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FINAL HEALTH AND SAFETY PLAN FOR LONG TERM GROUNDWATER MONITORING AT
OPERABLE UNIT 1 (OU 1) NAS PENSACOLA FL
5/1/2005
TETRA TECH

Health and Safety Plan
Long-Term Groundwater
Monitoring
at
Operable Unit 1

Naval Air Station Pensacola
Pensacola, Florida



Southern Division
Naval Facilities Engineering Command
Contract No. N62467-94-D-0888
Contract Task Order 0333

May 2005

**HEALTH AND SAFETY PLAN
LONG-TERM GROUNDWATER MONITORING
AT
OPERABLE UNIT 1**

**NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT**

**Submitted to:
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**CONTRACT NUMBER N62467-94-D-0888
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May 2005

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been written to encompass site activities that are to be conducted at the Naval Air Station Pensacola (NAS Pensacola), Pensacola, Florida as part of Contract Task Order (CTO) 0333. Specifically, this HASP addresses activities associated with the long-term groundwater monitoring program that will be conducted at Operable Unit 1 (or Site 1) within NAS Pensacola. This HASP is being prepared for NAS Pensacola as part of an overall effort conducted under Comprehensive Long-Term Environmental Action Navy (CLEAN III) administered through the U.S. Navy Southern Division Naval Facilities Engineering Command (NAVFAC), as defined under Contract Number N62467-94-D-0888. In addition to the HASP, a copy of the Tetra Tech NUS, Inc. (TtNUS) Environmental Health and Safety Guidance Manual must be present at the site during the performance of site activities. The Guidance Manual provides detailed information pertaining to the HASP, as well as TtNUS Standard Operating Procedures (SOP's). Both documents must be present at the site to comply with the requirements stipulated in the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.120.

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work and site. The HASP will be modified if new information becomes available. Changes to the HASP will be made by the Project Health & Safety Officer (PHSO) and approved by the TtNUS Health and Safety Manager (HSM) and the Task Order Manager (TOM). The TOM will notify affected personnel of the changes.

The elements of this HASP are in compliance with the requirements established by OSHA 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER), and sections of 29 CFR 1926, "Safety and Health Regulations for Construction". The information contained in this plan, as well as policies on conducting onsite operations, have been obtained from the TtNUS Health and Safety Program.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in onsite activities. Personnel assigned to these positions will exercise the primary responsibility for onsite 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 onsite activities.

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

- The PHSO is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
 - i. Providing information regarding site contaminants and physical hazards associated with the site.
 - ii. Establishing air monitoring and decontamination procedures.
 - iii. Assigning personal protective equipment based on task and potential hazards.
 - iv. Determining emergency response procedures and emergency contacts.
 - v. Stipulating training requirements and reviewing appropriate training and medical surveillance certificates.
 - vi. Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste work.
 - vii. Modify this HASP, as it becomes necessary.
- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed SSO. The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.
- The SSO supports site activities by advising the FOL on aspects of health and safety on-site. These duties may include:
 - i. Coordinates health and safety activities with the FOL.
 - ii. Selects, applies, inspects, and maintains personal protective equipment.
 - iii. Establishes work zones and control points in areas of operation.
 - iv. Implements air monitoring program for onsite activities.
 - v. Verifies training and medical clearance of onsite personnel status in relation to site activities.
 - vi. Implements Hazard Communication, Respiratory Protection Programs, and other associated health and safety programs as they may apply to site activities.
 - vii. Coordinates emergency services.
 - viii. Provides site-specific training for onsite personnel.
 - ix. Investigates accidents and injuries (see Attachment I - Illness/Injury Procedure and Report Form)
 - x. Provides input to the PHSO regarding the need to modify, this HASP, or applicable health and safety associated documents as per site-specific requirements.
- Compliance with the requirements stipulated in this HASP is monitored by the SSO and coordinated through the TtNUS CLEAN HSM.

Note: In some cases one person may be designated responsibilities for more than one position. For example, at NAS Pensacola the FOL may also be responsible for SSO 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 Pensacola **Address:** Pensacola, Florida
Navy Engineer-in-Charge: Byas Glover **Phone Number:** (843) 820-5651
Facility Contact: Greg Campbell **Phone Number:** (850) 452-4611 Ext. 103

Purpose of Site Visit: This activity is divided into a multi-task operation (see Section 4.0), including groundwater and surface water sampling, water level measurements, Remedial System maintenance and sampling and other related activities.

Project Team:

TtNUS Personnel:

Gerald Walker, P.G.

TBD

Matthew M. Soltis, CIH, CSP

Donald J. Westerhoff, CSP

TBD

Discipline/Tasks Assigned:

Task Order Manager (TOM)

Field Operations Leader (FOL)

CLEAN Health and Safety Manager (HSM)

Project Health and Safety Officer (PHSO)

Site Safety Officer (SSO)

Non-TtNUS Personnel

TBD

TBD

Affiliation/Discipline/Tasks Assigned

Hazard Assessments (for purposes of 29 CFR 1910.132) and HASP preparation conducted by:
Donald J. Westerhoff, CSP

TBD - To be determined

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section is part of a planning effort to direct and guide field personnel in the event of an emergency. Site activities will be coordinated with NAS Pensacola Emergency Services prior to commencement. In the event of an emergency, which cannot be mitigated using onsite resources, personnel will evacuate to a safe place of refuge and the FOL will contact "911" to report the emergency. Site personnel may transport ill workers or those who have non-serious injuries to medical facilities, provided that such transport can be done safely. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. NAS Pensacola Emergency Dispatch will be notified anytime outside response agencies are contacted. This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(l)(1)(ii).

TtNUS will, through necessary services, include 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

2.2 EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, injury or illness resulting from exposure to chemical or physical hazards are the most probable emergencies that can be encountered during site activities. To minimize and eliminate these potential emergency situations, pre-emergency planning activities associated with this project include the following. The SSO and/or the FOL are responsible for:

- Coordinating response actions with NAS Pensacola Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.
- Establishing and maintaining information at the project staging area (Support Zone) for easy access in the event of an emergency. This information includes the following:
 - Chemical Inventory (for substances used onsite), with Material Safety Data Sheets.

- Onsite personnel medical records (medical data sheets).
 - A logbook identifying personnel onsite each day.
 - Emergency notification phone numbers in site vehicles
-
- Identifying a chain of command for emergency action.
 - Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.

It is the responsibility of the TtNUS FOL to ensure that this information is available and present at the site.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Foreseeable emergency situations that may be encountered during site activities will generally be recognizable by visual observation. A clear knowledge of the signs and symptoms of overexposure to contaminants of concern may alert personnel of the potential hazards concerning themselves or their fellow workers. These potential hazards, the activities with which they have been associated, and the recommended control methods are discussed in detail in sections 5.0 and 6.0 of this document. Additionally, early recognition will be supported by periodic site surveys to eliminate any conditions that may predispose site personnel or properties to an emergency. These surveys will consist of ensuring:

- Approach paths to monitoring wells are maintained (cleared, mowed, etc.)
- Monitoring well protective casings are cleared of spider and insect nests.

The FOL and the SSO will constitute the site evaluation committee responsible for these periodic surveys. Site surveys will be conducted at least once a week during the initiation of this effort. These surveys will be documented in the Project Logbook.

2.3.2 Prevention

TtNUS and subcontractor personnel will minimize the potential for emergencies by ensuring compliance with the HASP, the Health and Safety Guidance Manual, applicable OSHA regulations, and by following directions given by those persons responsible for the health, safety, and welfare of personnel.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

In the event that the site must be evacuated, personnel will immediately stop activities and report to a pre-determined safe place of refuge. The safe place of refuge may also serve as the telephone

communication point, as communication with emergency response agencies may be necessary. Telephone communication points and safe places of refuge will be determined prior to the commencement of site activities and will be conveyed to personnel as part pre-site training. Upon reporting to the refuge location, personnel will remain there until directed otherwise by the TtNUS FOL or the On-Scene Incident Commander. The FOL will take a head count at this location to confirm the presence of site personnel. Emergency response agencies will be notified of any unaccounted for personnel.

2.5 EVACUATION ROUTES AND PROCEDURES

Once an evacuation is initiated, personnel will proceed immediately to the designated place of refuge, unless doing so would further jeopardize the welfare of workers. In such an event, personnel will proceed to a designated alternate location (to be identified) and remain there until further notification from the FOL. The use of these locations as assembly points provides communication and a direction point for emergency services, should they be needed.

Evacuation procedures will be discussed prior to the initiation of any work at the site. This shall include identifying primary and secondary evacuation routes and assembly points. Evacuation routes from the site are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) will influence the designation of evacuation routes. As a result, assembly points at NAS Pensacola will be selected, and in the event of an emergency, field personnel will proceed to these points by the most direct route possible without further endangering themselves.

2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Since TtNUS personnel will not always be working in the proximity of each other, hand signals, voice commands, air horns, and/or two-way radios may comprise the mechanisms to alert site personnel of an emergency.

If an incident occurs, site personnel will initiate the following procedures:

- Initiate incident alerting procedures (if needed) verbally, by air horn, or using two-way radios.
- Evacuate non-essential personnel.
- Initiate initial response procedures.
- Describe to the FOL (who will serve as the Incident Commander) what has occurred in as much detail as possible.

In the event that site personnel cannot control the incident through offensive and/or defensive measures, the FOL and/or the SSO will enact emergency notification procedure to secure additional outside assistance in the following manner:

- Report the emergency to the NAS Pensacola Emergency Dispatch (See Table 2-1). Call 911 for outside emergency service if unable to contact the Emergency Dispatch.
- Give the emergency operator the location of the emergency and a brief description of what has occurred.
- Stay on the phone follow the instructions given by the operator
- The appropriate agency will be notified and dispatched
- Call Navy On-Site Representative
- Call TOM

If an incident occurs at outside of our designated operating areas impacting field personnel, the following procedures are to be initiated:

- Initiate an evacuation (if needed) by voice commands, hand signals, air horns, or two-way radio.
- Call Navy On-Site Representative
- Proceed to the assembly points as directed by NAS Pensacola or other Navy personnel.

2.7 EMERGENCY CONTACTS

Prior to performing work at the site, personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an incident. A cellular phone shall be available at the site. Table 2-1 provides a list of emergency contacts and their corresponding telephone numbers. This table must be posted at the site where it is readily available to site personnel.

**TABLE 2-1
EMERGENCY CONTACTS
NAS PENSACOLA**

AGENCY	TELEPHONE
NAS Pensacola – Emergency Dispatch	(850) 452-3333
EMERGENCY (outside services) (Police, Fire, and Ambulance Services)	911
Navy Engineer-in-Charge – Byas Glover	(843) 820-5651
Navy Facility Contact – Greg Campbell	(850) 452-4611 Ext. 103
Navy Hospital	(850) 505-6601
Baptist Hospital	(850) 469-2313
Poison Control Center	1-(800) 222-1222
TiNUS Tallahassee Office and Task Order Manager Gerry Walker	(850) 385-9899
CLEAN Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer Donald J. Westerhoff, CSP	(412) 921-7281
WorkCare	(800) 455-6155

