



N62376.AR.000418
NAWC TRENTON NJ
5090.3a

FINAL
SITE SAFETY, HEALTH, AND EMERGENCY RESPONSE PLAN
FOR
EBS PHASE II FACILITY INVESTIGATIONS
NAVAL AIR WARFARE CENTER, AIRCRAFT DIVISION
TRENTON, NEW JERSEY

Contract No. N62472-92-D-1296
Contract Task Order No. 0048

Prepared for:

Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway
Lester, Pennsylvania 19113-2090

Prepared by:

EA Engineering, Science, and Technology, Inc.
Two Oak Way
Berkeley Heights, New Jersey 07922
(908) 665-2440

October 1996
FINAL
EA Project 296.0048

FINAL
SITE SAFETY, HEALTH, AND EMERGENCY RESPONSE PLAN
FOR
EBS PHASE II FACILITY INVESTIGATIONS
NAVAL AIR WARFARE CENTER, AIRCRAFT DIVISION
TRENTON, NEW JERSEY

Contract No. N62472-92-D-1296
Contract Task Order No. 0048



Mr. Steven G. Feldmann
CTO Manager

10/2/96

Date



Mr. Kris Hoiem, CIH
Program Safety & Health Officer

9/30/96

Date

CONTENTS

	<u>Page</u>
LIST OF FIGURES	
LIST OF TABLES	
1. SITE INFORMATION	1
2. SCOPE AND APPLICABILITY OF THE SSHERP	1
3. PERSONNEL	2
3.1 Key Personnel	2
3.2 Responsibilities	3
3.2.1 CTO Manager	3
3.2.2 Site Manager	3
3.2.3 Site Safety and Health Officer	4
3.2.4 Field Personnel	5
3.3 Visitors	5
4. SITE DESCRIPTION	5
4.1 General Description	5
4.2 AOC Descriptions	6
5. HAZARD ANALYSIS	6
5.1 Hazard Communication	6
5.2 Chemical Hazards	6
5.3 Physical and Biological Hazards	7
5.3.1 Fire/Explosion Hazards	7
5.3.2 Biological Hazards	8
5.3.3 Heavy Equipment Hazards	8
5.3.4 Vehicle and Pedestrian Hazards	9
5.3.5 Noise Hazards	9
5.3.6 Electrical Hazards	9
5.3.7 Utilities	9
5.3.8 Weather Hazards	10
5.3.9 Heat/Cold Stress	10
6. EMPLOYEE TRAINING	12

CONTENTS (Continued)

7.	MEDICAL SURVEILLANCE	13
8.	PERSONAL PROTECTIVE EQUIPMENT	13
8.1	General PPE Requirements	13
8.2	Levels of PPE	14
8.2.1	Level D PPE	14
8.2.2	Level C PPE	14
8.2.3	Level B PPE	15
8.3	Initial Requirements/Upgrade or Downgrade of PPE Levels	15
8.4	Hearing Protection	16
9.	ENVIRONMENTAL MONITORING	16
9.1	Environmental Monitoring and Action Levels	16
9.2	Calibration and Maintenance of Monitoring Equipment	16
10.	SITE CONTROL	16
10.1	Work Zones	16
11.	DECONTAMINATION PROCEDURES	17
11.1	Personnel Decontamination	18
11.2	Equipment Decontamination	18
11.3	Waste Disposal	18
12.	EMERGENCY RESPONSE PLAN	18
12.1	Emergency Recognition	18
12.2	Procedures for Handling Emergencies	19
12.3	Medical Emergencies	20
12.4	Fire/Explosion Emergencies	21
12.5	Emergency Telephone Numbers	21
13.	CONFINED SPACE ENTRY	22
14.	SPILL CONTAINMENT PROCEDURES	23
ATTACHMENT A SITE SAFETY, HEALTH, AND EMERGENCY RESPONSE PLAN REVIEW RECORD		

CONTENTS (Continued)

ATTACHMENT B	PHYSICAL HAZARD INFORMATION SHEET
ATTACHMENT C	EA SITE WORKER TRAINING AND PHYSICAL EXAMINATION RECORD
ATTACHMENT D	ENVIRONMENTAL MONITORING RECORD
ATTACHMENT E	CALIBRATION PROCEDURES
ATTACHMENT F	SITE ENTRY AND EXIT LOG
ATTACHMENT G	ROUTE TO HOSPITAL
ATTACHMENT H	ACCIDENT INVESTIGATION REPORT

LIST OF FIGURES

<u>Number</u>	<u>Title</u>
4-1	Site Location Map: Naval Air Warfare Center, Trenton, NJ.
4-2	Activity Settings: Naval Air Warfare Center, Trenton, NJ.

