMENTS

This Appendix is Mandatory

1. In the event that pulsed-tone audiometers are used, they shall have a tone on-time of at least 200 milliseconds.

2. Self-recording audiometers shall comply with the following requirements:

(A) The chart upon which the audiogram is traced shall have lines at positions corresponding to all multiples of 10 dB hearing level within the intensity range spanned by the audiometer. The lines shall be equally spaced and shall be separated by at least ¼ inch. Additional increments are optional. The audiogram pen tracings shall not exceed 2 dB in width.

(B) It shall be possible to set the stylus manually at the 10-dB increment lines for calibration purposes.

(C) The slewing rate for the audiometer attenuator shall not be more than 6 dB/sec except that an initial slewing rate greater than 6 dB/sec is permitted at the beginning of each new test frequency, but only until the second subject response.

(D) The audiometer shall remain at each required test frequency for 30 seconds (± 3 seconds). The audiogram shall be clearly marked at each change of frequency and the actual frequency change of the audiometer shall not deviate from the frequency boundaries marked on the audiogram by more than ± 3 seconds.

(E) It must be possible at each test frequency to place a horizontal line segment parallel to the time axis on the audiogram, such that the audiometric tracing crosses the line segment at least six times at that test frequency. At each test frequency the threshold shall be the average of the midpoints of the tracing excursions.

APPENDIX D TO § 1910.95—AUDIOMETRIC TEST ROOMS

This Appendix is Mandatory

Rooms used for audiometric testing shall not have background sound pressure levels exceeding those in Table D-1 when measured by equipment conforming at least to the Type 2 requirements of American National Standard Specification for Sound Level Meters, S1.4-1971 (R1976), and to the Class II requirements of American National Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets, S1.11-1971 (R1976).

TABLE D-1—MAXIMUM ALLOWABLE OCTAVE-BAND SOUND PRESSURE LEVELS FOR AUDIOMETRIC TEST ROOMS

Octave-band center frequency (Hz)	500	1000	2000	4000	8000
Sound pressure level (dB)	40	40	47	57	62

APPENDIX E TO § 1910.95—ACOUSTIC CALIBRATION OF AUDIOMETERS

This Appendix is Mandatory

Audiometer calibration shall be checked acoustically, at least annually, according to the procedures described in this appendix. The equipment necessary to perform these measurements is a sound level meter, octave-band filter set, and a National Bureau of Standards 9A coupler. In making these measurements, the accuracy of the calibrating equipment shall be sufficient to determine that the audiometer is within the tolerances permitted by American Standard Specification for Audiometers, S3.6-1969.

(1) Sound Pressure Output Check

A. Place the earphone coupler over the microphone of the sound level meter and place the earphone on the coupler.

B. Set the audiometer's hearing threshold level (HTL) dial to 70 dB.

C. Measure the sound pressure level of the tones at each test frequency from 500 Hz through 6000 Hz for each earphone.

D. At each frequency the readout on the sound level meter should correspond to the levels in Table E-1 or Table E-2, as appropriate, for the type of earphone, in the column entitled "sound level meter reading."

(2) Linearity Check

A. With the earphone in place, set the frequency to 1000 Hz and the HTL dial on the audiometer to 70 dB.

B. Measure the sound levels in the coupler at each 10-dB decrement from 70 dB to 10 dB, noting the sound level meter reading at each setting.

C. For each 10-dB decrement on the audiometer the sound level meter should indicate a corresponding 10 dB decrease.

D. This measurement may be made electrically with a voltmeter connected to the earphone terminals.

(3) Tolerances

When any of the measured sound levels deviate from the levels in Table E-1 or Table E-2 by ± 3 dB at any test frequency between 500 and 3000 Hz, 4 dB at 4000 Hz, or 5 dB at 6000 Hz, an exhaustive calibra-

tion is advised. An exhaustive calibration is required if the deviations are greater than 15 dB or greater at any test frequency.