2.8 ROUTE TO HOSPITALS

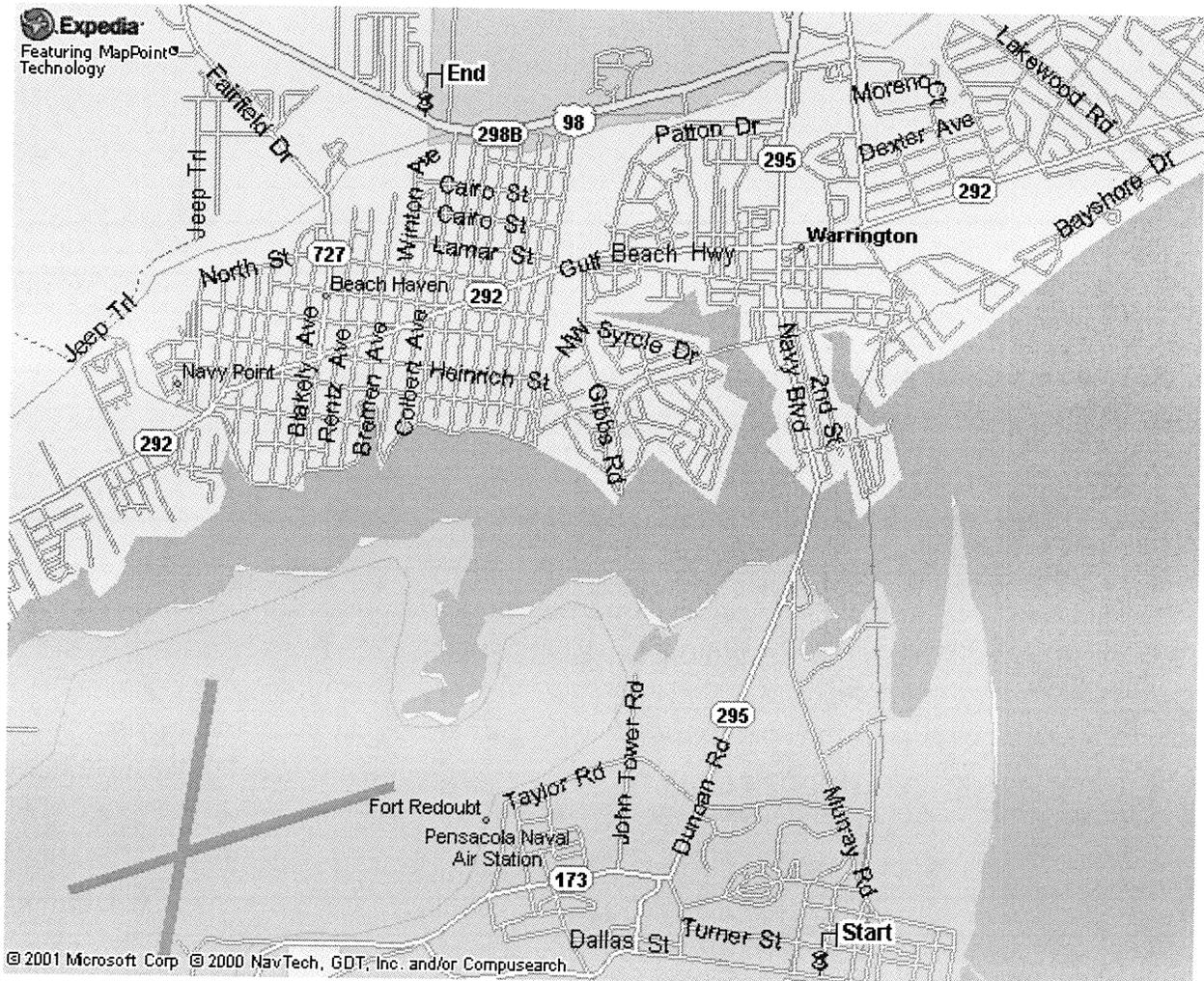
Two hospitals could potentially be used during this project depending on the circumstances. For emergency situations the Naval Hospital Pensacola (NHP) may be utilized. The hospital is closer to the site and is fully prepared to accept chemically contaminated patients. Baptist Hospital will be used for non-emergency care services. Routes and directions to these hospitals are provided in Figures 2-1 and 2-1-1

Navy Hospital
6000 W. Highway 98
Pensacola, Florida 32512
(850) 505-6600

Directions to the Navy Hospital from the site are as follows:

Proceed out of Main Gate (Navy Blvd) heading north to US Highway 98. Turn left (heading west) on US 98 and proceed approximately 1 mile. Hospital will be on the right (Building 2268).

Figure 2-1
Route to Naval Hospital Pensacola

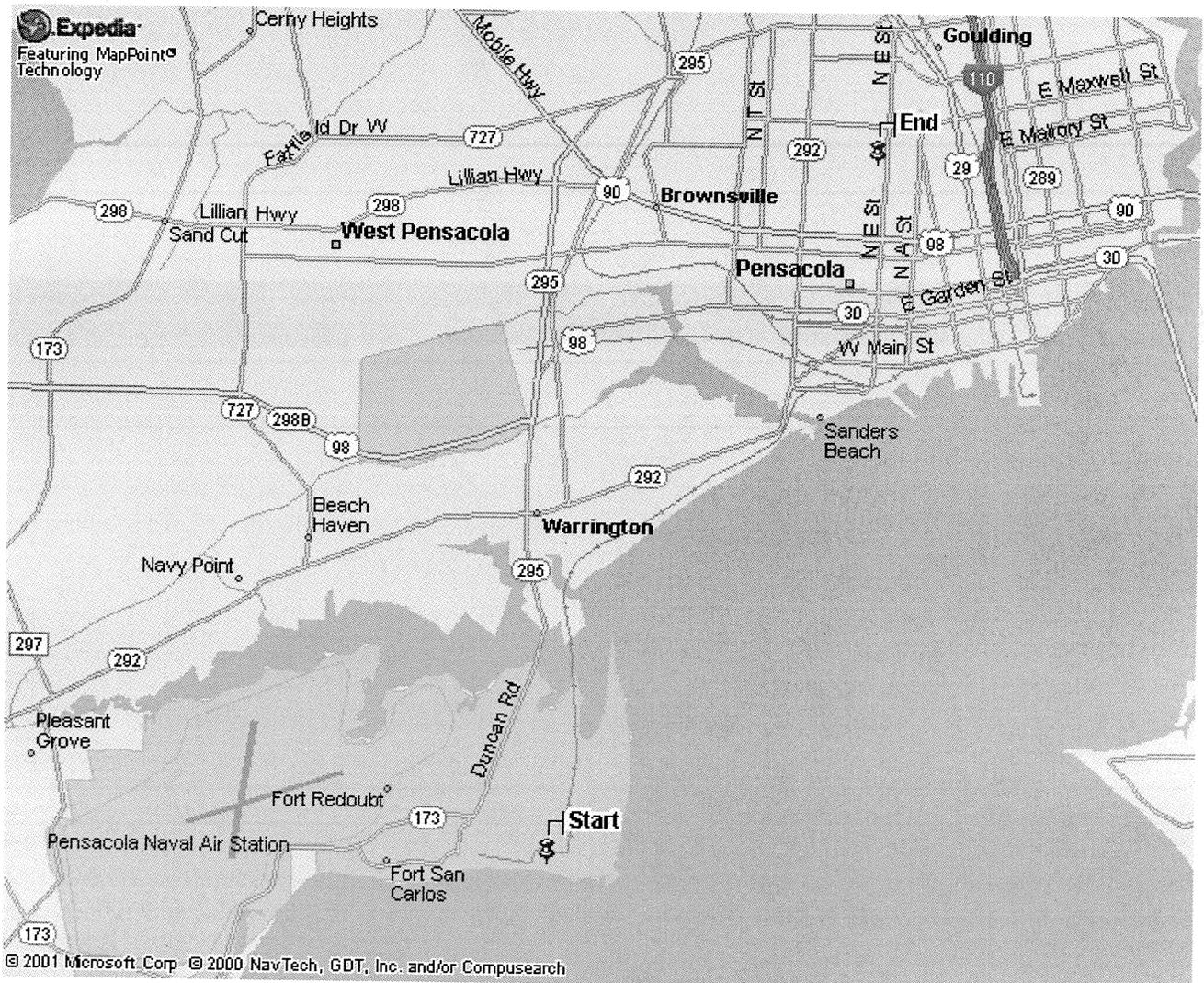


Baptist Hospital
1000 West Moreno Blvd.
Pensacola, FL 32508
(850-469-2313)

Directions to this Hospital from the Main Gate of NAS Pensacola are:

Proceed out of Main Gate (Navy Blvd) heading north to Hwy 292. Turn right (heading east) on Hwy 292 until it turns into Garden Street (approx. 3 miles). Take Garden Street to intersection with "E" Street. Turn left onto "E" Street and proceed approximately 1 mile to Hospital on left.

Figure 2-1-1
Route to Baptist Hospital



2.9 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

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. However, it is unlikely that an evacuation would occur which would require workers to evacuate the site without first performing the necessary decontamination procedures.

TtNUS personnel will perform removal of personnel from emergency situations and may provide initial medical support for injury/illnesses requiring only first-aid level support. Medical attention above that level will require assistance and support from the designated emergency response agencies. **If the emergency involves personnel exposures to chemicals, follow the steps provided in Figure 2-2.**

2.10 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working at the site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting 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. 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 exposure situations.

In the event of a personnel exposure to a hazardous substance or agent:

- 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 exposed person is a TtNUS 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. The care of the victim will be monitored by WorkCare physicians. 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 (enter Ext. 109), or follow the voice prompt for after hours and weekend notification, and be prepared to provide:
 - Any known information about the nature of the exposure.
 - 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 exposed 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 (e.g., MSDS) to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) and Human Resources Director Marilyn Duffy at 1-800-245-2730.

As environmental data is gathered and the exposure scenario becomes more clearly defined, this information should be forwarded to WorkCare. WorkCare will compile the results of the 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. This generalized summary will be accompanied by a personalized letter describing the individual's findings/results. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

FIGURE 2-2 (continued)
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 there 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 NAS PENSACOLA

NAS Pensacola is located in Escambia County, Florida on approximately 5,800-acres. It is located on a peninsula bounded on the east and south by Pensacola Bay and Big Lagoon, and on the north by Bayou Grande.

3.2 OPERABLE UNIT 1

Operable Unit (OU) 1 (also known as Site 1 or the Sanitary Landfill) comprises an inactive landfill and 80 acres surrounding it. It is located within the north central portion of NAS Pensacola. The landfill is at an elevation of 8 to 20 feet above mean sea level (msl) and is densely vegetated with 15- to 25-foot planted pines and natural scrub vegetation. The site is bordered by an inland water body (Bayou Grande) to the north, by the A.C. Read Golf Course to the east, and by areas of natural scrub vegetation to the west and south. Taylor Road lies approximately 200 feet south of the site, beyond the scrub vegetation.

Buried waste at the landfill has been characterized in the Remedial Investigation as containing detectable concentrations of the analyzed parameter groups (inorganic volatiles, semivolatiles, pesticides, and PCB). Inorganic and organic constituents were also found to be present in the surficial zone (shallow and intermediate well depths) beneath the site. Based on the 1994 analytical results, the greatest impact from inorganics and organics to shallow and intermediate groundwater quality is within and around the landfill perimeter. Surface water samples in nearby wetlands were also collected and found to contain iron above FDEP Class III water body standards. The remedial action selected for OU1 is a combination of institutional controls, natural attenuation, and interception and treatment of groundwater in the designated "Wetland 3 Area". The first three years of groundwater treatment and monitoring have been completed and the Engineer's-in-Charge (EIC) decision is to continue the monitoring program.

4.0 SCOPE OF WORK

The following is a list of activities that are covered in this HASP for the CTO 0333 project:

- Mobilization/demobilization
- Multi-media sampling, including:
 - Groundwater
 - Surface water
- Water Level Measurement to gauge the depth to groundwater in the onsite monitoring wells.
- Remedial System maintenance and sampling
- Clearing of trees and brush resulting from hurricane damage
 - Chain saw operation
 - Heavy equipment operation (including 2 Bobcats and one John Deere Model 550 bulldozer)
- Decontamination of sampling equipment
- Investigative-Derived Waste Management (IDW)

The activities will be performed to identify the nature and extent of actual or potential site contamination. Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The TOM, or designated representative, will submit requests for modification to this document to the HSM.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES

Table 5-1 of this section is intended to assist project personnel in the recognition of hazards and recommended control measures necessary for each planned task to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which personal protective equipment (PPE) and decontamination procedures are to be used as well as appropriate air monitoring techniques and action levels. This table must be updated if the scope of work, contaminants of concern, or pertinent conditions change.

Safe Work Permits (SWP) will be issued for all site activities (See Section 9.4). The FOL and/or the SHSO are responsible for completing for each site task that will be performed, and then reviewing the task-specific SWPs with all task participants prior to the initiation of each site task. The FOL/SHSO will prepare each SWP using the information presented in Table 5-1 as the primary reference, adding additional information as warranted.

As discussed earlier, the Health and Safety Guidance Manual supports this table and HASP. The manual further explains supporting company written H&S programs and elements for other site -specific aspects as required by regulatory requirements. The Guidance Manual is to be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many of Tetra Tech NUS' SOPs are also provided in this Guidance Manual. This manual is also available to all employees on our company intranet site at the following web address: <http://intranet.ttnus.com/private/ref/guidance%20manual.pdf>.

5.1 HEAVY EQUIPMENT OPERATION SAFE WORK PRACTICES

The brush clearing task will involve the use of several items of heavy equipment including several skid loaders (e.g., Bobcats) and a John Deere Model 550 bulldozer. Operation of these types of heavy equipment must be compliant with applicable OSHA regulations including 29 CFR 1926.602 and 1926.604. The principle aspects of these regulations that must be addressed on site are summarized below:

- The FOL/SSO must perform an initial inspection of each piece of heavy equipment upon its arrival onsite, prior to being put into use. The Equipment Inspection Checklist in Attachment III is to be used for these inspections. If the vehicles are found to have visible mud or dirt from previous activities, the subcontractor will be required to adequately clean the vehicle(s) prior to being cleared for site acceptance and then put into service.