LIST OF TABLES

<u>Number</u>	<u>Title</u>
5-1	Potential constituents of concern at NAWCAD-Trenton.
5-2	Possible hazardous substances at EBS Phase II Areas of Concern.
5-3	Cooling power of wind on exposed flesh.
5-4	Threshold limit values work/warm-up schedule.
9-1	Environmental monitoring requirements.
12-1	Emergency telephone numbers.

SITE SAFETY, HEALTH, AND EMERGENCY RESPONSE PLAN

This site safety, health, and emergency response plan (SSHERP) was developed for implementation of health and safety protocols and practices during EBS Phase II field activities at NAWCAD-Trenton. The investigation will be conducted under the Base Realignment and Closure (BRAC) multi-year Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract (Contract No. N62472-92-D-1296). This SSHERP is a "stand alone" document which meets Occupational Safety and Health Administration (OSHA) requirements for site workers.

1. SITE INFORMATION

Site: Naval Air Warfare Center, Aircraft Division
Location: Trenton, New Jersey
Scheduled dates: Summer-Fall 1996

2. SCOPE AND APPLICABILITY OF THE SSHERP

This SSHERP addresses site-specific safety and health protocols associated with the 35 EBS Phase II Areas of Concern (AOCs) which are scheduled for potential field sampling. It has been prepared in accordance with the following regulations and guidelines:

- OSHA Construction Standards, 29 CFR 1926 including 29 CFR 1926.65, "Hazardous Waste Operations and Emergency Response."
- OSHA General Industry Standards 29 CFR 1910, including 29 CFR 1910.1030 "Occupational Exposure to Bloodborne Pathogens."
- Northern Division Naval Facilities Engineering Command Statement of Work (SOW) for implementing the CTO.
- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985.
- *Federal Acquisition Regulation (F.A.R.)*, Clause 52.236-13: Accident Prevention.
- *Safety and Health Management Plan for BRAC CLEAN Contract No. N62472-92-D-1296*, May 1994.

The scope of this SSHERP includes, but is not limited to, safety and health hazards anticipated from the past or current activities during field procedures, such as the following:

- Collection of soil and sediment samples
- Ground-water sampling
- Monitoring well installation

- Direct-Push borings
- Soil vapor surveys
- Topographic surveying

Prior to commencement of field activities, site workers will be briefed on all emergency procedures and potential hazards of site operations. These briefings will include a minimum of the following information:

- Disclosure of potential hazards
- Procedures for clearances/restricted areas
- Emergency response
- Vehicle rules/requirements
- Equipment to be used
- Restrictions on handling of materials encountered in work areas
- Rules for transporting/storing hazardous materials
- Personal Protective Equipment (PPE)
- Applicable operating procedures that may affect tasks

Site personnel, including contractors, subcontractors, and visitors, are required to read and attest to their knowledge of, and willingness to comply with, all aspects and provisions of this SSHERP by signing the agreement in Attachment A.

3. PERSONNEL

3.1 KEY PERSONNEL

CTO Manager:	Steven Feldmann
Site Manager:	Ron Harwood
Site Safety and Health Officer (SSHO):	Steven Feldmann
Field Personnel:	To be determined
EA Subcontractor:	Driller: To be determined Surveyor: To be determined Direct-Push (DP) Contractor: Environmental Field Service, Inc.

3.2 RESPONSIBILITIES

The responsibilities for safety and health-related issues for Project operations are as follows.

3.2.1 CTO Manager

The responsibilities of the CTO Manager include:

- Assuring compliance with the Program Safety and Health Management Plan (S&HMP) and this SSHERP.
- Coordinating with the designated Navy Technical Representative (NTR).
- Providing overall supervisory control for safety and health protocols in effect for the project.
- Assigning the Site Manager and SSFO and assuring that the assigned on-site staff will enforce provisions of the approved SSHERP.
- Submitting a letter to the Navy's Contracting Officer's Technical Representative (COTR) prior to initiating field work certifying that employees, including subcontractors and consultants, who will work on-site and who may be exposed to hazardous wastes, have completed training and are currently participating in a medical surveillance program in accordance with OSHA 1926.65, the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Activities" and the NEESA "Safety and Health Guidelines for Navy Assessment and Control of Installation Pollutants (NACIP) Confirmation Studies."
- Assuring adequate resources are available for safety and health.
- Preparing and submitting project reports.

3.2.2 Site Manager

The Site Manager's responsibilities include:

- Day to day coordination of the field efforts.
- Oversight of subcontractors and completion of field efforts.
- Management of all field activities.
- Management of project field team toward project accomplishments.

The Site Manager during any emergency will be responsible for initiating and coordinating responses. The Site Manager will:

- Work with the SSHO to identify and evaluate hazards.
- Be responsible for initiating the evacuation of the work site when needed, communicating with off-site emergency responders, and coordinating activities of on-site and off-site emergency responders.
- Determine if the abatement of hazardous conditions is sufficient prior to allowing resumption of work operations after an emergency.