TABLE E-1—REFERENCE THRESHOLD LEVELS FOR TELEPHONICS—TDH-39 EARPHONES

Frequency, Hz	Reference threshold level for TDH-39 earphones, dB	Sound level meter reading, dB
500	11.5	81.5
1000	7	77
2000	9	79
3000	10	80
4000	9.5	79.5
6000	15.5	85.5

TABLE E-2—REFERENCE THRESHOLD LEVELS FOR TELEPHONICS—TDH-49 EARPHONES

Frequency, Hz	Reference threshold level for TDH-49 earphones, dB	Sound level meter reading, dB
500	13.5	83.5
1000	7.5	77.5
2000	11	81.0
3000	9.5	79.5
4000	10.5	80.5
6000	13.5	83.5

APPENDIX F TO § 1910.95—CALCULATIONS AND APPLICATION OF AGE CORRECTIONS TO AUDIOGRAMS

This Appendix Is Non-Mandatory

In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging to the change in hearing level by adjusting the most recent audiogram. If the employer chooses to adjust the audiogram, the employer shall follow the procedure described below. This procedure and the age correction tables were developed by the National Institute for Occupational Safety and Health in the criteria document entitled "Criteria for a Recommended Standard . . . Occupational Exposure to Noise," ((HSM)-11001).

For each audiometric test frequency;

(i) Determine from Tables F-1 or F-2 the age correction values for the employee by:

(A) Finding the age at which the most recent audiogram was taken and recording the corresponding values of age corrections at 1000 Hz through 6000 Hz;

(B) Finding the age at which the baseline audiogram was taken and recording the corresponding values of age corrections at 1000 Hz through 6000 Hz.

(ii) Subtract the values found in step (i)(B) from the value found in step (i)(A).

(iii) The differences calculated in step (ii) represented that portion of the change in hearing that may be due to aging.

EXAMPLE: Employee is a 32-year-old male. The audiometric history for his right ear is shown in decibels below.

Employee's age	Audiometric test frequency (Hz)				
	1000	2000	3000	4000	6000
26	10	5	5	10	5
*27	0	0	0	5	5
28	0	0	0	10	5
29	5	0	5	15	5
30	0	5	10	20	10
31	5	10	20	15	15
*32	5	10	10	25	20

The audiogram at age 27 is considered the baseline since it shows the best hearing threshold levels. Asterisks have been used to identify the baseline and most recent audiogram. A threshold shift of 20 dB exists at 4000 Hz between the audiograms taken at ages 27 and 32.

(The threshold shift is computed by subtracting the hearing threshold at age 27, which was 5, from the hearing threshold at age 32, which is 25). A retest audiogram has confirmed this shift. The contribution of aging to this change in hearing may be estimated in the following manner:

Go to Table F-1 and find the age correction values (in dB) for 4000 Hz at age 27 and age 32.

	Frequency (Hz)				
	1000	2000	3000	4000	6000
Age 32	6	5	7	10	14
Age 27	5	4	6	7	11
Difference	1	1	1	3	3

The difference represents the amount of hearing loss that may be attributed to aging in the time period between the baseline audiogram and the most recent audiogram. In this example, the difference at 4000 Hz is 3 dB. This value is subtracted from the hearing level at 4000 Hz, which in the most recent audiogram is 25, yielding 22 after adjustment. Then the hearing threshold in the baseline audiogram at 4000 Hz (5) is subtracted from the adjusted annual audio-

gram hearing threshold at 4000 Hz (22). Thus the age-corrected threshold shift would be 17 dB (as opposed to a threshold shift of 20 dB without age correction).

TABLE F-1—AGE CORRECTION VALUES IN DECIBELS FOR MALES

Years	Audiometric Test Frequencies (Hz)				
	1000	2000	3000	4000	6000
20 or younger	5	3	4	5	8
21	5	3	4	5	8
22	5	3	4	5	8
23	5	3	4	6	9
24	5	3	5	6	9
25	5	3	5	7	10
26	5	4	5	7	10
27	5	4	6	7	11
28	6	4	6	8	11
29	6	4	6	8	12
30	6	4	6	9	12
31	6	4	7	9	13
32	6	5	7	10	14
33	6	5	7	10	14
34	6	5	8	11	15
35	7	5	8	11	15
36	7	5	9	12	16
37	7	6	9	12	17
38	7	6	9	13	17
39	7	6	10	14	18
40	7	6	10	14	19
41	7	6	10	14	20
42	8	7	11	16	20
43	8	7	12	16	21
44	8	7	12	17	22
45	8	7	13	18	23
46	8	8	13	19	24
47	8	8	14	19	24
48	9	8	14	20	25
49	9	9	15	21	26
50	9	9	16	22	27
51	9	9	16	23	28
52	9	10	17	24	29
53	9	10	18	25	30
54	10	10	18	26	31
55	10	11	19	27	32
56	10	11	20	28	34
57	10	11	21	29	35
58	10	12	22	31	36
59	11	12	22	32	37
60 or older	11	13	23	33	38