- Only persons properly qualified through training and/or experience, and so designated as “qualified” by their employer, will be permitted to operate any item of heavy equipment.
- All heavy equipment must be equipped with both Roll Over Protection Structures (ROPS) and working seat belts for the operator.
- Other than the operator, no other person is to be permitted to ride on an operating piece of heavy equipment.
- Before dismounting, operators are to always ensure that their vehicle is at a complete stop, that controls are put in a safe position (such as “Park” or “Neutral”), with buckets and blades fully lowered to the ground surface, and the parking brake is set.
- Operators are to never leave their vehicle running while unattended.
- Each piece of heavy equipment must have a service braking system capable of stopping and holding the equipment fully loaded.
- If the skid loaders are equipped with pneumatic tires (as opposed to tracks) and they are capable of moving at speeds exceeding 15 MPH, they must be equipped with fenders covering all wheels.
- The skid loaders and the bulldozer must be equipped with an audible horn, distinguishable from the surrounding noise level, which shall be operated as needed when the vehicles are moving in any direction.
- The skid loaders and the bulldozer must be equipped with an audible an operable back-up alarm, which activates whenever the vehicle is moving in reverse, and is distinguishable from surrounding noise levels.
- Scissor points (such as on the bucket arms of the skid loaders) which can constitute a hazard to the operator, shall be adequately guarded.
- No modifications or additions that could affect either the safe operation or the capacities of these heavy equipment items will be permitted without the expressed, prior, written approval of the manufacturer.
- If the skid loaders are equipped with pneumatic tires that are mounted on spilt rim wheels (or rims equipped with locking rings or similar devices), tire racks (or equivalent protection) must be used when inflating, mounting, or dismounting tires.
- Whenever a piece of heavy equipment is parked, the parking brake will be set, and buckets/blades are to be fully lowered (in contact with the ground surface). If skid loaders are equipped with tires and they are to be parked on an incline, the above steps must be taken and the wheels must be appropriately chocked.
- Operator cab glass (if any) must be constructed of safety glass, or equivalent.
- Any maintenance activities performed on heavy equipment (such as battery charging or replacement) must be performed by persons who are knowledgeable of OSHA requirements that are applicable, and these requirements must be observed.

- Other maintenance activities such as lubrication and fueling must be performed in designated areas, and in a manner that prevents spills or other releases.
- At the completion of their use on site, all heavy equipment must be adequately cleaned to remove any visible dirt/mud and scanned with air monitoring devices specified in this HASP prior to being released for departure.

5.2 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices identified on Table 5-1 and the Safe Work Permits attached to this HASP, the following safe work practices (SWP) are to be followed when conducting any work on-site. These safe work practices address a pattern of general precautions and measures for reducing risks associated with site operations. This is a partial list and may be amended as necessary.

- Eating, drinking, chewing gum or tobacco, taking medication, or smoking is prohibited 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. A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs.
- Avoid contact with potentially contaminated substances. Avoid puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Keep monitoring equipment away from potentially contaminated surfaces.
- Take note of the location of the nearest telephone and 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.
- Rehearse unfamiliar operations prior to implementation.
- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity 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 injuries, illnesses, and unsafe conditions, practices, defective equipment, and potential exposure incidents to the Site Safety Officer (SSO).

- Matches, lighters, tobacco products, and food and drink are restricted from entering in the Exclusion Zone or Contamination Reduction Zone.
- 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.

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical, physical, and natural hazards associated with the site to be investigated and the activities that are to be conducted as part of the scope of work. Table 6-1, which is included as part of this HASP, provides various information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data. Section 6.1 provides general information regarding contaminants that may be present at the site.

6.1 CHEMICAL HAZARDS

Site contaminants at OU 1 at NAS Pensacola include various volatile organic compounds (VOCs) associated with fuels and chlorinated solvents. Based on available analytical data including the most recent round of groundwater samples, none of the primary contaminants of concern (benzene and vinyl chloride) present a significant inhalation exposure concern to site personnel performing site activities. It is anticipated that the greatest potential for exposure will exist when site workers perform O&M activities on the remedial system that may bring them into contact with media (air/water) that may contain VOCs. Air monitoring will be performed to evaluate airborne concentrations of potential VOCs. Safe work practices and the use of PPE will also be used to prevent potential exposures and to minimize contact with contaminated media.

Table 6-1 provides information on the compounds and individual substances identified as the primary site contaminants. Included is information on the toxicological, chemical, and physical properties of these substances. Certain information on this Table (such as glove selection) is based on clinical information regarding pure chemicals. Assessment of hazards and recommended control measures (such as nitrile surgeons gloves) within this HASP, however, are based on the diluted nature of media to be sampled and the limited contact anticipated. Exposure to these compounds is most likely to occur through inhalation of airborne vapors. However, available analytical data suggests that significant airborne concentrations of these compounds are unlikely to be present.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAVAL AIR STATION PENSACOLA, FLORIDA**

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Benzene	71-43-2	<p>PID: I.P. 9.24 eV, 100% response with PID and 10.2 eV lamp.</p> <p>FID: 150% relative response ratio with FID.</p>	<p>OSHA: 1 ppm</p> <p>ACGIH: 0.5 ppm 2.5 ppm STEL</p> <p>NIOSH: 0.1 ppm 1 ppm STEL 500 ppm IDLH</p>	<p>Inadequate - Odor threshold 34-199 ppm. OSHA accepts the use of air-purifying respirators with organic vapor cartridge up to 10 ppm despite the inadequate warning properties providing cartridges are changed at the beginning of each shift.</p> <p>Recommended gloves: Buty/neoprene blend - >8.00 hrs; Silver shield as a liner - >8.00 hrs; Viton - >8.00 hrs</p>	<p>Boiling Pt: 176°F; 80°C Melting Pt: 42°F; 5.5°C Solubility: 0.07% Flash Pt: 12°F; -11°C LEL/LFL: 1.3% UEL/UFL: 7.9% Vapor Density: 2.77 Vapor Pressure: 75 mmHg Specific Gravity: 0.88</p> <p>Incompatibilities: Strong oxidizers, fluorides, perchlorates, and acids Appearance and Odor: Colorless to a light yellow liquid with an aromatic odor</p>	<p>Overexposure may result in irritation to the eyes, nose, throat, and respiratory system. CNS effects include giddiness, lightheadedness, headaches, staggered gait, fatigue, and lassitude and depression. Additional effects may include nausea. Long duration exposures may result in respiratory collapse. Regulated as an OSHA carcinogen. May cause damage to the blood forming organs and may cause a form of cancer called leukemia.</p>
Cadmium	7440-43-9	<p>Particulate Form - Unable to be detected by PID or FID.</p>	<p>OSHA: PEL= 5 µg/m³ TWA₈</p> <p>Action Level = 2.5 µg/m³ TWA₈</p> <p>ACGIH: 0.01 mg/m³ (total particulate) 0.002 mg/m³ (respirable particulate)</p> <p>IDLH: 9 mg/m³ (as Cd)</p>	<p>The use of an air purifying, half face-piece respirator with a high efficiency particulate air filter for concentrations up to 0.25 mg/m³.</p> <p>Recommended Gloves: This is in particulate form. Therefore any glove suitable to prevent skin contact.</p>	<p>Boiling Pt: 1412°F; 767°C Melting Pt: 610°F; 321°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 1 mmHg @ 741°F; 394°C Specific Gravity: 8.65 @ 90°F; 32°C Incompatibilities: Strong oxidizers, elemental sulfur, selenium, tellurium, zinc, nitric acid, and hydrazoic acid Appearance and Odor: Metal: Silver-white, blue-tinged lustrous, odorless solid. Fume: yellow-brown, finely divided particulate dispersed in air.</p>	<p>Overexposure to this substance may result in irritation to the respiratory tract, dyspnea, tightness in the chest, coughing, possibly pulmonary edema. Overexposure to fumes causes symptoms characteristic of the flu (headaches, chills, muscle aches, nausea, vomiting, diarrhea). Chronic exposure may result in damage to the lungs, kidneys and liver. This substance has been identified as a confirmed animal; potential human carcinogen by IARC and NTP.</p>

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAVAL AIR STATION PENSACOLA, FLORIDA**

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Vinyl chloride	75-01-4	<p>PID: I.P. 9.99 eV, High response with PID and 10.2 eV lamp.</p> <p>FID: 40% response with FID.</p>	<p>OSHA: 1.0 ppm 5.0 ppm Ceiling</p> <p>ACGIH: 1 ppm</p> <p>NIOSH: Lowest Feasible Concentration</p>	<p>Inadequate - Odor threshold 10-20 ppm. Gas Mask with a vinyl chloride Type N canister may be employed for concentrations up to 25 ppm. Canisters employed must have a minimum service life of 4-hrs. Exceedances over 25 ppm, must use a positive pressure demand, open-circuit, self-contained breathing apparatus, pressure demand type, with full facepiece. Refer to 29 CFR 1910.1017(g) for specific requirements based on atmospheric concentrations of vinyl chloride.</p> <p>Recommended gloves: Silver shield >6.00 hrs; Nitrile 5.70 hrs; or Viton 4.4 hrs</p>	<p>Boiling Pt: 7°F; -13.9°C Melting Pt: -256°F; -160°C Solubility: 0.1% @ 77°F; 25°C Flash Pt: 18°F; -8°C LEL/LFL: 3.6% UEL/UFL: 33% Vapor Density: 2.21 Vapor Pressure: 3.3 atm Specific Gravity: N.A. Incompatibilities: Oxidizers, copper, aluminum, peroxides, iron, steel, Appearance and Odor: Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations.</p>	<p>A severe skin, eye, and mucous membrane irritant(Liquid: frostbite). Narcotic effect causing weakness, abdominal pains, GI bleeding, and pallor skin or cyanosis. Chronic exposure has been linked to the formation of malignant tumors originating from blood lymphatic vessels in the liver (associated enlargement of the liver), and kidneys (angiosarcoma and nephroblastoma). Listed as a carcinogen by NTP, IARC and ACGIH.</p>

6.2 PHYSICAL HAZARDS

The following is a list of physical hazards that may be encountered at the site or may present during the performance of site activities associated with the scope of work.

- Energized systems (electrical shock, moving equipment/machinery)
- Slip, trip, and fall hazards
- Strain/muscle pulls from manual lifting
- Heat Stress

6.2.1 Energized Systems

O&M activities on the remedial system are specified in the O&M Manual Groundwater Recovery and Treatment System at Operable Unit 01 (Bechtel Environmental, Inc.). These activities may involve contact with energized systems (electrical, hydraulic, and/or pneumatic components, or pressurized systems). As a result, appropriate energy control procedures and measures must be implemented to prevent potential injuries. Lockout/Tagout procedures (deenergizing system components, securing them to prevent inadvertent energizing or start up, dissipating or blocking of stored energy, communication between workers, etc.) in accordance with OSHA Standard 29 CFR 1910.147 will be required for any O&M activity which may bring site personnel into contact with energized components of the remedial system. For additional guidance contact the PHSO.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. In general, avoidance of areas of known infestation or growth will be the preferred exposure control for insects/animals and poisonous plants. Specific discussion on principle hazards of concern follows:

6.3.1 Insect/Animal Bites and Stings

Various insects and animals may be present and should be considered.

Fire Ants

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.

Also, areas to be investigated could be prime nesting and/or hiding locations for snakes and other insects. Personnel should avoid reaching into areas that are not visibly clear of snakes or insects. Snake chaps will be worn in areas of known or anticipated snake infestation. All site personnel who are allergic to stinging insects such as bees, wasps, and hornets 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 SSO notified.

Ticks

There are various areas throughout the U.S. where Lyme Disease is endemic. Fortunately, Florida is not one of these areas. Nonetheless, personnel should be aware of the hazards of tick bites and Lyme Disease. The longer an affected tick remains attached to the body, the greater the potential for contracting the disease. Wearing long sleeved shirts and long pants (tucked into boots). As well as performing frequent body checks will 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 Health and Safety Guidance Manual.

Mosquitoes

The medical alert for West Nile Virus (WNV) and other mosquito-borne diseases that covered 39 different counties throughout the state was lifted in January 2003 by the Florida Department of Health (DOH). Even though the alert has been lifted, DOH recommends that people in areas with high concentrations of mosquitoes still need to take precautions.

West Nile Virus - Encephalitis caused by WNV is transmitted to humans by mosquitoes. Mosquitoes become infected when feeding on birds infected with the WNV. Infected mosquitoes then transmit the WNV to humans and animals when biting (or taking a blood meal). WNV 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 barehanded 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 WNV encephalitis is usually 3 to 12 days. There is no specific therapy or vaccine against WNV encephalitis. The Florida Department of Health has tracked nine human encephalitis cases caused by the WNV.