3.2.3 Site Safety and Health Officer

The Site Safety and Health Officer's (SSHO) duties include:

The SSHO will be responsible for daily compliance with site safety and health requirements. The SSHO's responsibilities include:

- Conducting daily inspections of the site.
- Stopping work when imminent safety or health risks exist or as outlined in the site specific SSHERP.
- Implementing usage of forms in Appendices.
- Implementing the SSHERP.
- Providing an initial safety and health briefing to site workers and visitors and providing weekly safety and health meetings during the project performance.
- Reviewing training and medical records prior to site work.
- Evaluating reported hazardous conditions and recommending corrective action.
- Conducting necessary monitoring.
- Establishing and ensuring compliance with site control areas and procedures.
- Supervising decontamination to ensure decontamination of personnel, tools, and equipment.
- Supervising the distribution, use, maintenance, and disposal of personal protective clothing and equipment.

- Investigating and preparing incident reports as necessary.
- Ensuring that a qualified individual is designated to serve as an alternate SSHO, when the assigned SSHO can not be on-site during field activities.

3.2.4 Field Personnel

Employees (including subcontractor and consultant employees) will be responsible for:

- Following the site specific SSHERP and applicable safety and health rules, regulations, and procedures.
- Using required controls and safety devices, including personal protective equipment.
- Notifying his/her supervisor of suspected safety or health hazards.
- Complying with training and medical requirements.

3.3 VISITORS

Visitors will remain in an observation area and will not be permitted to enter an exclusion zone unless they have complied with the appropriate OSHA training and medical requirements and have the permission of the Site Manager and the SSHO.

4. SITE DESCRIPTION

4.1 GENERAL DESCRIPTION

NAWCAD-Trenton is located in Ewing Township in the west-central portion of Mercer County, New Jersey (Figure 4-1). The Activity is situated approximately 5 miles northeast of Philadelphia, PA. The Activity consists of three noncontiguous parcels: the main site (approximately 66 acres), a pumping station on the Delaware River, and an electrical substation (Figure 4-2). The Activity can be found on the USGS Pennington and Trenton West 7.5-minute topographic map. The Delaware River is located approximately 2 miles to the south and west of the Activity.

Under the Navy's program for base closure, 14 AOCs were identified during a Phase I survey and were outlined in the Draft Community Environmental Response Facilitation Act (CERFA) report. An additional 59 AOCs (73 total) were identified during the site reconnaissance conducted by EA personnel in April and May 1995. Each AOC was further evaluated and screened to identify those AOCs requiring further investigation. Descriptions of the AOCs and the screening justifications are presented in the Final EBS Area of Concern Screening Matrix, NAWCAD, Trenton, New Jersey (EA, 1996). The screening matrix identified 35 AOCs requiring further sampling. Sampling procedures are discussed in the EBS Phase II Work Plan. This SSHERP was developed in conjunction with the Work Plan to identify the potential hazards for the AOCs and

to present the site-specific safety, health, and emergency response procedures to be followed during the investigations.

4.2 AOC DESCRIPTIONS

Areas to be investigated include 35 AOCs identified for Confirmatory (18 AOCs) and Full (15 AOCs) sampling and 2 AOCs that require sampling for Closure/Housekeeping (total of 35 AOCs). The AOCs under review are located in six zones within the Activity. These AOCs consist of buildings, structures, and land areas which have served a variety of purposes. These include, but are not limited to hazardous substance and petroleum product storage areas, maintenance areas, testing laboratories, boiler rooms, and hazardous waste storage areas.

5. HAZARD ANALYSIS

5.1 HAZARD COMMUNICATION

The SSHO will conduct regularly scheduled safety meetings with all site workers to discuss the planned activities, since these activities and workers may change over the duration of the project.

A Material Safety Data Sheet (MSDS) for each chemical brought on-site during field activities will be kept on-site by the SSHO. Field personnel shall be informed of the location of MSDSs. Subcontractors must inform the Field Manager and SSHO about any hazardous substances brought on-site and provide appropriate MSDSs to the SSHO. Also, any chemicals brought on-site must be labeled in accordance with OSHA Hazard Communication Requirements, 29 CFR 1926.59.

Potential chemicals to be supplied by primary field investigation team:

- Benzene, toluene, ethylbenzene, and xylene gas chromatograph (GC) standards; methane calibration gas; isobutylene calibration gas; methanol; and nitric acid preservative

Potential chemicals to be supplied by subcontracting drilling company:

- Portland cement, sodium bentonite, and No. 2 quartz silica sand

5.2 CHEMICAL HAZARDS

Limited analytical data has been collected at the EBS Phase II AOCs. Assumptions about potential chemical constituents were made by reviewing past activities conducted at the individual AOCs. Table 5-1 presents a list of potential constituents of concern at areas of concern. Table 5-2 presents the exposure limits, routes of exposure, and symptoms of exposure for the chemicals suspected to be present.