TABLE F-2—AGE CORRECTION VALUES IN DECIBELS FOR FEMALES

Years	Audiometric Test Frequencies (Hz)				
	1000	2000	3000	4000	6000
20 or younger	7	4	3	3	6
21	7	4	4	3	6
22	7	4	4	4	6
23	7	5	4	4	7
24	7	5	4	4	7
25	8	5	4	4	7
26	8	5	5	4	8
27	8	5	5	5	8
28	8	5	5	5	8
29	8	5	5	5	9

TABLE F-2—AGE CORRECTION VALUES IN DECIBELS FOR FEMALES—Continued

Years	Audiometric Test Frequencies (Hz)				
	1000	2000	3000	4000	6000
30	8	6	5	5	9
31	8	6	6	5	9
32	9	6	6	6	10
33	9	6	6	6	10
34	9	6	6	6	10
35	9	6	7	7	11
36	9	7	7	7	11
37	9	7	7	7	12
38	10	7	7	7	12
39	10	7	8	8	12
40	10	7	8	8	13
41	10	8	8	8	13
42	10	8	9	9	13
43	11	8	9	9	14
44	11	8	9	9	14
45	11	8	10	10	15
46	11	9	10	10	15
47	11	9	10	11	16
48	12	9	11	11	16
49	12	9	11	11	16
50	12	10	11	12	17
51	12	10	12	12	17
52	12	10	12	13	18
53	13	10	13	13	18
54	13	11	13	14	19
55	13	11	14	14	19
56	13	11	14	15	20
57	13	11	15	15	20
58	14	12	15	16	21
59	14	12	16	16	21
60 or older	14	12	16	17	22

APPENDIX G TO § 1910.95—MONITORING NOISE LEVELS NON-MANDATORY INFORMATIONAL APPENDIX

This appendix provides information to help employers comply with the noise monitoring obligations that are part of the hearing conservation amendment.

WHAT IS THE PURPOSE OF NOISE MONITORING?

This revised amendment requires that employees be placed in a hearing conservation program if they are exposed to average noise levels of 85 dB or greater during an 8 hour workday. In order to determine if exposures are at or above this level, it may be necessary to measure or monitor the actual noise levels in the workplace and to estimate the noise exposure or "dose" received by employees during the workday.

WHEN IS IT NECESSARY TO IMPLEMENT A NOISE MONITORING PROGRAM?

It is not necessary for every employer to measure workplace noise. Noise monitoring or measuring must be conducted only when exposures are at or above 85 dB. Factors which suggest that noise exposures in the workplace may be at this level include employee complaints about the loudness of noise, indications that employees are losing

their hearing, or noisy conditions which make normal conversation difficult. The employer should also consider any information available regarding noise emitted from specific machines. In addition, actual workplace noise measurements can suggest whether or not a monitoring program should be initiated.

HOW IS NOISE MEASURED?

Basically, there are two different instruments to measure noise exposures: the sound level meter and the dosimeter. A sound level meter is a device that measures the intensity of sound at a given moment. Since sound level meters provide a measure of sound intensity at only one point in time, it is generally necessary to take a number of measurements at different times during the day to estimate noise exposure over a workday. If noise levels fluctuate, the amount of time noise remains at each of the various measured levels must be determined.

To estimate employee noise exposures with a sound level meter it is also generally necessary to take several measurements at different locations within the workplace. After appropriate sound level meter readings are obtained, people sometimes draw "maps" of the sound levels within different areas of the workplace. By using a sound level "map" and information on employee locations throughout the day, estimates of individual exposure levels can be developed. This measurement method is generally referred to as *area* noise monitoring.

A dosimeter is like a sound level meter except that it stores sound level measurements and integrates these measurements over time, providing an average noise exposure reading for a given period of time, such as an 8-hour workday. With a dosimeter, a microphone is attached to the employee's clothing and the exposure measurement is simply read at the end of the desired time period. A reader may be used to read-out the dosimeter's measurements. Since the dosimeter is worn by the employee, it measures noise levels in those locations in which the employee travels. A sound level meter can also be positioned within the immediate vicinity of the exposed worker to obtain an individual exposure estimate. Such procedures are generally referred to as *personal* noise monitoring.