Eastern Equine Encephalitis - Eastern Equine Encephalitis (EEE) virus circulates in nature primarily in a bird-mosquito cycle with man, horses and exotic game birds (Pheasants and Chukar partridges) as dead end hosts. The virus appears to be confined primarily to states along the Atlantic and Gulf coasts causing clinical cases in unvaccinated equines every summer. Epidemics in humans are quite rare; occurring only four times in the past 62 years in Massachusetts, Louisiana and New Jersey. The virus is usually circulated throughout the year in fresh-water swamps by mosquitoes that prefer feeding on wild birds. An incubation period of 3 to 7 days is usually followed by acute onset of fever, headache, stiff neck, disorientation, and lethargy, convulsions, and other signs of encephalitis sometimes followed by coma and death.

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 or DEET, mosquitoes may bite through thin clothing.

Snakes

Areas to be investigated on this project could be prime nesting and/or hiding locations for snakes. Personnel should avoid reaching into areas that are not visibly clear of snakes or insects. Snake chaps will be worn in areas of known or anticipated snake infestation. Although 45 species of snakes are found in Florida, only the 6 are poisonous and a danger to humans. If you find a snake and you do not know whether or not it is poisonous, the safest thing to do is leave it alone. Florida snakes are not aggressive and, unless they are cornered, most will flee when humans approach. Occasionally, you might encounter one that is reluctant to leave because it is basking in the sun to get warm. Among snakebite victims, an unacceptably high number are bitten on the hands and arms when they are handling the snake. **Do not catch a snake and do not handle one unless you are sure it is not poisonous.** In addition, for a short time after a snake

is killed, its reflexes may continue to work. Those reflexes typically cause the body to writhe slowly for awhile, but they can cause a convulsive contraction and a bite, so you should not handle a freshly killed venomous snake.

Copperhead - Average adult size is 22-36 inches (56-91 cm), record is 53 inches (135 cm). It is a stout-bodied snake with broad, light brown to gray cross bands, alternating with dark brown to reddish-brown cross bands. Constrictions along the backbone give the dark bands an hourglass shape. On the sides of the body the dark bands usually have light centers, and occasionally one dark spot. Southern copperheads sometimes have an overall pinkish tint. The top of head in front of the eyes is covered with large plate-like scales. The pupil is elliptical, a catlike vertical slit. There is a deep facial pit between the nostril and the eye. The preferred habitat is low, wet areas around swamps, streambeds, river bottoms, and damp ravines, but it also occurs on the hillsides above the wet areas. It also is found in suburban neighborhoods near people. Copperhead bites are extremely painful but usually are not life-threatening for healthy adults. As with poisonous snakebites, the victim should seek immediate medical care from a physician or hospital experienced in treating snakebite

Cottonmouth - Average adult size is 20-48 inches (51-121 cm), record is 74.5 inches (189 cm) and is a dark-colored, heavy-bodied snake. Juveniles are brightly colored with reddish-brown cross bands on a brown ground color. The dark cross bands contain many dark spots and speckles. The pattern darkens with age so adults retain only a hint of the former banding or are a uniform black. The eye is camouflaged by a broad, dark, facial stripe. The head is thick and distinctly broader than the neck, and when viewed from above, the eyes cannot be seen. The top of head in front of the eyes is covered with large plate-like scales. The pupil is vertical (catlike). There is a deep facial pit between the nostril and the eye. Its habitat is any wetlands or waterway in the state. Cottonmouths can be found along streams, springs, rivers, lakes, ponds, marshes, swamps, sloughs, reservoirs, retention pools, canals, and roadside ditches. It occasionally wanders far from water, and has been found in bushes and trees. Cottonmouth bites can be quite dangerous. The victim should seek immediate medical care from a physician or hospital experienced in treating snakebite.

Eastern Diamondback Rattlesnake - Average adult size is 36-72 inches (91-183 cm), record is 96 inches (244 cm). It is a large, heavy-bodied snake with a row of large dark diamonds with brown centers and cream borders down its back. The ground color of the body is brownish. The tail ends in a rattle. The tail is usually a different shade, brownish or gray, and toward the end of the tail the diamonds fade out or break into bands. The large and thick head has a light bordered dark stripe running diagonally through the eye and there are vertical light stripes on the snout. The pupil is vertical (catlike) and there is a deep facial pit between the nostril and the eye. Diamondbacks are often found in pine flat woods, longleaf pine

and turkey oak, and sand pine scrub areas. These habitats contain palmetto thickets and gopher tortoise burrows in which the Diamondback may seek refuge. This is a large and potentially dangerous snake. It can strike up to 2/3 its body length; a 6-foot (183 cm) specimen may strike 4 feet (122 cm).

Timber Rattlesnake - Average adult size is 36-60 inches (76-152 cm), record is 74.5 inches (189 cm). Can be a large, heavy-bodied snake. The reddish brown stripe running down the center of the back is disrupted by a series of large, black, chevron-like cross bands on the pinkish gray or tan body. The tail is uniform black. The head is large and sometimes with a dark diagonal line through the eye or just behind the eye. The pupil is vertical (catlike) and there is a facial pit between the nostril and the eye. The tail ends in a rattle. Timber rattlesnakes in Florida prefer low bottomlands where it is fairly damp, river beds, hammocks pine flat woods, swamps, and cane thickets. This snake should be given a wide berth and left alone. Because of its cryptic coloration (camouflage), it can be easily overlooked, especially if it does not rattle.

Dusky Pygmy Rattlesnake - Average adult size is 12-24 inches (30-61 cm), record is 31 inches (79 cm). This is a small snake, but very thick for its size. The top of the triangular shaped head is covered with 9 large scales. The body color is light to dark gray. A longitudinal row of black or charcoal transverse blotches disrupts a reddish brown stripe running down the middle of the back. Dark spots on the side line up with the blotches. The tail is slender and ends in a miniature rattle. The belly is heavily mottled with black and white. The pupil of the eye is vertical (catlike), and there is a deep facial pit between the nostril and the eye. This snake is common in lowland pine flat woods, prairies, around lakes and ponds, and along the borders of many freshwater marshes and cypress swamps. This small snake has a reputation for being very aggressive. Its bite, while usually not life threatening, is extremely painful and can result in the loss of a digit. However, in some cases it can be fatal. The rattle is so small it is seldom heard. When it is heard, it sounds like an insect buzzing. Florida's two hognose snakes occasionally are confused with the Pygmy Rattlesnake. It is easy to distinguish between the harmless hognose snakes and the Pygmy Rattlesnake. The harmless hognose snakes defend themselves against potential predators by spreading (flattening) their heads and necks. If this does not scare the threat away, the hognose snakes will turn onto their backs and play dead. The hognose snakes have upturned noses and round pupils, and they also have no facial pits or rattles.

Eastern Coral Snake - Average adult size is 20-30 inches (51-76 cm), record is 47.5 inches (121 cm). Body ringed with black, yellow, and red; narrow yellow rings separating the wider red and black rings. The rings continue across the belly of the snake. From tip of snout to just behind the eye the head is black. The tail is black and yellow, without any red rings. The red rings usually contain black flecks or spots. The pupil is round. This snake occupies a variety of habitats, from dry, well-drained flat woods and scrub

areas to low, wet hammocks and the borders of swamps. They are quite secretive and are usually found under debris and in the ground, but occasionally they are found in the open, and have even been seen climbing the trunks of live oaks. Good numbers of them are turned up when pine flat woods are bulldozed. Because they also are ringed with red, black, and yellow or white, two harmless snakes in Florida, the Scarlet Kingsnake and the Scarlet Snake, often are confused with the Coral Snake. Both of these mimics (look-a-likes) can be distinguished from the Coral Snake by their red snouts and red on their tails. In addition, the red bands of the Scarlet Kingsnake and the Scarlet Snake never touch the yellow bands (the red and yellow are separated by the black). Also, on both the Coral Snake and the Scarlet Kingsnake the rings go around the body, but not on the Scarlet Snake which has a white belly. If you have difficulty separating the harmless mimics from the Coral Snake, the following mnemonic rhymes will identify the Coral Snake for you: 'If red touches yellow, it can kill a fellow,' and 'If its nose is black, it's bad for jack.' Because the Coral Snake is a relative of the cobras, people believe its bite nearly always is fatal. While its bite is serious and should receive immediate medical attention, statistics suggest that the bite of the Coral Snake is less threatening than the bite of a Diamondback Rattlesnake.

Alligators

Alligators live in all Florida counties but are most common in the major river drainage basins and large lakes in the central and southern portions of the state. They also can be found in marshes, swamps, ponds, drainage canals, phosphate-mine settling ponds, and ditches. Alligators are tolerant of poor water-quality and occasionally inhabit brackish marshes along the coast. A few even venture into salt water.

Mature alligators seek open water areas during the April-to-May courtship and breeding season. After mating, the females move into marsh areas to nest in June and early July where they remain until the following spring. Males generally prefer open and deeper water year-round. Alligators less than four feet long typically inhabit the marshy areas of lakes and rivers. Dense vegetation in these habitats provides protective cover and many of the preferred foods of young alligators.

- Most human attacks associated with alligators occur when they have been fed by humans or when defending their nests.
- Under no circumstances should you approach an alligator closely. They are quite agile, even on land. As with any wild animal, alligators merit a measure of respect.
- Alligators are classified as a threatened species and thus enjoy the protection of state and federal law. Only representatives of the Florida Game and Fresh Water Fish Commission are empowered to handle nuisance alligators.
- It is illegal to feed, tease, harass, molest, capture or kill alligators.
- If a serious problem does exist, contact the Florida Game and Fresh Water Fish Commission.

6.3.2 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 the Florida Keys are located in 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.

6.3.3 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. (extremely cold temperatures are not expected to be encountered due to project location). 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.

7.0 AIR MONITORING

Direct reading instruments will be used at the site to detect and evaluate the presence of site contaminants and other potentially hazardous conditions. As a result, specific air monitoring measures and requirements are established in Table 5-1 pertaining to the specific hazards and tasks of an identified operation. Additionally, the Health and Safety Guidance Manual, Section 1.0, contains detailed information regarding direct reading instrumentation, as well as general calibration procedures of various instruments.

7.1 INSTRUMENT AND USE

A direct reading Instrument will be used primarily to monitor source points and worker breathing zone areas, while observing instrument action levels. Action levels are discussed in Table 5-1 as they may apply to a specific task or location.

7.1.1 Photoionization Detector

In order to accurately monitor for any substances that may present an exposure potential to site personnel, a Photoionization Detector (PID) using a lamp energy of 10.6 eV or higher will be used. This instrument will be used to monitor potential source areas and to screen the breathing zones of employees during site activities. The PID with this lamp strength has been selected because it is capable of detecting the organic vapors of concern.

Prior to the commencement of any field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from any areas of potential contamination. These readings, any influencing conditions (i.e., weather, temperature, humidity) and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

7.1.2 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 elevated levels of protection. The SSO 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 the instruments each day prior to and after 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 procedure (copies of which can be found in the Health & Safety Guidance Manual which will be maintained on-site for reference). 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 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

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section is included to specify health and safety training and medical surveillance requirements for TtNUS personnel participating in on site activities. All TtNUS personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the NAS Pensacola. TtNUS 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 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.

8.1.1 Requirements for Subcontractors

Identified TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e) and 8 hours of refresher training meeting the requirements of 29 CFR 1910.120(e)(8) prior to performing field work at the NAS Pensacola. TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter, on company letterhead, containing the information in the example letter provided in Figure 8-1. This letter will be accompanied by training certificates or some other form of official documentation for subcontractor personnel participating in site activities.

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to the TtNUS 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 at the sites
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements

FIGURE 8-1
EXAMPLE TRAINING LETTER

The following statements must be typed on company letterhead and signed by an officer of the company and accompanied by copies of personnel training certificates:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Gerald Walker
Task Order Manager
Tetra Tech NUS, Inc.
1401 Oven Park Drive
Suite 102
Tallahassee, FL 32312

Subject: HAZWOPER Training for Naval Air Station Pensacola, Florida

Dear Mr. Walker:

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with applicable occupational safety and health regulations, including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 126.

I also understand that Title 29 CFR 1910.120, entitled "Hazardous Waste Operations and Emergency Response," requires an appropriate level of training for certain employees engaged in hazardous waste operations. In this regard, I hereby state that the following employees have had 40 hours of introductory hazardous waste site training or equivalent work experience as requested by 29 CFR 1910.120(e) and have had 8 hours of refresher training as applicable and as required by 29 CFR 1910.120(e)(8) and that site supervisory personnel have had training in accordance with 29 CFR 1910.120(e)(4).

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555.

Sincerely,

(Name and Title of Company Officer)

- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Initial response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Review of the use of Safe Work Permits

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

8.3 MEDICAL SURVEILLANCE

All TtNUS personnel participating in project field activities will have had a physical examination meeting the requirements of TtNUS's medical surveillance program. Documentation for medical clearances will be maintained in the TtNUS Pittsburgh office and made available, as necessary.

8.3.1 Medical Surveillance Requirements for Subcontractors

Identified subcontractors are required to obtain a certificate of their ability to perform hazardous waste site work and to wear respiratory protection. The "Subcontractor Medical Approval Form" provided in Figure 8-3 shall be used to satisfy this requirement, providing it is properly completed and signed by a licensed physician.