Petroleum distillates, solvents, and their constituents detected in past investigations and in various literature suggest that the primary chemicals of concern at NAWCAD-Trenton are volatile

organic compounds (VOC) and semivolatile organic compounds (SVOC), including polynuclear aromatic hydrocarbons (PAH). These chemicals are potentially present at most AOCs and in all environmental media.

Secondary chemicals of concern are anticipated to be heavy metals, primarily mercury. Metals are suspected only at those sites that have previously been known to store metallic compounds and paint, and also those locations where coal/coal ash may have been stored/disposed.

Dermal contact with these chemical hazards is likely at all sites. Many hazardous chemicals, such as solvents and petroleum products, are readily absorbed through the skin. Therefore, dermal protection must be worn at all times when handling or contacting environmental media.

Inhalation of organic vapors may result from disturbing soil while performing soil borings and soil sampling, and may also occur during ground-water sampling. Proper respiratory protection must be worn when levels of organic vapors in the breathing zone exceed the action levels specified in Chapter 9 of this SSHERP.

5.3 PHYSICAL AND BIOLOGICAL HAZARDS

Many physical hazards will potentially be present at the review items during EBS Phase II field activities. These physical hazards may include, but may not be limited to:

- General safety hazards
- Fire/explosion hazards
- Poisonous insects and plants
- Heavy equipment hazards
- Vehicle and pedestrian hazards
- Noise hazards
- Electrical hazards
- Utilities
- Weather hazards
- Heat/cold stress

Sites will be visually inspected for the presence of general safety hazards (e.g., trip/slip hazards, unstable surfaces or steep grades, sharp objects) prior to beginning work. If any hazards are present, these hazards will be recorded and precautionary measures will be taken to prevent injury. During intrusive activities, site workers will also avoid materials which could potentially contain asbestos (i.e., ceiling tile, floor tile, pipe insulation, etc.). Physical Hazard Identification sheets are also provided in Attachment B.

5.3.1 Fire/Explosion Hazards

The potential for fire and/or explosion emergencies is always present. Workers must continuously monitor the work area for combustible or explosive gases when operations have the potential to generate sparks. Employees should always be alert for unexpected events, such as ignition of

chemicals or sudden release of materials under pressure, and prepared to act in these emergencies.

All field vehicles will be equipped with a fire extinguisher. Employees must be trained in the proper use of fire suppression equipment. However, large fires that cannot be controlled with fire extinguishers should be handled by professionals. The fire department should be notified in these instances.

5.3.2 Biological Hazards

Poisonous Plants

Poisonous plants, such as poison ivy, may be present at the AOCs. Personnel should know how to recognize these plants and avoid them. If contact occurs, the affected areas must be washed with soap and water immediately.

Insect Bites/Stings

Protective outer clothing such as gloves, hard hats, and coveralls can reduce the potential for insect bites and stings. Insect bite symptoms may include redness, rash, swelling, chills, fever, diarrhea, and vomiting. Any worker who has been bitten or stung and shows symptoms of a severe reaction should seek medical assistance immediately. Workers who know of their allergies to insects should advise their employer and the SSHO prior to field activities and should carry an antidote kit, if necessary.

To prevent contact with disease-carrying ticks, workers should wear long-sleeved shirts, long pants, and boots that extend above the ankle with socks pulled over pants cuffs. Workers should thoroughly check clothing, skin, and hair for the presence of ticks at the end of each work day. If a tick attaches to the body, it should be removed by gently tugging with tweezers where the mouth parts enter the skin. The tick should not be killed prior to removal.

5.3.3 Heavy Equipment Hazards

The use of heavy equipment (e.g., drill rigs, generators, compressors, etc.) may pose safety hazards to site workers. Heavy equipment work must be conducted only by trained, experienced personnel. If possible, personnel must remain outside the turning radius of large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator. No guards, safety appliances, or other devices may be removed or made ineffective unless repairs or maintenance are required, and then only after power has been shut off and locked out. Safety devices must be replaced once repair or maintenance is complete. Exhaust from equipment must be directed so that it does not endanger workers or obstruct the view of the operator. When not operational, equipment must be set and locked so that it cannot be activated, released, dropped, etc.

5.3.4 Vehicle and Pedestrian Hazards

Vehicle traffic or pedestrians, particularly in busy areas, may be susceptible to site hazards or may present a hazard to site workers. Equipment must be located in an area that does not present a hazard to bystanders. Barriers must be used to separate the work areas from both vehicular and pedestrian traffic areas and to prevent inadvertent entry into the work area. When possible, work in high traffic areas will be performed when traffic is minimal. Safety cones (with a minimum height of 28 in.) shall be placed around the work area to create a buffer zone. Workers should wear safety vests or reflective material to enhance visibility in these areas. The buffer zone shall be maintained even when work is not being performed in the area to prevent unauthorized access and to make the work site visible.