Area monitoring can be used to estimate noise exposure when the noise levels are relatively constant and employees are not mobile. In workplaces where employees move about in different areas or where the noise intensity tends to fluctuate over time, noise exposure is generally more accurately estimated by the personal monitoring approach.

In situations where personal monitoring is appropriate, proper positioning of the microphone is necessary to obtain accurate measurements. With a dosimeter, the microphone is generally located on the shoulder and remains in that position for the entire workday. With a sound level meter, the microphone is stationed near the employee's head, and the instrument is usually held by an individual who follows the employee as he or she moves about.

Manufacturer's instructions, contained in dosimeter and sound level meter operating manuals, should be followed for calibration and maintenance. To ensure accurate results, it is considered good professional practice to calibrate instruments before and after each use.

HOW OFTEN IS IT NECESSARY TO MONITOR NOISE LEVELS?

The amendment requires that when there are significant changes in machinery or production processes that may result in increased noise levels, remonitoring must be conducted to determine whether additional employees need to be included in the hearing conservation program. Many companies choose to remonitor periodically (once every year or two) to ensure that all exposed employees are included in their hearing conservation programs.

WHERE CAN EQUIPMENT AND TECHNICAL ADVICE BE OBTAINED?

Noise monitoring equipment may be either purchased or rented. Sound level meters cost about $500 to $1,000, while dosimeters range in price from about $750 to $1,500. Smaller companies may find it more economical to rent equipment rather than to purchase it. Names of equipment suppliers may be found in the telephone book (Yellow Pages) under headings such as: "Safety Equipment," "Industrial Hygiene," or "Engineers-Acoustical." In addition to providing information on obtaining noise monitoring equipment, many companies and individuals included under such listings can provide professional advice on how to conduct a valid noise monitoring program. Some audiological testing firms and industrial hygiene firms also provide noise monitoring services. Universities with audiology, industrial hygiene, or acoustical engineering departments may also provide information or may be able to help employers meet their obligations under this amendment.

Free, on-site assistance may be obtained from OSHA-supported state and private consultation organizations. These safety and health consultative entities generally give priority to the needs of small businesses. See the attached directory for a listing of organizations to contact for aid.