Subcontractors who have a company medical surveillance program meeting the requirements of paragraph (f) of OSHA 29 CFR 1910.120 can substitute "Subcontractor Medical Approval Form" with a letter, on company letterhead, containing the information in the example letter presented in Figure 8-4 of this HASP.

FIGURE 8-3
SUBCONTRACTOR MEDICAL APPROVAL FORM

For employees of _____
Company Name

Participant Name: _____ Date of Exam: _____

Part A

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA Standard 29 CFR 1910.120, paragraph (f) and found to be medically -

- qualified to perform work at the NAS Pensacola work site
- not qualified to perform work at the NAS Pensacola work site

and,

2. Undergone a physical examination as per OSHA 29 CFR 1910.134(b)(10) and found to be medically -

- qualified to wear respiratory protection
- not qualified to wear respiratory protection

My evaluation has been based on the following information, as provided to me by the employer.

- A copy of OSHA Standard 29 CFR 1910.120 and appendices.
- A description of the employee's duties as they relate to the employee's exposures.
- A list of known/suspected contaminants and their concentrations (if known).
- A description of any personal protective equipment used or to be used.
- Information from previous medical examinations of the employee which is not readily available to the examining physician.

Part B

I, _____, have examined _____
Physician's Name (print) Participant's Name (print)

and have determined the following information:

FIGURE 8-3
SUBCONTRACTOR MEDICAL APPROVAL FORM
PAGE TWO

1. Results of the medical examination and tests (excluding finding or diagnoses unrelated to occupational exposure):

2. Any detected medical conditions that would place the employee at increased risk of material impairment of the employee's health:

3. Recommended limitations upon the employee's assigned work:

I have informed this participant of the results of this medical examination and any medical conditions which require further examination or treatment.

Based on the information provided to me, and in view of the activities and hazard potentials involved at the NAS Pensacola work site, this participant

- () may
() may not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

NOTE: Copies of test results are maintained and available at:

Address

FIGURE 8-4

**EXAMPLE
MEDICAL SURVEILLANCE LETTER**

The following statements must be typed on company letterhead and signed by an officer of the company:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Gerald Walker
Task Order Manager
Tetra Tech NUS, Inc.
1401 Oven Park Drive
Suite 102
Tallahassee, FL 32312

Subject: HAZWOPER Training for NAS Pensacola, Florida

Dear Mr. Walker:

As an officer of XYZ Corporation, I hereby state that the persons listed below participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR) Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response. I further state that the persons listed below have had physical examinations under this program within the past 12 months and that they have been cleared, by a license physician, to perform hazardous waste site work and to wear positive- and negative-pressure respiratory protection. I also state that, to my knowledge, no person listed below has any medical restriction that would preclude him/her from working for NAS Pensacola.

LIST OF FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555

Sincerely,

(Name and Title of Company Officer)

8.3.2 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 Medical Data Sheet found in the TtNUS Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

In situations in which the exclusion zone is not entered or when there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from some of the training and medical surveillance requirements. All subcontractors and visiting personnel are required to receive site-specific training (as discussed in Section 8.2) regarding information provided in this HASP. Examples of subcontractors who may be exempt from training and medical surveillance requirements may include surveyors who perform surveying activities at the site perimeters or in areas where there is no potential for exposure to site contaminants, and in this case the subcontractor providing concrete coring services.

The use of the subcontractor exception is strictly limited to the authority of the CLEAN Health and Safety Manager.

9.0 SITE CONTROL

This section outlines the 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 three-zone approach will be used during work at this site: Exclusion Zone, Contamination Reduction Zone, and 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 potentials for the spread of contaminants and to protect individuals who are not cleared to enter the work areas.

9.1 EXCLUSION ZONE

The Exclusion Zone will be considered those areas of the site of known or suspected contamination. The Exclusion Zone for groundwater and surface water sampling is considered to be 5 ft. surrounding the point of sample acquisition.

9.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone (CRZ) will be a buffer area between the Exclusion Zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting Exclusion Zone activities. This area may be delineated using barrier tape, cones, and postings to inform and direct facility personnel. Decontamination will be conducted at a central location. All equipment potentially contaminated will be bagged and taken to that location for decontamination.

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

9.4 SAFE WORK PERMITS

All exclusion zone activities conducted in support of this project will be done so using this HASP as a reference guide and Safe Work Permits to incorporate site-specific information to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used during site activities is

illustrated in Figure 9-1. All permits will be issued by the SSO in the morning prior to the beginning of on site activities. Partially completed Safe Work Permits are included in Attachment II of this HASP.

Safe Work Permits are to be completed in accordance with the specifications contained in Table 5-1, and the other sections of the HASP as appropriate.

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., DOD, EPA, OSHA, FDEP, etc.)
- Southern Division Navy Personnel
- Other authorized visitors

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, the 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, the site visitors wishing to observe operations in progress will be escorted by 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, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

**FIGURE 9-1
SAFE WORK PERMIT**

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

I. Work limited to the following (description, area, equipment used): _____

II. Primary Hazards: _____

III. Field Crew: _____

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

V. Protective equipment required Level D Level B
 Level C Level A
 Modifications/Exceptions: _____

Respiratory equipment required
 Yes Specify on the reverse
 No

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Primary Route(s) of Exposure/Hazard: _____

(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.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses	<input type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Chemical/splash goggles.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Radio/Cellular Phone.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Barricades	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash suits/coveralls	<input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type - _____)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable apron	<input type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots ..	<input type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers	<input type="checkbox"/> Yes <input type="checkbox"/> No
High Visibility vest.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape up/use insect repellent	<input type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash	<input type="checkbox"/> Yes <input type="checkbox"/> No	Other.....	<input type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: _____

VIII. Site Preparation

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

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: _____

Permit Issued by: _____ Permit Accepted by: _____

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. A TtNUS representative will accompany all visitors entering the exclusion zones during ongoing operations. 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 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 will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas. As this activity takes place at a Navy facility open to public access, the first line of security will take place using exclusive zone barriers, site work permits, and any existing barriers at the sites to restrict the general public. The second line of security will take place at the work site referring interested parties to the Base Contact. The Base Contact will serve as a focal point for base personnel, interested parties, and serve as the final line of security and the primary enforcement contact.

9.7 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated 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 site activities will practice the "buddy system" to ensure the safety of the personnel involved in this operation.

9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

TtNUS and subcontractor personnel will provide MSDSs for the chemicals brought on site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on site. A chemical inventory of the chemicals used on site will be developed using the Health and Safety Guidance Manual. 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 be working in proximity to one another during field activities, a supported means of communication between field crew members will not be necessary.

External communication will be accomplished by using cellular telephones. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities at NAS Pensacola, the FOL will determine and arrange for telephone communications.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is anticipated that quantities of bulk potentially hazardous materials (greater than 55-gallons) will not be handled during the site activities. It is possible, however, that as the job progresses disposable PPE and other non-reusable items may be generated. As needed, 55-gallon drums will be used to contain unwanted items generated during sampling activities. The drum(s) will be labeled with the site name and address, the type of contents, and the date the container was filled as well as an identified contact person. As warranted, samples will be collected and analyzed to characterize the material and determine appropriate disposal measures. Once characterized the drum(s) will be removed from the staging area and disposed of in accordance with Federal, State and local regulations. Given the likely solid nature of drum contents, a comprehensive Spill Containment Program is not necessary. The following discussion is provided as contingency information only.

10.2 POTENTIAL SPILL AREAS

Should drums contain liquid wastes, potential spill areas will be monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Areas designated for handling, loading, and unloading of potentially contaminated waters and debris present limited potential for leaks or spills.

All drums/containers used for containing liquids will be sealed, labeled, and staged within a centralized area awaiting shipment or disposal.

10.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, periodic inspections by the SSO will be conducted during working hours to visually determine that containers are not leaking. If a leak is detected, the first approach will be to transfer the container contents using a hand pump into a new container. Other provisions for the transfer of container contents will be made and appropriate emergency contacts will be notified, if necessary. In most instances, leaks will be collected and contained using absorbents such as Oil-dry, vermiculite, and/or sand, which may be stored at the staging area in a conspicuously marked drum. This material too, will be containerized for disposal pending analyses. All inspections will be documented in the Project Logbook.

10.4 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 and/or the SSO will serve as the Spill Response Coordinator for this operation should the need arise.

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the types of equipment that may be maintained at the staging area for the purpose of supporting this Spill Containment Program (depending on the likelihood that drums and/or liquid wastes are generated).

- Sand, clean fill, vermiculite, or other noncombustible absorbent (oil-dry);
- Drums (55-gallon U.S. DOT 17-E or 17-H)
- Shovels, rakes, and brooms
- Labels

10.6 SPILL CONTROL PLAN

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

- 1) Notify the SSO or FOL immediately.

- 2) Take immediate actions to stop the leak or spill by plugging or patching the drum or raising the leak to the highest point. Avoid contacting drum contents. Spread the absorbent material in the area of the spill covering completely.

It is not anticipated that a spill will occur in which the field crews cannot handle. Should this occur; however, the FOL or SSO will notify appropriate emergency response agencies.

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 any confined spaces. A confined space is defined as an area which has one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- 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).
- Is not designed for continuous employee occupancy.

A Permit-Required Confined Space is one that:

- 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.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual 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 the chemicals brought on-site, including decon solution, fuels, sample preservations, calibration gases, etc.
- A full size OSHA Job Safety and Health Poster
- 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 (posted) - This list represents the 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 site personnel. These documents should match the listings on the chemical inventory list for 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 defaced, altered, or covered by other material.

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-1). This list identifies site personnel, dates of training (including site-specific training), and medical surveillance. The list indicates clearance as well as status. Personnel must meet these requirements in order to enter the site while 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 the 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.

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 (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, as stated above, 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 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action - Navy
CNS	Central Nervous System
CTO	Contract Task Order
CZR	Contamination Reduction Zone
DOD	United States Department of Defense
eV	electron Volts
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IDLH	Immediate Dangerous to Life or Health
IDW	Investigative-Derived Wastes
LEL/LFL	Lower Explosive Limit / Lower Flammable Limit
MSDS	Material Safety Data Sheets
N/A	Not Available
NAS	Naval Air Station
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	Personal Protective Equipment
SAP	Sampling and Analyses Plan
SOPs	Standard Operating Procedures
SSO	Site Safety Officer
TBD	To be determined
TLV	Threshold Limit Value
TOM	Task Order Manager
TWA	Time-Weighted Average
WP	Work Plan

ATTACHMENT I

**INJURY/ILLNESS PROCEDURE
AND REPORT FORM**



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: _____
Subsidiary Health and Safety Representative

Prepared by: _____

Position: _____

cc: _____
Workers Compensation Administrator

Office: _____

Project name: _____

Telephone number: _____

Project number: _____

Fax number: _____

Information Regarding Injured or Ill Employee

Name: _____

Office: _____

Home address: _____

Gender: M F No. of dependents: _____

Marital status: _____

Home telephone number: _____

Date of birth: _____

Occupation (regular job title): _____

Social security number: _____

Department: _____

Date of Accident: _____

Time of Accident: _____ a.m. p.m.

Time Employee Began Work: _____

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

SAFE WORK PERMITS

**SAFE WORK PERMIT
DECONTAMINATION ACTIVITIES (EXCLUDING HEAVY EQUIPMENT)
OU 1 - NAS PENSACOLA, FLORIDA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Decontamination of sampling equipment. Brushes and spray bottles will be used.
- II. Required Monitoring Instrument(s): PID
- III. Field Crew: _____
- IV. On-site Inspection conducted 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
 Detailed on Reverse
- Respiratory equipment required
 Full face APR Escape Pack
 Half face APR SCBA
 PAPR Bottle Trailer
 Skid Rig None
- Modifications/Exceptions: When using pressure washers, steam cleaners field crews will wear hearing protection, and face shields.

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>VOCs (primarily benzene and vinyl chloride)</u>	<u>Sustained readings above background levels</u>	<u>Repeat decon procedure</u>
_____	_____	_____

- VII. Additional Safety Equipment/Procedures
- | | | | |
|-------------------------------------|---|---------------------------------------|---|
| Hard-hat..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Hearing Protection (Plugs/Muffs) | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type - Nitrile)..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical Resistant Boot Covers..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Impermeable apron | <input type="checkbox"/> Yes <input type="checkbox"/> No |
- Modifications/Exceptions: Tyvek or impermeable aprons if cleaning sampling equipment causes excessive splashing.