5.3.5 Noise Hazards

Work around large equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; can cause physical damage to the ear, pain, and temporary and/or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hr time-weighted average sound level of 85 dBA (decibels on the A-weighted scale), hearing protection shall be selected with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and reduce noise levels to or below the permissible values. In the absence of instrumentation, an appropriate rule of thumb is that when normal conversation is difficult at a distance of two to three feet, hearing protection is required. Field personnel shall have hearing protection on site at all times

5.3.6 Electrical Hazards

Overhead power lines, electrical wiring, electrical equipment, and buried cables pose risks to workers of electric shock, burns, muscle twitches, heart fibrillation, and other physical injuries, as well as fire and explosion hazards. Workers will take appropriate protective measures when working near live electrical parts, including inspection of work area to identify potential spark sources, maintenance of a safe distance, proper illumination of work areas, provision of barriers to prevent inadvertent contact, use of nonconductive equipment. If overhead lines cannot be deenergized prior to the start of work, a 10-ft distance must be maintained between overhead energized power lines with a voltage of 50 kV and elevated equipment parts. This distance shall be increased 4 in. for every 10 kV greater than 50 kV. For example, workers must maintain a distance of 11.6 ft from energized power lines with a voltage of 100 kV.

5.3.7 Utilities

Underground utilities pose hazards to workers involved in drilling, SVCA, and other invasive operations. These hazards include electrical hazards, explosion, and asphyxiation, as well as costly and annoying hazards associated with damaging communication, sewer, and water lines. Prior to commencement of invasive operations, underground utilities, including buried wires, pipes, tanks, etc., must be visibly marked with flags or marking paint to alert workers of areas unsafe for digging/excavating. The Activity will provide utility clearance at the AOCs prior to the

start of intrusive field work. Personnel must be aware that although an area may be cleared, it does not mean that unanticipated hazards will not appear.

Workers should always be alert for unanticipated events such as snapping cables, drilling into unmarked underground utilities, drilling into a heavily contaminated zone, etc. Such occurrences should prompt involved individuals to halt work immediately and take appropriate corrective measures to gain control of the situation.

5.3.8 Weather Hazards

Weather conditions should always be taken into consideration. Heavy rains or snowfall, electrical storms, high winds, and extreme temperatures, for example, may create extremely dangerous situations for employees. Equipment performance may also be impaired because of inclement weather. Whenever unfavorable conditions arise, the Site Manager and SSHO will evaluate both the safety hazards and ability of the employees to effectively perform given tasks under such conditions. Activities will be halted at their discretion.

Wind direction should be accounted for when positioning equipment at sampling locations. If exposure to organic vapors is anticipated, workers should locate upwind of sampling point. Wind direction often changes abruptly and without warning, so personnel should always be prepared to reposition, if necessary.

5.3.9 Heat/Cold Stress

5.3.9.1 Heat Stress

Illness resulting from exposure to extreme heat is possible during field operations. All personnel, especially those in the exclusion zone, should be familiar with the signs and symptoms of heat stress, including:

- Heat exhaustion—dizziness, light-headedness, slurred speech, rapid pulse, confusion, fainting, fatigue, copious perspiration, cool skin that is sometimes pale and clammy, and nausea.
- Heat stroke—hot, dry, flushed skin, delirium, and coma (in some cases). Heat stroke is a life-threatening event and requires immediate medical attention.

Some preventive measures to avoid heat stress include:

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

Heat stress monitoring will be conducted in a manner that anticipates and prevents the onset of heat stress symptoms [e.g., wet-bulb globe temperature monitoring (WBGT) coupled with OSHA work-rest regimens]. If the WBGT Index is used and semi-impermeable or impermeable clothing is worn, the WBGT Index will be lowered, as appropriate. Unacclimatized workers and workers wearing full body chemical protective clothing shall be monitored when the work area temperature is greater than 70°F, and the work period length will be decreased, if required. When required, the work period should be decreased so that after 1 minute of rest, a worker's heart rate (HR) does not exceed 110 beats per minute. A suggested work-rest regimen is:

Ambient Temperature	Work	Rest
70°F	3 hours	15 min.
75°F	2-1/2 hours	15 min.
80°F	2 hours	15 min.
85°F	1-1/2 hours	15 min.
90°F	1 hour	15 min.

If a worker's HR is greater than 100 beats per minute, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the HR is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent. When ambient temperatures are expected to exceed 75°F, resting HRs of each worker should be measured prior to start of on-site activities.

Other factors, such as a worker's acclimatization, level of physical fitness, and age, may increase or decrease his susceptibility to heat stress. Before assigning a task to an individual worker, all of these factors should be taken into account to ensure that the task will not endanger the worker's health.

If heat stress is suspected or observed, the affected person must be moved to a cool or shaded area and given plenty of liquids to consume. If symptoms of heat stroke are observed, the victim will be transported to the hospital immediately.