OSHA ONSITE CONSULTATION PROJECT DIRECTORY

State	Office and address	Contact
Alabama	Alabama Consultation Program, P.O. Box 6005, University, Alabama 35486.	(205) 348-7136, Mr. William Weems, Director.
Alaska	State of Alaska, Department of Labor, Occupational Safety & Health, 3301 Eagle St., Pouch 7-022, Anchorage, Alaska 99510.	(907) 276-5013, Mr. Stan Godsoe, Project Manager (Air Mail).
American Samoa	Service not yet available.	
Arizona	Consultation and Training, Arizona Division of Occupational Safety and Health, P.O. Box 19070, 1624 W. Adams, Phoenix, AZ 85005.	(602) 255-5795, Mr. Thomas Ramaley, Manager.
Arkansas	OSHA Consultation, Arkansas Department of Labor, 1022 High St., Little Rock, Ark. 72202.	(501) 371-2992, Mr. George Smith, Project Director.
California	CAL/OSHA Consultation Service, 2nd Floor, 525 Golden Gate Avenue, San Francisco, CA 94102.	(415) 557-2870, Mr. Emmett Jones, Chief.
Colorado	Occupational Safety & Health Section, Colorado State University, Institute of Rural Environmental Health, 110 Veterinary Science Building, Fort Collins, CO 80523.	(303) 491-6151, Dr. Roy M. Buchan, Project Director.
Connecticut	Division of Occupational Safety & Health, Connecticut Department of Labor, 200 Folly Brook Boulevard, Wethersfield, Conn. 06109.	(203) 566-4550, Mr. Leo Alix, Director.
Delaware	Delaware Department of Labor, Division of Industrial Affairs, 820 North French Street, 6th Floor, Wilmington, DE 19801.	(302) 571-3908, Mr. Bruno Salvadori, Director.
District of Columbia	Occupational Safety & Health Division, District of Columbia, Department Employment Services, Office of Labor Standards, 2900 Newton Street NE., Washington, DC 20018.	(202) 832-1230, Mr. Lorenzo M. White, Acting Associate Director.
Florida	Department of Labor & Employment Security, Bureau of Industrial Safety and Health, LaFayette Building, Room 204, 2551 Executive Center Circle West, Tallahassee, FL 32301.	(904) 488-3044, Mr. John C. Glenn, Administrator.
Georgia	Economic Development Division, Technology and Development Laboratory, Engineering Experiment Station, Georgia Institute of Technology, Atlanta, GA 30332.	(404) 894-3806, Mr. William C. Howard, Assistant to Director, Mr. James Burson, Project Manager.
Guam	Department of Labor, Government of Guam, 23548 Guam Main Facility, Agana, Guam 96921.	(671) 772-6291, Joe R. San Agustin, Director.
Hawaii	Education and Information Branch, Division of Occupational Safety and Health, Suite 910, 677 Ala Moana, Honolulu, HI 96813.	(808) 548-2511, Mr. Don Alper, Manager (Air Mail).
Idaho	OSHA Onsite Consultation Program, Boise State University, Community and Environmental Health, 1910 University Drive, Boise, ID 83725.	(208) 385-3929, Dr. Eldon Edmundson, Director.
Illinois	Division of Industrial Services, Dept. of Commerce and Community Affairs, 310 S. Michigan Avenue, 10 Floor, Chicago, IL 60601.	(800) 972-4140/4216 (Toll-free in State), (312) 793-3270, Mr. Stan Czwinski, Assistant Director.
Iowa	Bureau of Labor, 307 E. Seventh Street, Des Moines, IA 50319.	(515) 281-3606, Mr. Allen J. Meier, Commissioner.
Indiana	Bureau of Safety, Education and Training, Indiana Division of Labor, 1013 State Office Building, Indianapolis, IN 46204.	(317) 633-5845, Mr. Harold Mills, Director.
Kansas	Kansas Dept. of Human Resources, 401 Topeka Ave., Topeka, KS 66603.	(913) 296-4086, Mr. Jerry Abbott, Secretary.
Kentucky	Education and Training, Occupational Safety and Health, Kentucky Department of Labor, 127 Building, 127 South, Frankfort, KY 40601.	(502) 564-6895, Mr. Larry Potter, Director.
Louisiana	No services available as yet (Pending FY 83).	
Maine	Division of Industrial Safety, Maine Dept. of Labor, Labor Station 45, State Office Building, Augusta, ME 04333.	(207) 289-3331, Mr. Lester Wood, Director.
Maryland	Consultation Services, Division of Labor & Industry, 501 St. Paul Place, Baltimore, Maryland 21202.	(301) 659-4210, Ms. Ileana O'Brien, Project Manager, 7(c)(1) Agreement.
Massachusetts	Division of Industrial Safety, Massachusetts Department of Labor and Industries, 100 Cambridge Street, Boston, MA 02202.	(617) 727-3567, Mr. Edward Noseworthy, Project Director.