- VIII. Procedure review with permit acceptors
- | | | | |
|---|--|------------------------|--|
| Safety shower/eyewash (Location & Use) | <input type="checkbox"/> Yes <input type="checkbox"/> NA | Emergency alarms..... | <input type="checkbox"/> Yes <input type="checkbox"/> NA |
| Procedure for safe job completion..... | <input type="checkbox"/> Yes <input type="checkbox"/> NA | Evacuation routes..... | <input type="checkbox"/> Yes <input type="checkbox"/> NA |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> Yes <input type="checkbox"/> NA | Assembly points..... | <input type="checkbox"/> Yes <input type="checkbox"/> NA |

- IX. Site Preparation
- | | |
|--|--|
| Utility Locating and Excavation Clearance completed..... | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| Vehicle and Foot Traffic Routes Cleared and Established..... | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| Physical Hazards Barricaded and Isolated..... | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| Emergency Equipment Staged..... | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |

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

- XI. Special instructions, precautions: Chemical hazards with decontamination due to fluids such as isopropyl alcohol, etc. Refer to the manufacturer's MSDS regarding PPE, handling, storage, and first-aid measures related to decontamination fluids.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
MOBILIZATION AND DEMOBILIZATION ACTIVITIES
OU - 1 - NAS PENSACOLA, 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.
- II. Required Monitoring Instruments: None
- III. Field Crew: _____
- IV. On-site Inspection conducted 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
 - Detailed on Reverse
- Respiratory equipment required
 - Full face APR
 - Half face APR
 - PAPR
 - Skid Rig
- Escape Pack
- SCBA
- Bottle Trailer
- None

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, or coveralls, safety glasses and safety footwear. Hard hats and hearing protection will be worn when working near operating equipment

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>None anticipated</u>	_____	_____
_____	_____	_____
_____	_____	_____

- VII. Additional Safety Equipment/Procedures

Hard-hat..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) .. <input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Radio..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield..... <input type="checkbox"/> Yes <input type="checkbox"/> No	Barricades..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Splash suits/coveralls <input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type - Cotton/leather) <input type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe work shoes/boots <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: Pant legs taped to work boots if in an area of heavy vegetation. Tyvek coverall may also be used to protect against natural hazards (e.g., ticks). If working in areas where snakes are a threat, wear snake chaps to protect against bites. Use gloves if activities involve potential for cuts.

- VIII. Procedure review with permit acceptors

Safety shower/eyewash (Location & Use)	Yes	NA	Emergency alarms.....	Yes	NA
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points.....	<input type="checkbox"/>	<input type="checkbox"/>

- IX. Site Preparation

Utility Locating and Excavation Clearance completed.....	Yes	No	NA
Vehicle and Foot Traffic Routes Cleared and Established	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Barricaded and Isolated.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

- XI. Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls, natural hazards, etc.) Avoid potential nesting areas. Wear light colored clothing so that ticks and other biting insects can be easily visible and can be removed. Inspect clothing and body for ticks. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather. 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
OU - 1 - NAS PENSACOLA, 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 groundwater, surface water, and IDW.
- II. Required Monitoring Instrument(s): PID with 10.6 eV lamp or FID
- III. Field Crew: _____
- IV. On-site Inspection conducted 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
 Detailed on Reverse
- Respiratory equipment required
 Full face APR
 Half face APR
 PAPR
 Skid Rig
- Escape Pack
 SCBA
 Bottle Trailer
 None
- Modifications/Exceptions: NONE

- VI. Chemicals of Concern VOCs (primarily benzene and vinyl Chloride) Action Level(s) Sustained readings > 1 ppm in worker breathing zone Response Measures Evacuate area / Contact PHSO Return when levels fall to normal background levels

- VII. Additional Safety Equipment/Procedures
- | | | | |
|-------------------------------------|---|-------------------------------------|---|
| Hard-hat..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) .. | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Radio..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash Shield..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Barricades..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type - Nitrile) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe work shoes/boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Chemical Resistant Boot Covers..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Impermeable apron..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
- Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work clothes and PVC or PE coated Tyvek if saturation or work clothes may occur. Rubber boots/hip waders and U.S. Coast Guard-approved life vest if surface water sampling requires working near bodies of water where the potential for drowning exists.

- VIII. Procedure review with permit acceptors
- | | | | | | |
|---|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|
| | Yes | NA | | Yes | NA |
| Safety shower/eyewash (Location & Use) | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes | <input type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points..... | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Site Preparation
- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| | Yes | No | NA |
| Utility Locating and Excavation Clearance completed..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vehicle and Foot Traffic Routes Cleared and Established | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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

- XI. Special instructions, precautions: Avoid potential nesting areas. The SSO shall preview work areas for signs of habitation, nesting, or foraging in remote areas where sampling is to be conducted. Wear light colored clothing so that ticks and other biting insects can be easily visible and can be removed. Inspect clothing and body for ticks upon exiting wooded areas and high brush. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather. Use proper lifting techniques as described on Table 5-1 for mobilization/demobilization.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
IDW MANAGEMENT
NAS PENSACOLA, FLORIDA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Handling, sampling and staging of IDW drums.
- II. Required Monitoring Instruments: PID with 10.6 eV (or higher) lamp
- III. Field Crew: _____
- IV. On-site Inspection conducted 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
 Detailed on Reverse
- Respiratory equipment required
 Full face APR Escape Pack
 Half face APR Airline/SCBA
 PAPR Bottle trailer
 Skid Rig None

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety shoes, hardhat, nitrile outer gloves with surgical-style inner gloves, impermeable boot covers.

- VI. Chemicals of Concern
VOCs (Benzene, and Vinyl Chloride)
- Action Level(s)
Sustained readings greater than >1 ppm in worker breathing zone
- Response Measures
Evacuate area. /Contact PHSO Return when levels fall to normal background levels

- VII. Additional Safety Equipment/Procedures
- | | | | | | |
|-------------------------------------|---|-----------------------------|---------------------------------------|---|--|
| Hard-hat..... | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs)..... | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Safety belt/harness | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| Chemical/splash goggles..... | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Radio..... | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| Splash Shield..... | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Barricades..... | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Splash suits/coveralls | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Gloves (Type - Nitrile) | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| Steel toe work shoes or boots | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Work/rest regimen | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
- Modifications/Exceptions: Tyvek coverall if there is a potential for soiling clothes. Work/rest regimen to be determined by SSO & site personnel

- VIII. Procedure review with permit acceptors
- | | | | | | |
|---|------------------------------|-----------------------------|------------------------|---|-----------------------------|
| Safety shower/eyewash (Location & Use) | <input type="checkbox"/> Yes | <input type="checkbox"/> NA | Emergency alarms..... | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> NA |
| Procedure for safe job completion..... | <input type="checkbox"/> Yes | <input type="checkbox"/> NA | Evacuation routes..... | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> NA |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> Yes | <input type="checkbox"/> NA | Assembly points..... | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> NA |

- IX. Site Preparation
- | | | | |
|--|------------------------------|-----------------------------|-----------------------------|
| Utility Locating and Excavation Clearance completed..... | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Vehicle and Foot Traffic Routes Cleared and Established..... | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Physical Hazards Barricaded and Isolated..... | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| Emergency Equipment Staged..... | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

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

- XI. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
O&M ACTIVITIES ON REMEDIAL SYSTEM
OU - 1 - NAS PENSACOLA, FLORIDA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): O&M activities.
- II. Required Monitoring Instrument(s): PID with 10.6 eV lamp or FID
- III. Field Crew: _____
- IV. On-site Inspection conducted 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
 - Detailed on Reverse
- Respiratory equipment required
 - Full face APR
 - Half face APR
 - PAPR
 - Skid Rig
- Escape Pack
- SCBA
- Bottle Trailer
- None

Modifications/Exceptions: Specific O&M activities may require additional PPE or safety equipment depending on the hazards that are present and associated with those tasks. Contact the PHSO for additional guidance.

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>VOCs (primarily benzene and vinyl chloride)</u>	<u>Sustained readings > 1 ppm in worker breathing zone</u>	<u>Evacuate area / Contact PHSO</u> <u>Return when levels fall to normal background levels</u>

- VII. Additional Safety Equipment/Procedures

<ul style="list-style-type: none"> Hard-hat..... <input type="checkbox"/> Yes <input type="checkbox"/> No Safety Glasses <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Chemical/splash goggles..... <input type="checkbox"/> Yes <input type="checkbox"/> No Splash Shield..... <input type="checkbox"/> Yes <input type="checkbox"/> No Splash suits/coveralls..... <input type="checkbox"/> Yes <input type="checkbox"/> No Steel toe work shoes/boots <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Chemical Resistant Boot Covers..... <input type="checkbox"/> Yes <input type="checkbox"/> No 	<ul style="list-style-type: none"> Hearing Protection (Plugs/Muffs) .. <input type="checkbox"/> Yes <input type="checkbox"/> No Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Radio..... <input type="checkbox"/> Yes <input type="checkbox"/> No Barricades..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Gloves (Type - Nitrile) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No Impermeable apron..... <input type="checkbox"/> Yes <input type="checkbox"/> No
--	--

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work clothes and PVC or PE coated Tyvek if saturation or work clothes may occur. Hard hat if overhead hazards are present. Hearing protection if noise producing equipment is used.

VIII. Procedure review with permit acceptors	Yes	NA
Safety shower/eyewash (Location & Use)	<input type="checkbox"/>	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	NA
Emergency alarms.....	<input type="checkbox"/>	<input type="checkbox"/>
Evacuation routes.....	<input type="checkbox"/>	<input type="checkbox"/>
Assembly points.....	<input type="checkbox"/>	<input type="checkbox"/>

- IX. Site Preparation

Utility Locating and Excavation Clearance completed.....	Yes	No	NA
Vehicle and Foot Traffic Routes Cleared and Established	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Barricaded and Isolated.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

- XI. Special instructions, precautions: The SSO shall preview work areas and determine the need for additional PPE (with guidance from the PHSO) based on the tasks that are to be performed. This HASP must be modified if O&M activities require the use of fall protection or elevated levels of protection or if hazards not addressed within this HASP are determined to exist. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather. Contaminant concentrations may accumulate in remedial systems or be volatilized and present an increased exposure potential. Use proper lifting techniques as described on Table 5-1 for mobilization/demobilization.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
CHAIN SAW OPERATION
OU - 1 - NAS PENSACOLA, FLORIDA**

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

I. **Work limited to the following (description, area, equipment used):** Tree clearing using gasoline-powered chain saws

II. **Primary Hazards:** Lacerations (cuts), noise, eye hazards, contact with flying debris, head injuries and/or abrasions and contusions of other body parts as a result of being struck by falling or flying objects, numbness/tingling/weakness of hands due to exposure to prolonged or excessive vibration, contact with hot surfaces, fires from improper fueling / fuel handling.

III. **Field Crew:** _____

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

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 for this task.

VI. Chemicals of Concern <u>None anticipated for this task</u>	Hazard Monitoring <u>Not Applicable (NA)</u>	Action Level(s) <u>NA</u>	Response Measures <u>NA</u>
--	--	-------------------------------------	---------------------------------------

Primary Route(s) of Exposure/Hazard: Primary hazards associated with this task are of a physical nature, not a chemical one.

(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..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) .. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness <input type="checkbox"/> Yes <input type="checkbox"/> No
Chemical/splash goggles..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio/Cellular Phone <input type="checkbox"/> Yes <input type="checkbox"/> No
Face Shield..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash suits/coveralls <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - <u>leather/cotton</u>)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable apron <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots .. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers .. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
High Visibility vest..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Tape up/use insect repellent <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Other (<u>Chain Saw Chaps</u>) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: Ensure that portable fire extinguishers are on-hand (Type A/B, and minimum 10 pound capacity).

VIII. **Site Preparation**

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

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:** In addition to this SWP, all chain saw operators MUST review the chain saw operator's manual, and must comply with all manufacturer's specifications and recommendations for safe use, fueling, and maintenance. Operators are also to review the attached American Red Cross Fact Sheet (entitled "Using a Chain Saw Safely").
Tape up ankle joints (bottom of pants legs to top of work boots). Apply and re-apply insect repellants in accordance with manufacturer's recommendations. Apply repellants containing DEET directly to exposed skin, and repellants containing Permethrin only to clothing. Ensure that other personnel remain a safe distance from all chain saw operations.

Permit Issued by: _____ Permit Accepted by: _____

Adapted From:
American Red Cross
Fact Sheet – Using a Chain Saw Safely

The chain saw is a time saving and efficient power tool, but it can be a very unforgiving and lethal device.

FIRST: Read your safety manual that came with your chain saw, and follow all instructions presented in that manual for chain saw fueling, start up, operation, and maintenance.

If you are going to help clear tree and wood debris, you must wear:

- A hard hat with a protective
- Hearing protection (ear plugs and/or ear muffs, with an NRR of at least 25 dB)
- Cotton or leather gloves
- Chain saw protective chaps or chain saw protective pants (UL Listed)
- Steel toe work boots

The above items are required by **OSHA reg. 1910.266** for all employed chain saw operators.