5.3.9.2 Cold Stress

Cold stress hazards are most likely to occur at low temperatures or low wind chill factors, with wet, windy conditions also contributing to risks. Workers should be familiar with the signs and symptoms of cold stress, including hypothermia and frostbite. Hypothermia is a cold-induced decreasing of the core body temperature that produces shivering, numbness, drowsiness, and muscular weakness. Frostbite is a constriction of blood vessels in the extremities, which limits the supply of warming blood. Symptoms of frostbite are white or grayish skin, blisters, numbness, mental confusion, failing eyesight, fainting, shock, and cessation of breathing. As a precautionary measure, all employees should wear insulated coveralls, heat covering, and boots when temperatures fall below 40°F, including wind chill. Bare skin contact with cold surfaces (below 20°F) must be avoided. Table 5-3 presents the cooling power of wind on exposed flesh expressed as equivalent temperature.

A temperature-dependent work regimen limiting lengthy periods of outdoor activity may be necessary. Table 5-4 gives the threshold limit values work/warm-up schedule for a 4-hr shift. Workers entering heated shelters should remove the outer layer of clothing and loosen remaining clothing to permit sweat evaporation. Dehydration must be avoided by drinking warm drinks or soups.

6. EMPLOYEE TRAINING

A record of current training for site workers will be recorded on the form in Attachment C. Personnel who do not meet the following training requirements are prohibited from engaging in hazardous waste site operations within the exclusion zone:

All Hazardous Waste Site Workers:

- Forty (40) hours of Initial Off-site Hazardous Waste Operations Training (in accordance with 29 CFR 1910.120) and 3 days on-site training under the direct supervision of a more experienced site worker.
- If more than 12 months have passed since initial training, an 8-hour Annual Refresher Training must have been completed within the last twelve months (as per 29 CFR 1910.120).

Site Manager: In addition to the above requirements for site workers, the site manager must have completed the one-time 8-hr Supervisor's Hazardous Waste Operations Training (as per 29 CFR 1910.120).

First Aid/CPR: At least two on-site workers must be currently certified in both first aid and CPR and have received bloodborne pathogen training by the American Red Cross or equivalent organization. First aid training must be updated every three years; CPR training must be updated annually.

Subcontractors: Prior to project start-up, the CTO Manager must obtain a written list of subcontractor personnel to be present on-site and written certification that the workers meet the training requirements summarized above. A record of their training shall be included in Attachment C.

Visitors: Authorized visitors will not be permitted to enter areas where they may be exposed to hazardous substances if they do not meet the training requirements summarized above.

Pre-entry Briefing: As discussed in Section 2, the SSHO must brief workers and visitors on the potential hazards of the site and the protective measures to be implemented. Site-specific training will include: site monitoring equipment, emergency procedures, areas of restricted access, methods of decontamination, responsibilities for safety of personnel and property, and material safety data sheets.

7. MEDICAL SURVEILLANCE

A record of current medical examination records for site workers will be included in Attachment C. Medical examinations and consultations will comply with the protocols of 29 CFR 1926.65 and will be provided according to the following schedule:

- Prior to field work assignment.
- Annually or biennially for all employees covered by the program.
- At termination of employment or reassignment to an area where the employee had not been examined within the past 6 months.
- As soon as possible after the development of signs or symptoms that may indicate an overexposure to hazardous substances or health hazards.
- More frequently if the physician deems such examination necessary to maintain employee health.

The records shall be complete and accurate and be kept on file for at least 30 years after termination of employment. A minimum of the following information shall be kept:

- Name and social security number.
- Physicians written opinions, recommendations, limitations, and test results.
- Employee medical complaints related to hazardous waste operations.
- Information provided to the physician by the employee concerning possible exposures, accidents, etc.

Subcontractors must provide medical surveillance information in writing to the CTO Manager for their workers prior to mobilization on-site.

8. PERSONAL PROTECTIVE EQUIPMENT

8.1 GENERAL PPE REQUIREMENTS

Personnel shall be equipped with proper PPE for the tasks they are asked to perform. The SSHO will distribute PPE to EA employees and will also train employees in proper use and disposal of PPE. Subcontractors are responsible for providing proper PPE for their own employees.

Respiratory fit-tests will be performed as necessary. Adequate records of results, including size and brand of respirators in which employees passed fit-test requirements, will be kept. The date

of latest fit-testing shall be documented in Attachment C. At a minimum, this should be performed within 1 year prior to start of operations requiring respiratory protection.

Should any PPE fail during use, the affected person must leave the exclusion zone immediately and replace or repair all failed PPE. This person is not permitted to re-enter the exclusion zone until the problem has been rectified.

8.2 LEVELS OF PPE

Engineering controls and work practices will be used where feasible to minimize potential hazards. The components of each level of PPE that may potentially be donned during EBS Phase II field activities are listed below.