OSHA ONSITE CONSULTATION PROJECT DIRECTORY—Continued

State	Office and address	Contact
Michigan (Health)	Special Programs Section, Division of Occupational Health, Michigan Dept. of Public Health, 3500 N. Logan, Lansing, MI 48909.	(517) 373-1410, Mr. Irving Davis, Chief.
Michigan (Safety)	Safety Education & Training Division Bureau of Safety and Regulation, Michigan Department of Labor, 7150 Harris Drive, Box 30015, Lansing, Michigan 48909.	(517) 322-1809, Mr. Alan Harvie, Chief.
Minnesota	Training and Education Unit, Department of Labor and Industry, 5th Floor, 444 Lafayette Road, St. Paul, MN 55101.	(612) 296-2973, Mr. Timothy Tierney, Project Manager.
Mississippi	Division of Occupational Safety and Health, Mississippi State Board of Health, P.O. Box 1700, Jackson, MS 39205.	(601) 982-6315, Mr. Henry L. Laird, Director.
Missouri	Missouri Department of Labor and Industrial Relations, 722 Jefferson Street, Jefferson City, MO 65101.	1-(800) 392-0208, (314) 751-3403, Ms. Paula Smith, Mr. Jim Brake.
Montana	Montana Bureau of Safety & Health, Division of Workers Compensation, 815 Front Street, Helena, MT 59601.	(406) 449-3402, Mr. Ed Gatzemeier, Chief.
Nebraska	Nebraska Department of Labor, State House Station, State Capitol, P.O. Box 94600, Lincoln, NB 68509.	475-8451 Ext. 258, Mr. Joseph Carroll, Commissioner.
Nevada	Department of Occupational Safety and Health, Nevada Industrial Commission, 515 E. Muffer Street, Carson City, NV 89714.	(702) 885-5240, Mr. Allen Traenkner, Director.
New Hampshire	For information contact	Office of Consultation Programs, Room N3472 200 Constitution Avenue, NW. Washington, DC 20210, Phone: (202) 523-8985.
New Jersey	New Jersey Department of Labor and Industry Division of Work Place Standards, CN-054, Trenton, NJ 08625.	(609) 292-2313, FTS-8-477-2313, Mr. William Clark, Assistant Commissioner.
New Mexico	OSHA Consultation, Health and Environment Department, Environmental Improvement Division, Occupational Health & Safety Section, 4215 Montgomery Boulevard, NE., Albuquerque, NM 87109.	(505) 842-3387, Mr. Albert M. Stevens, Project Manager.
New York	Division of Safety and Health, New York State Department of Labor, 2 World Trade Center, Room 6995, New York, NY 10047.	(212) 488-7746/7, Mr. Joseph Alleva, Project Manager, DOSH.
North Carolina	Consultation Services, North Carolina Department of Labor, 4 West Edenton Street, Raleigh, NC 27601.	(919) 733-4885, Mr. David Pierce, Director.
North Dakota	Division of Environmental Research, Department of Health, Missouri Office Building, 1200 Missouri Avenue, Bismarck, ND 58505.	(701) 224-2348, Mr. Jay Crawford, Director.
Ohio	Department of Industrial Relations, Division of Onsite Consultation, P.O. Box 825, 2323 5th Avenue, Columbus, OH 43216.	(800) 282-1425 (Toll-free in State), (614) 466-7485, Mr. Andrew Doehrel, Project Manager.
Oklahoma	OSHA Division, Oklahoma Department of Labor, State Capitol, Suite 118, Oklahoma City, OK 73105.	(405) 521-2461, Mr. Charles W. McGlon, Director.
Oregon	Consultative Section, Department of Workers' Compensation, Accident Prevention Division, Room 102, Building 1, 2110 Front Street NE., Salem, OR 97310.	(503) 378-2890, Mr. Jack Buckland, Supervisor.
Pennsylvania	For information contact	Office of Consultation Programs, Room N3472, 200 Constitution Avenue NW., Washington, DC 20210, Phone: (202) 523-8985.
Puerto Rico	Occupational Safety & Health, Puerto Rico Department of Labor and Human Resources, 505 Munoz Rivera Ave., 21st Floor, Hato Rey, Puerto Rico 00919.	(809) 754-2134, Mr. John Cinque, Assistant Secretary, (Air Mail).
Rhode Island	Division of Occupational Health, Rhode Island Department of Health, The Cannon Building, 206 Health Department Building, Providence, RI 02903.	(401) 277-2438, Mr. James E. Hickey, Chief.