Read your owner's manual concerning kickback. To reduce the risk of kickback injury:

Use a reduced kickback bar, low kickback chain and chain brake
Avoid contact between the bar tip and any object
Hold the chain saw firmly with both hands
Do not over-reach
Do not cut above shoulder height
Check the chain brake frequently
Follow sharpening and maintenance instructions for the chain saw

Make sure that your chain saw has the following features, and that these features are working:

Chain brake (manual or inertial)
Chain catcher
Working safety throttle switch
Working on/off switch
Spark arrester

Make sure your chain saw carburetor is properly adjusted.

This should be done by a trained servicing dealer. A misadjusted carburetor will cause stalling or poor performance and could cause the operator to be injured.

Always fill a gas-powered chain saw only when the engine is cool.

If the saw is out of gas, let it cool 30 minutes before refueling.
Do not smoke when refueling the saw!

Have several commercially sharpened saw chains to match your chain saw and bar.

THIS IS VERY IMPORTANT!

You can immediately dull a chain saw chain by hitting the ground with the tip, or cutting dirty wood, hitting a rock or nails. It is very tiring to cut with a dull chain and the extra pressure you apply to the chain saw to cut faster will only increase your chance of an injury!

Look out for hazards!

- Broken or hanging branches, attached vines, or a dead tree that is leaning. All of these hazards can cause the chain saw operator to be injured.
- If you have to cut a dead tree, be very careful! The top could break off and kill you.
- If the tree is broken and under pressure, make sure you know which way the pressure is going. If you're not sure, make small cuts to release some of the pressure before cutting up the section.
- Be careful of young trees that other trees have fallen on. They act like spring poles and may propel the chain saw back into your leg. (Many professional loggers have been hurt in this manner.)

Felling a dangerous broken tree should be left to a professional cutter.

A downed tree may weigh several tons and can easily injure or kill an unaware chain saw operator. More injuries occur during clean up after a hurricane than during the storm.

Carry the chain saw with the engine off.

When bucking up (cutting) a downed tree:

Place a plastic wedge into the cut to keep your chain saw from binding up. They are available at any chain saw dealer and sometimes come packaged with the saw.

Never cut when tired or alone.

Most woodcutting accidents occur late in the afternoon when most people are pushing to finish up for the day. Always work with a partner but never around children or pets.

Use a chain saw from the ground level only, not on a ladder or in a tree.

When felling a tree, keep everyone at least "two tree lengths away."

You should have a preplanned escape route.

It should be at a 45° angle from the projected direction of a falling tree. Make sure there is nothing that could trip or stop you from making a quick retreat.

When picking up heavy wood debris, get several helpers.

Bend your knees and lift with your legs, not your back.

A 24-inch log may weigh over 100 pounds.

Cleaning up tree damage after a storm is a very demanding job.

If you follow these basic tips you can avoid preventable injuries.

This information was provided courtesy of Gränsfors Bruks, Inc., a manufacturer/supplier of logging safety apparel and accessories, of Summerville, S.C., and is used with permission. This information has also been reviewed for technical accuracy by the U.S. Consumer Product Safety Commission.

**SAFE WORK PERMIT
HEAVY EQUIPMENT OPERATION
OU - 1 - NAS PENSACOLA, FLORIDA**

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

I. Work limited to the following (description, area, equipment used): Brush clearing using heavy equipment including Bobcat vehicles and bull dozer.

II. Primary Hazards: Caught by/struck by heavy equipment (from vehicle movement or roll-over), noise, falling objects from (e.g., BobCat bucket) and/or flying projectiles, foot injury, minor cuts/contusions/abrasions.

III. Field Crew: _____

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

V. Protective equipment required **Respiratory equipment required**
 Level D Level B Yes Specify on the reverse
 Level C Level A No
 Modifications/Exceptions: If visible dust cannot be suppressed or avoided, upgrade to Level C (half face air purifying respirator with HEPA cartridges).

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
<u>Cadmium</u>	<u>Visual monitoring</u>	<u>Sustained Visible dust</u>	<u>Upgrade to Level C</u>

Primary Route(s) of Exposure/Hazard: Inhalation of dust particles contaminated with cadmium. Skin contact and ingestion are of lesser concern, as these are readily protected by proper use of PPE, decontamination, and personal hygiene practices.

(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.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Chemical/splash goggles.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio/Cellular Phone.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash suits/coveralls	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Gloves (Type - _____)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable apron.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Work/rest regimen	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots ..	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
High Visibility vest.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape up/use insect repellent	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher.....	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Other.....	<input type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: Level D: High visibility vests and work gloves at SSO's discretion, but must be work by any necessary ground crew. Non-essential personnel must remain out of heavy vehicle operations areas. If visible dust levels are prolonged/recurring and cannot be avoided or suppressed, upgrade to Level C will be required. This will be the above PPE, plus hooded Tyvek, surgeon's gloves, and boot covers, AND the SSO must compete and implement the Respiratory Protection Program in Attachment IV of the HASP.
Ground spotters (if needed) or other necessary ground personnel are responsible for avoiding blind spots of the heavy equipment operators. Ensure that each rig is equipped with a ROPS cage, working backup alarms and portable a type A/B/C fire extinguisher. Inspect each rig prior to putting into service onsite, and at least weekly thereafter. Heavy vehicle operators MUST ALWAYS WEAR SEAT BELTS when operating their rig(s). Also, NO UNAUTHORIZED RIDERS are permitted on any rig, at anytime, for any reason.

VIII. Site Preparation

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

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: Only persons who are adequately qualified (through licensing, training, and/or experience) and authorized to operate heavy equipment may serve as operators. Ensure that other personnel remain a safe distance from all heavy equipment operations. SSO must ensure that fuel is properly stored, dispensed, and transferred. Fuel storage must be in appropriate flammable liquid containers. Smoking is prohibited in fuel storage areas, while fueling vehicles, or while operating heavy equipment. The SSO is to closely review Section 5.1 with all heavy equipment operators prior to work start-up. Tape up ankle joints (bottom of pants legs to top of work boots). Apply and re-apply insect repellants in accordance with manufacturer's recommendations. Apply repellants containing DEET directly to exposed skin, and repellants containing Permethrin only to clothing.

Permit Issued by: _____ Permit Accepted by: _____

**SAFE WORK PERMIT
HEAVY EQUIPMENT DECONTAMINATION ACTIVITIES
OU 1 - NAS PENSACOLA, FLORIDA**

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

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Pressure-washing heavy equipment (skid loaders/bulldozer) at established decontamination pad.
- II. Required Monitoring Instrument(s): None – visual inspection adequate to determine that site soils have been removed.
- 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: No increase in Level of Protection anticipated for this task.

VI. Chemicals of Concern	Action Level(s)	Response Measures
<u>PNAs and metals</u>	<u>Visual inspection</u>	<u>Repeat decon procedure</u>

(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..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety belt/harness..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/splash goggles..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio <input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Barricades <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Splash suits/rain suit..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type - Nitrile)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Steel toe Work shoes or boots <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No
Chemical Resistant Boot Covers..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Impermeable apron <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Modifications/Exceptions: . . .

VIII. Procedure review with permit acceptors	Yes	NA	Emergency alarms.....	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes.....	<input type="checkbox"/>	<input type="checkbox"/>
Procedure for safe job completion.....	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Assembly points.....	<input type="checkbox"/>	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected.....	<input type="checkbox"/>	<input type="checkbox"/>			

- IX. Site Preparation

Utility Locating and Excavation Clearance completed.....	Yes	No	NA
Vehicle and Foot Traffic Routes Cleared and Established.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Physical Hazards Barricaded and Isolated.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

- XI. Special instructions, precautions: Ensure that all personnel are removed from the heavy equipment decon pad when vehicles are being brought in or removed. Operators are to put vehicles in "safe" position (turned OFF, parking brake set, blades/buckets lowered so that they are only high enough above ground level to be cleaned.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT III

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION

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., bulldozer, generator)

	Good	Need Repair	N/A
Tires or tracks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hoses and belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cab, mirrors, safety glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Is the equipment equipped with audible back-up alarms and back-up lights?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horn and gauges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brake condition (dynamic, park, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire extinguisher (Type/Rating - _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fluid Levels:			
- Engine oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Transmission fluid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Brake fluid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Cooling system fluid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Windshield wipers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Hydraulic oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil leak/lube	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coupling devices and connectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exhaust system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blade/boom/ripper condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access-ways: Frame, hand holds, ladders, walkways (non-slip surfaces), guardrails?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power cable and/or hoist cable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steering (standard and emergency)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Safety Guards:

	Yes	No
- Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? _____	<input type="checkbox"/>	<input type="checkbox"/>
- Hot pipes and surfaces exposed to accidental contact? _____	<input type="checkbox"/>	<input type="checkbox"/>
- All emergency shut offs have been identified and communicated to the field crew? _____	<input type="checkbox"/>	<input type="checkbox"/>
- Have emergency shutoffs been field tested? _____	<input type="checkbox"/>	<input type="checkbox"/>
- Results? _____	<input type="checkbox"/>	<input type="checkbox"/>
- Are any structural members bent, rusted, or otherwise show signs of damage? _____	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>

- 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? _____

Portable Power Tools:

- Tools and Equipment in Safe Condition? _____
- Saw blades, grinding wheels free from recognizable defects (grinding wheels have been sounded)? _____
- Portable electric tools properly grounded? _____
- Damage to electrical power cords? _____
- Blade guards in place? _____
- Components adjusted as per manufacturers recommendation? _____

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? _____

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? _____
- Does the operator have emotional and/or physical limitations which would prevent him/her from performing this task in a safe manner? _____
- Is the operator 21 years of age or more? _____

Identification:

- Is a tagging system available, for positive identification, for tools removed from service? _____

Additional Inspection Required Prior to Use On-Site

- | | Yes | No |
|---|--------------------------|--------------------------|
| - Does equipment emit noise levels above 90 decibels? | <input type="checkbox"/> | <input type="checkbox"/> |
| - If so, has an 8-hour noise dosimetry test been performed? | <input type="checkbox"/> | <input type="checkbox"/> |
| - 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

**SITE-SPECIFIC RESPIRATORY
PROTECTION PROGRAM**

PROGRAM SCOPE:

This project-specific Respirator Protection Program (RPP) has been prepared for Operable Unit 1 (OU 1) at NAS Pensacola, CTO 333. This RPP shall be implemented by the Site Safety Officer in the event that brush clearing activities with heavy equipment generate prolonged visible dusty conditions which cannot be avoided or suppressed.

This program has been prepared, and shall be updated as necessary, in accordance with the OSHA Respiratory Protection standard 29 CFR 1910.134. The Site Safety Officer will serve as the "Program Administrator" in accordance with that OSHA standard, and as such will be responsible for implementing and maintaining this program at the NAS Pensacola site if the need arises for personnel to wear respiratory protection. The Program Administrator is also responsible for monitoring this program for ongoing effectiveness and application, and for making recommendations as necessary to the Project Health and Safety Officer and/or Corporate Health and Safety Manager for any modifications to this site-specific program.

It is anticipated that the only individuals who may be required to use respirators at this site will be subcontractor personnel who are operating heavy equipment. If that subcontractor already has a written RPP in place that satisfies OSHA requirements, then their program will take precedence over this document. In that case, the SSO shall collect a copy of that program, review it, and maintain a copy of it at the project site.

1.0 PROCEDURES USED FOR RESPIRATOR SELECTION

An evaluation of analytical data available pertinent to OU 1 and relevant to the nature of heavy equipment operation was performed using worst-case exposure models published by the American Industrial Hygiene Association. This evaluation concluded that if dust concentrations reached 5.6 mg/m^3 at this site area, the OSHA PEL for cadmium could be reached. It was recognized that the OSHA PEL is an 8-hour Time Weighted Average (TWA_8). It is generally recognized that a dust concentration of greater than 2.5 mg/m^3 is visible to the unaided human eye. Therefore, intermittent or short durations of visibly dusty conditions will likely not correlate to a worker exposure above the OSHA PEL. However, if visibly dusty conditions cannot be avoided or suppressed and they become either sustained or frequently recurring, then respiratory protection will be required as a precaution.

For this task at this project, respirator selection was based on Table 2 of the OSHA Cadmium Standard (29 CFR 1910.1027[g][3][i]). That standard specifies that for cadmium exposures of 10 X the PEL, that a half-face air purifying respirator equipped with High Efficiency Particulate Air (HEPA) cartridges is appropriate, and that is the arrangement that will be used on this project, if respiratory protection use is deemed necessary by the SSO.