8.2.1 Level D PPE

Level D protection will be the minimum protection used for field operations. The following are the minimum requirements for Level D:

- Steel-toe, steel-shank safety shoes/boots.
- Boot covers (optional).
- Hard hat that meets ANSI Standard Z89.1-1986.
- Chemical-resistant gloves when contact with potentially contaminated soil or water is expected.
- Leather work gloves (as appropriate).
- Safety glasses (as appropriate).
- Hearing protectors (when noise hazards are present or as required by SSHO).
- Face shield (when operating steam cleaner).
- Coveralls (as appropriate).
- Poly-coated coveralls (when splash hazards are present or contact with heavily contaminated soil/water is expected).

8.2.2 Level C PPE

Level C protection will be used when the concentrations and types of airborne substances are known and criteria for the use of air-purifying respirators are met. The following are the minimum requirements for Level C:

- Full-facepiece, air-purifying respirator equipped with combination organic vapor and high efficiency particulate cartridges.
- Steel-toe, steel-shank safety shoes/boots.
- Chemical-resistant boot covers.
- Hard hat that meets ANSI Standard Z89.1-1986.
- Chemical-resistant inner and outer gloves.
- Chemical-resistant coveralls.
- Hearing protectors (when noise hazards are present, or as required by SSHO).

8.2.3 Level B PPE

Level B protection will be used when the highest level of respiratory protection is required. The following are the minimum requirements for Level B:

- Positive-pressure, supplied air breathing apparatus with full-facepiece mask and 5-minute escape bottle.
- Steel-toe, steel-shank safety shoes/boots.
- Chemical-resistant boot covers.
- Hard hat (when overhead hazards are present, or as required by SSHO) that meets ANSI Standard Z89.1-1986.
- Chemical-resistant inner and outer gloves.
- Chemical-resistant coveralls.
- Hearing protectors (when noise hazards are present, or as required by SSHO).

8.3 INITIAL REQUIREMENTS/UPGRADE OR DOWNGRADE OF PPE LEVELS

Based on evaluation of the potential safety and health hazards, the required initial levels of personal protective equipment will be Level D.

During field operations, the SSHO will evaluate environmental monitoring results and potential for exposure to hazards. Only the SSHO can authorize an upgrade or downgrade of the PPE level worn on-site, using only the criteria presented in Section 9.1. Changes in PPE level,

including the rationale for the changes, will be documented on the environmental monitoring record (Attachment D).

8.4 HEARING PROTECTION

Hearing protection must be available and must be worn whenever noise levels exceed 85 dBA. When the SSHO determines that a potential excessive noise exposure exists, hearing protection will be required. Muffs and foam ear plugs will be available for hearing protection. The hearing protection that best suits the workers' needs without restricting or impairing their abilities should be chosen.

9. ENVIRONMENTAL MONITORING

9.1 ENVIRONMENTAL MONITORING AND ACTION LEVELS

Task-specific environmental monitoring requirements are summarized in Table 9-1, including the type of monitoring to be performed, the frequency and location of monitoring, action levels, and required responses if action levels are detected. Site workers will be responsible for monitoring environmental conditions. All field personnel responsible for monitoring should become familiar with the use, calibration, and regular maintenance of monitoring instruments.

Initial and detectable measurements will be logged on the Environmental Monitoring Record in Attachment D. Action levels that are exceeded will also be documented on Attachment D, along with the corrective action taken. If no detectable levels are measured, this will be documented on Attachment D at least once every 30 minutes.

9.2 CALIBRATION AND MAINTENANCE OF MONITORING EQUIPMENT

Monitoring instruments require frequent charging and routine cleaning to ensure that they will function properly when needed. The SSHO will be in charge of training personnel in proper use and care of all monitoring equipment.

All monitoring equipment must be calibrated at least twice throughout the work day: once before using (e.g., in the morning) and at least one other time (e.g., after lunch). A calibration log should be kept for each instrument. This log should also contain detailed descriptions of any problems encountered with the instrument, along with any records of factory calibration and repair. Procedures for calibrating specific instruments are outlined in Attachment E.

10. SITE CONTROL

10.1 WORK ZONES

Work zones will be divided into three different areas: the exclusion zone, contamination-reduction zone, and the support zone. The detailed descriptions of each are as follows:

Exclusion Zone: within 25 ft of drilling locations. The need for exclusion zones at other sampling locations will be determined by the SSHO after evaluating potential for exposure to hazardous substances and presence of potential safety hazards. This zone will be clearly delineated with caution tape and stakes to prohibit unauthorized access from untrained personnel or base/civilian personnel. This area has the highest potential for exposure to hazardous chemicals. Therefore, proper PPE must be worn in this area.