OSHA ONSITE CONSULTATION PROJECT DIRECTORY—Continued

State	Office and address	Contact
South Carolina	Consultation and Monitoring, South Carolina Department of Labor, P.O. Box 11329, Columbia, SC 29211.	(803) 758-8921, Mr. Robert Peck, Director, 7(c)(1), Project.
South Dakota	South Dakota Consultation Program, South Dakota State University, S.T.A.T.E.-Engineering Extension, 201 Pugsley Center-SDSO, Brookings, SD 57007.	(605) 688-4101, Mr. James Ceglian, Director.
Tennessee	OSHA Consultative Services, Tennessee Department of Labor, 2nd Floor, 501 Union Building, Nashville, TN 37219.	(615) 741-2793, Mr. L. H. Craig Director.
Texas	Division of Occupational Safety and State Safety Engineer, Texas Department of Health and Resources, 1100 West 49th Street, Austin, TX 78756.	(512) 458-7287, Mr. Walter G. Martin, P.E. Director.
Trust Territories	Service not yet available.	
Utah	Utah Job Safety and Health Consultation Service, Suite 4004, Crane Building, 307 West 200 South, Salt Lake City, UT 84101.	(801) 533-7927/8/9, Mr. H. M. Bergeson, Project Director.
Vermont	Division of Occupational Safety and Health, Vermont Department of Labor and Industry, 118 State Street, Montpelier, VT 05602.	(802) 828-2765, Mr. Robert Mcleod, Project Director.
Virginia	Department of Labor and Industry, P.O. Box 12064, 205 N. 4th Street, Richmond, Va. 23241.	(804) 786-5875, Mr. Robert Beard, Commissioner.
Virgin Islands	Division of Occupational Safety and Health, Virgin Islands Department of Labor, Lagoon Street, Room 207, Frederiksted, Virgin Islands 00840.	(809) 772-1315, Mr. Louis Llanos, Deputy Director-DOSH.
Washington	Department of Labor and Industry, P.O. Box 207, Olympia, WA 98504.	(206) 753-6500, Mr. James Sullivan, Assistant Director.
West Virginia	West Virginia Department of Labor, Room 451B, State Capitol, 1900 Washington Street, Charleston, WV 25305.	FTS 8-885-7890, Mr. Lawrence Barker, Commissioner.
Wisconsin (Health)	Section of Occupational Health, Department of Health and Social Services, P.O. Box 309, Madison, WI 53701.	(608) 266-0417, Ms. Patricia Natzke, Acting Chief.
Wisconsin (Safety)	Division of Safety and Buildings, Department of Industry, Labor and Human Relations, 1570 E. Moreland Blvd., Waukesha, WI 53186.	(414) 544-8686, Mr. Richard Michalski, Supervisor.
Wyoming	Wyoming Occupational Health and Safety Department, 200 East 8th Avenue, Cheyenne, Wyo. 82002.	(307) 777-7786, Mr. Donald Owsley, Health and Safety Administrator.

APPENDIX H TO § 1910.95—AVAILABILITY OF REFERENCED DOCUMENTS

Paragraphs (c) through (o) of 29 CFR 1910.95 and the accompanying appendices contain provisions which incorporate publications by reference. Generally, the publications provide criteria for instruments to be used in monitoring and audiometric testing. These criteria are intended to be mandatory when so indicated in the applicable paragraphs of § 1910.95 and appendices.

It should be noted that OSHA does not require that employers purchase a copy of the referenced publications. Employers, however, may desire to obtain a copy of the referenced publications for their own information.

The designation of the paragraph of the standard in which the referenced publications appear, the titles of the publications, and the availability of the publications are as follows:

Paragraph designation	Referenced publication	Available from—
Appendix B	"List of Personal Hearing Protectors and Attenuation Data," HEW Pub. No. 76-120, 1975. NTIS-PB267461.	National Technical Information Service, Port Royal Road, Springfield, VA 22161.
Appendix D	"Specification for Sound Level Meters," S1.4-1971 (R1976).	American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.
§ 1910.95(k)(2), appendix E	"Specifications for Audiometers," S3.6-1969.	American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

ATTACHMENT VII

FIRE EXTINGUISHER USE AND APPLICATION

FIRE EXTINGUISHER

USE AND INSPECTION

Fire Extinguisher Use and Inspection procedures will be conducted in support of the activities to be conducted at NASCF, Jacksonville, Florida. The following text is intended to provide general instruction to the field personnel charged with this responsibility.

Fire Extinguisher Use

All personnel trained in incidental response measures may be required to use and operate a fire extinguisher in response to an incipient stage fire. Therefore, the following instruction is provided and will be conveyed to all field personnel as part of site-specific training.

To use a portable fire extinguisher, the user should be familiar with the operation of the specific fire extinguisher located in the workplace. The following procedure will properly extinguish a small fire.

1) IDENTIFY THE TYPE OF FIRE (CLASS A, B, C, D).

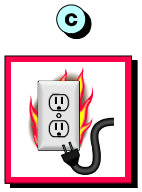
CLASSES OF FIRE/FIRE EXTINGUISHER IDENTIFICATION

Fire is divided into four classes for easy identification and extinguishment. The type of fuel or ignition source will determine the type of extinguishing medium required.

Class A - Ordinary combustibles (wood, paper, rubber, plastic, and cloth). Extinguishers suitable for Class A fires should be identified by a triangle containing the letter "A." If colored, the triangle is green.

Class B - Flammable liquids, gases, and greases. Extinguishers suitable for Class B fires should be identified by a square containing the letter "B." If colored, the square is red. <u>This type of extinguisher is effective on small petroleum product fires</u>.

Class C - Electrically energized systems. Extinguishers suitable for Class C fires should be identified by a circle containing the letter "C." If colored, the circle is blue.