2.0 MEDICAL EVALUATIONS OF RESPIRATOR USERS

All personnel who are required to work while wearing respiratory protection must provide the Site Safety Officer with documentation from an appropriately-qualified Health Care Professional that they have been evaluated in accordance with OSHA 29 CFR 1910.134 and have been medically-cleared to work in respiratory protection. The SSO is responsible for collecting and reviewing this documentation prior to permitting any site worker to work in respiratory protection, and the SSO is also responsible for maintaining this documentation onsite. The medical clearance must be completed prior to any respirator fit testing.

3.0 FIT TESTING REQUIREMENTS

All persons who will be required to work in respiratory protection must first pass an appropriate respirator fit test procedure. As the equipment operators on this project will be subcontractors, they may bring documentation of successfully passing a respirator fit test with them to the site, and submit that along with their HAZWOPER training and medical clearance documentation for review and records retention by the SSO. NOTE: If personnel cannot produce written evidence that they have *WITHIN THE LAST 12*

MONTHS passed a respirator fit test *FOR THE SAME MANUFACTURER MAKE, MODEL, AND SIZE* of half face air purifying respirator that will used at this site, then such a fit test must be successfully administered prior to permitting any person from performing work that requires a respirator.

For this site, Qualitative Fit Testing (QLFT) will be adequate, although any person showing evidence that they have successfully passed a Quantitative fit Test (QNFT) for the appropriate respirator make, model and size would certainly also be acceptable. Fit testing must be performed in accordance with the OSHA requirements specified in Appendix A of 191.134 (attached at the end of this RPP).

4.0 PROCEDURES FOR PROPER USE OF RESPIRATORS

As part of the initial site specific training, the SSO must demonstrate the proper donning and adjusting of the half face respirators, and how to perform a qualitative respirator seal check. The SSO must then also observe each equipment operator perform these functions. Upon the initiation of heavy equipment operation at OU1, the SSO's (at his discretion), may direct equipment operators to stop operations and properly don their personally-assigned respirators.

The need for or use of respiratory protection for any emergency situations is not anticipated.

5.0 RESPIRATOR CARE

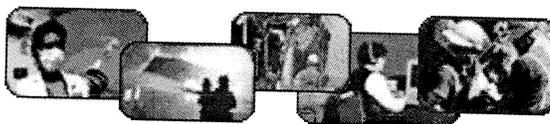
Each person who may need to work in respiratory protection will be provided their own respirator (there will be no sharing of these devices), and will be instructed that they are personally responsible for properly using the device and for their proper cleaning, care, and storage. At this project site, the following respirator care requirements will be communicated to users and implemented:

- Cleaning and disinfecting: Respirators shall be cleaned no less than after each day or each shift where they are used. Users must follow manufacturer's instructions for proper cleaning. Generally, this involves washing with a mild detergent, followed by rinsing with potable water and air drying.
- Storage: Follow manufacturer's recommendations. Generally, this will include storing respirators in a sanitary condition where they will not be exposed to dusts, potential contaminants, excessive heat, or direct sunlight. After a respirator has been cleaned and dried, they can be placed in clean plastic bags (e.g., Zip Lock bags) to help keep them clean between uses. Respiratory HEPA cartridges must also be stored in a clean and sanitary condition.
- Inspection: Personnel who are issued a respirator will be instructed to (and responsible for) inspecting the devices prior to each usage. Again, the manufacturer will provide instructions on this matter, which are to be followed. Generally, respirator inspection will include checking the mask, straps, etc. for visible damage, cleanliness, and proper working order.
- Respirator repairs and maintenance: Site personnel will not be authorized to perform any modifications or repairs to an issued respirator (aside from replacing cartridges). Respirators that are found to be damaged or defected are to be either returned to the appropriate manufacturer/distributor for repair, or they are to be disposed of as IDW and replaced.
- Training: All site personnel will have completed basic respiratory protection training as part of their initial 40-hour HAZWOPER Training. In addition, site personnel will be trained either by their employer or by the SSO in the proper donning and usage of respirators at this site, of the hazards at OU1 that could institute the need for respirators on this project (e.g., cadmium – see Table 6-1 of the HASP for more information on the health hazards of this substance), and in the limitations of these devices – such as they must be changed out at least at the end of each day's use, impacts on verbal communications and some resistance in breathing ability, that they do not provide protection against gases or vapors, and that they do not provide protection in oxygen-deficient atmospheres).

6.0 CARTRIDGE CHANGE-OUT: At least daily or at the end of each shift.



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Regulations (Standards - 29 CFR)

Fit Testing Procedures (Mandatory). - 1910.134 App A

[← Regulations \(Standards - 29 CFR\) - Table of Contents](#)

● Part Number:	1910
● Part Title:	Occupational Safety and Health Standards
● Subpart:	I
● Subpart Title:	Personal Protective Equipment
● Standard Number:	<u>1910.134 App A</u>
● Title:	Fit Testing Procedures (Mandatory).

Appendix A to § 1910.134: Fit Testing Procedures (Mandatory)

Part I. OSHA-Accepted Fit Test Protocols

A. Fit Testing Procedures -- General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.
3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.
4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item
- A.6. If the test subject is not familiar with using a particular respirator, the test subject shall

be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

(a) Position of the mask on the nose

(b) Room for eye protection

(c) Room to talk

(d) Position of mask on face and cheeks

7. The following criteria shall be used to help determine the adequacy of the respirator fit:

(a) Chin properly placed;

(b) Adequate strap tension, not overly tightened;

(c) Fit across nose bridge;

(d) Respirator of proper size to span distance from nose to chin;

(e) Tendency of respirator to slip;

(f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises.

(a) Employers must perform the following test exercises for all fit testing methods prescribed in this appendix, except for the CNP quantitative fit testing protocol and the CNP REDON

quantitative fit testing protocol. For these two protocols, employers must ensure that the test subjects (*i.e.*, employees) perform the exercise procedure specified in Part I.C.4(b) of this appendix for the CNP quantitative fit testing protocol, or the exercise procedure described in Part I.C.5(b) of this appendix for the CNP REDON quantitative fit-testing protocol. For the remaining fit testing methods, employers must ensure that employees perform the test exercises in the appropriate test environment in the following manner:

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (*i.e.*, when looking toward the ceiling).

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.

(8) Normal breathing. Same as exercise (1).

(b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as

to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

(a) Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

- (1) Three 1 liter glass jars with metal lids are required.
 - (2) Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C (77 deg. F) shall be used for the solutions.
 - (3) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.
 - (4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.
 - (5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.
 - (6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.
 - (7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.
 - (8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."
 - (9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.
 - (10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.
 - (11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.
- ### (b) Isoamyl Acetate Fit Test
- (1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.
 - (2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

- (3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.
 - (4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.
 - (5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.
 - (6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.
 - (7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.
 - (8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.
 - (9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.
 - (10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.
3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

- (a) Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.
 - (1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.
 - (2) The test enclosure shall have a 3/4-inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.
 - (3) The test subject shall don the test enclosure. Throughout the threshold screening test,

the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Saccharin solution aerosol fit test procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure described in 3. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

- (4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.
- (5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.
- (6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.
- (7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.
- (8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
- (9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).
- (10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.
- (11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).
- (12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. Bitrex™ (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The Bitrex™ (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste Threshold Screening.

The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

- (1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.
- (2) The test enclosure shall have a $\frac{3}{4}$ inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.
- (3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended.

The subject is instructed to report when he/she detects a bitter taste

- (4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.
 - (5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.
 - (6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.
 - (7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.
 - (8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.
 - (9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.
 - (10) The test conductor will take note of the number of squeezes required to solicit a taste response.
 - (11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.
 - (12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.
 - (13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.
 - (14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.
- (b) Bitrex Solution Aerosol Fit Test Procedure.
- (1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.
 - (2) The fit test uses the same enclosure as that described in 4. (a) above.
 - (3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).
 - (4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.
 - (5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.

- (6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.
 - (7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.
 - (8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
 - (9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).
 - (10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.
 - (11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).
5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

(a) General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

(b) Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

- (3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.
- (c) Irritant Smoke Fit Test Procedure
- (1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
- (2) The test subject shall be instructed to keep his/her eyes closed.
- (3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the facepiece area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
- (4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
- (5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.
- (6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.
- (7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
- (8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

1. General

- (a) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.
- (b) The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit Testing Protocol

- (a) Apparatus.

- (1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.
- (2) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.
- (3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.
- (4) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.
- (5) The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.
- (6) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least 1/4 inch.
- (7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.
- (8) The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.
- (9) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.
- (10) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.
- (11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate filter) before release.
- (12) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.
- (13) The limitations of instrument detection shall be taken into account when determining the fit factor.
- (14) Test respirators shall be maintained in proper working order and be inspected regularly

for deficiencies such as cracks or missing valves and gaskets.

(b) Procedural Requirements.

(1) When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.

(2) The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

(3) A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.

(4) Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.

(5) A stable test agent concentration shall be obtained prior to the actual start of testing.

(6) Respirator restraining straps shall not be over-tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.

(7) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested.

(8) Calculation of fit factors.

(i) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

(ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

(iii) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

(A) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(B) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(C) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

(D) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation:

$$\text{Overall Fit Factor} = \frac{\text{Number of exercises}}{1/ff_1 + 1/ff_2 + 1/ff_3 + 1/ff_4 + 1/ff_5 + 1/ff_6 + 1/ff_7 + 1/ff_8}$$

Where $ff_1, ff_2, ff_3, \text{ etc.}$ are the fit factors for exercises 1, 2, 3, etc.

(9) The test subject shall not be permitted to wear a half mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator unless a minimum fit factor of 500 is obtained.

(10) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Portacount Fit Test Requirements.

(1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.

(3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.

(5) Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

(6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

(b) Portacount Test Instrument.

(1) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

(2) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

(3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Controlled negative pressure (CNP) quantitative fit testing protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Occupational Health Dynamics of Birmingham, Alabama also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) CNP Fit Test Requirements.

(1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.

(2) The CNP system defaults selected for test pressure shall be set at -- 15 mm of water (- 0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

(Note: CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow inter-test comparison of the respirator fit.)

- (3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.
- (4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.
- (5) The employer must train the test subject to hold his or her breath for at least 10 seconds.
- (6) The test subject must don the test respirator without any assistance from the test administrator who is conducting the CNP fit test. The respirator must not be adjusted once the fit-test exercises begin. Any adjustment voids the test, and the test subject must repeat the fit test.
- (7) The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.
 - (b) CNP Test Exercises.
 - (1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.
 - (2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.
 - (3) Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.
 - (4) Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.
 - (5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.
 - (6) Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.
 - (7) Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.
 - (8) Normal Breathing. The test subject shall remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her

head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.

(c) CNP Test Instrument.

(1) The test instrument must have an effective audio-warning device, or a visual-warning device in the form of a screen tracing, that indicates when the test subject fails to hold his or her breath during the test. The test must be terminated and restarted from the beginning when the test subject fails to hold his or her breath during the test. The test subject then may be refitted and retested.

(2) A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

5. Controlled negative pressure (CNP) REDON quantitative fit testing protocol.

(a) When administering this protocol to test subjects, employers must comply with the requirements specified in paragraphs (a) and (c) of Part I.C.4 of this appendix ("Controlled negative pressure (CNP) quantitative fit testing protocol"), as well as use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in paragraph (b) of Part I.C.4 of this appendix.

(b) Employers must ensure that each test subject being fit tested using this protocol follows the exercise and measurement procedures, including the order of administration, described below in Table A-1 of this appendix.

Table A-1. -- CNP REDON Quantitative Fit Testing Protocol

Exercises ⁽¹⁾	Exercise procedure	Measurement procedure
Facing Forward	Stand and breathe normally, without talking, for 30 seconds.	Face forward, while holding breath for 10 seconds.
Bending Over	Bend at the waist, as if going to touch his or her toes, for 30 seconds.	Face parallel to the floor, while holding breath for 10 seconds
Head Shaking	For about three seconds, shake head back and forth vigorously several times while shouting.	Face forward, while holding breath for 10 seconds.
REDON 1	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask.	Face forward, while holding breath for 10 seconds.
REDON 2	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask again.	Face forward, while holding breath for 10 seconds.

¹ Exercises are listed in the order in which they are to be administered.

(c) After completing the test exercises, the test administrator must question each test subject regarding the comfort of the respirator. When a test subject states that the respirator is unacceptable, the employer must ensure that the test administrator repeats the protocol using another respirator model.

(d) Employers must determine the overall fit factor for each test subject by calculating the harmonic mean of the fit testing exercises as follows:

$$\text{Overall Fit Factor} = \frac{N}{\left[\frac{1}{FF_1} + \frac{1}{FF_2} + \dots + \frac{1}{FF_N} \right]}$$

Where:

N = The number of exercises;

FF1 = The fit factor for the first exercise;
FF2 = The fit factor for the second exercise; and
FFN = The fit factor for the nth exercise.

Part II. New Fit Test Protocols

A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or

2. An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

[63 FR 20098, April 23, 1998; 69 FR 46993, August 4, 2004]

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