Class D - Combustible metals (sodium, magnesium, phosphorus). Extinguishers suitable for fires involving metals should be identified by a five-pointed star containing the letter "D." If colored, the star is yellow.

<u>Note: Water and other extinguishing media, such as carbon dioxide and dry chemicals, are ineffective on metal fires.</u>

Class A, B, C

Class B, C

Class A, B

Class A

Mutli-class (ABC) Fire extinguishers will be provided for use on site. If you will buy a Fire Extinguisher, this is the type recommended. Size or rating recommended is 2 1/2 to 5 lbs.

1. Determine whether the extinguisher is adequate for this fire.

Rating number – The rating number assigned to a fire extinguisher is based on the capabilities of that fire class, for example
Class 5 A – Will provide extinguishing capabilities equal to that of 5 gallons of water.
Class 20 B - Will provide extinguishing capabilities equal to 20 square feet of flammable liquid burning.
Class C & D are not rated as to their limitations.

2. If adequate, hold the extinguisher upright and pull the ring pin.
3. Stand back 10 feet and aim at base of fire. Be careful not to spread burning material with pressurized extinguishing material.
4. Squeeze lever; sweep extinguisher in a side-to-side motion.

Portable Fire Extinguisher Placement/Mounting

Portable Fire Extinguishers will be placed/mounted in clear view in the areas where flammable materials are stored and/or dispensed. Mounting and placement of fire extinguishers will follow the following requirements

Fixed Locations (Flammable Storage)

- Extinguisher location will be marked by a red painted post or signage to indicate extinguisher location
- The travel distance to access a fire extinguisher shall be no greater than 50 feet.
- The fire extinguisher will be mounted at a maximum height of four feet.

Mobile Locations (Drill Rigs, Support Vehicles)

All vehicles carrying fuel containers or used in the dispensing of fuel will carry at a minimum a 5 pound rated fire extinguisher.

Portable Fire Extinguisher Inspection

All fire extinguishers used in support of this field effort will be inspected on the following frequencies:

- A certified provider will perform maintenance checks of fire extinguishers at least once a year. A tag attached to the neck of the fire extinguisher will indicate documentation of the maintenance check.

- All fire extinguishers will have a current hydrostatic inspection. For the type of extinguishers selected for use at NASCF hydrostatic inspections are required every 12 years.

- All fire extinguishers will be inspected monthly. The monthly inspection will cover the following
  - Are the fire extinguisher(s) placed in their designated location(s)?
  - Is the location conspicuously marked (Top 18 inches of the mounting pole to be painted red)?
  - Is the access impeding travel to the fire extinguisher blocked or restricted in any way?
  - Has the fire extinguisher been partially or completely discharged?
  - Is there signs of obvious physical damage?
  - Does the fire extinguisher shows sufficient pressure and are all of the tamper indicators are in place?

This inspection shall be documented on the attached tag provided by the maintenance/hydrostatic inspection service.

FIRE EXTINGUISHER CHECKLIST

NASCF JACKSONVILLE, FLORIDA

Project Name: NASCF	CTO 0359	**Date of Inspection:**_____
Fire Extinguisher Identification Number:_____		**Fire Extinguisher Location:** _____

Measurement Criteria	**Yes**	**No**	**N/A**	**Needs Repaired**
Are the fire extinguisher(s) placed in their designated location(s)?				
Is the location conspicuously marked (Top 18 inches of the mounting pole to be painted red)?				
Is the access impeding travel to the fire extinguisher blocked or restricted in any way?				
Has the fire extinguisher been partially or completely discharged?				
Is there signs of obvious physical damage?				
Does the fire extinguisher shows sufficient pressure and are all of the tamper indicators are in place?				

Project Name: NASCF	CTO 0359	**Date of Inspection:**_____
Fire Extinguisher Identification Number:_____		**Fire Extinguisher Location:** _____

Measurement Criteria	**Yes**	**No**	**N/A**	**Needs Repaired**
Are the fire extinguisher(s) placed in their designated location(s)?				
Is the location conspicuously marked (Top 18 inches of the mounting pole to be painted red)?				
Is the access impeding travel to the fire extinguisher blocked or restricted in any way?				
Has the fire extinguisher been partially or completely discharged?				
Is there signs of obvious physical damage?				
Does the fire extinguisher shows sufficient pressure and are all of the tamper indicators are in place?				