Contamination-Reduction Zone: This point will be the one accessible point to the exclusion zone. Decontamination of personnel, equipment, etc. will be performed in this location. Personnel in this area will be required to wear PPE which is one level less than that worn in the exclusion zone. They should also be prepared to enter the exclusion zone in case of emergency situations.

Support Zone: All other locations, such as vehicles and trailers.

Only authorized personnel will be permitted in the Exclusion and Contamination Reduction zones. Entering these zones will require donning the required PPE prior to entry. A site entry and exit log will be maintained (Attachment F). While in the exclusion zone and contamination-reduction zone, personnel are prohibited from engaging in the following activities:

- Eating, drinking, smoking, chewing gum, chewing tobacco, etc.
- Working before or after daylight hours without special permission.
- Wearing contact lenses.

Some safe work practices to follow include:

- Using the "buddy system": at least two people should be in the exclusion zone and contamination-reduction zone at all times.
- Dust suppression, such as wetting soil, should be considered if visible dust is being generated at or near work areas.
- Facial hair that interferes with a tight face seal must be removed if work requires donning of respiratory equipment.
- Hands and face must be thoroughly washed upon leaving the work area.

11. DECONTAMINATION PROCEDURES

Anything which enters an Exclusion Zone (i.e., personnel, drill rigs, monitoring equipment, field sample collection equipment, etc.) must be decontaminated prior to exit. Decontamination will be supervised by the SSHO.

11.1 PERSONNEL DECONTAMINATION

Remove and discard boot covers, if worn. Wash boots with detergent and water; rinse. Wash outer gloves, if worn, with detergent and water, rinse, and remove. Remove coveralls; discard if disposable, or place into plastic bag. Remove respirator, if worn. Remove and discard inner gloves. Wash hands, face, and other exposed skin with soap and water. Shower and shampoo as soon as possible at the end of the work day. Launder non-disposable clothing prior to reuse, separately from other laundry items.

11.2 EQUIPMENT DECONTAMINATION

Wet-wipe coolers and instruments used on-site with clean water prior to leaving the site. Wet-wipe respirator exteriors whenever exiting work areas. Clean respirators with a manufacturer-recommended sanitizer, then hang to drip dry, and place in plastic bags for protection against dust. Change respirator cartridges at least daily, when breakthrough occurs, or when breathing resistance becomes high, whichever occurs first. Damage used cartridges to prevent accidental reuse. Decontamination of field equipment (e.g., drill rigs, sampling gear) is discussed in Chapter 6 of the QAPjP prepared for this investigation.

11.3 WASTE DISPOSAL

Waste solids generated during work activities (including disposable gloves, respirator cartridges) will be double bagged, labeled, and properly disposed according to the procedures outlined in Chapter 7 of the QAPjP. Liquids from decontamination procedures will be initially contained in 55-gallon drums at the time of generation. The drums will be labeled and stored in a location designated by NAWCAD-Trenton personnel.

12. EMERGENCY RESPONSE PLAN

12.1 EMERGENCY RECOGNITION

Prior to work start-up, personnel must become familiar with this emergency response plan. The Site Manager and/or the SSHO must make this plan available for review and photocopying. Employees should also become familiar with the location of telephones, emergency medical facilities, and water supplies near work areas. Regular rehearsals of emergency response procedures are highly recommended.

In emergency situations, involved personnel must stop work immediately, evacuate the exclusion zone, and report to the SSHO and Site Manager for further assistance and instructions. Emergency situations will be handled by off-site support personnel; however, initial response and first aid will be available by qualified on-site personnel.

The following should be considered emergency situations:

- Medical emergency.

- Heavy equipment accident.
- Any chemical release or spill
- Overexposure of personnel to on-site contaminants.
- Cold-related injury/hypothermia.
- Heat-related illness.
- Discovery of unanticipated hazard (e.g., drums, underground utilities, heavily contaminated materials).
- Fire or explosion

In case of a hazardous materials emergency, the Site Manager, SSHO or senior on-site supervisor will assume full control of the situation until the arrival of emergency responders. The Site Manager or SSHO will work with emergency response teams to identify and evaluate hazards. Emergency responses and communications will be coordinated and controlled through the on-site Incident Commander, who will be designated by the emergency responders.

12.2 PROCEDURES FOR HANDLING EMERGENCIES

In the event of an emergency, the information available at the time must be properly evaluated and the appropriate steps taken to implement the emergency response plan. The Site Manager (or SSHO) will assume command of the situation and will call the appropriate emergency services, evacuate personnel as needed, and take other steps needed to gain control of the emergency.

The following information will be given when reporting an emergency:

1. Name and location of person reporting.
2. Location of accident/incident.
3. Name and affiliation of injured party.
4. Description of injuries, fire, spill, or explosion.
5. Status of medical aid and/or other emergency control efforts.
6. Details of chemicals involved.
7. Summary of accident, including suspected cause and time it occurred.
8. Temporary control measures taken to minimize further risk.

This information should only be disclosed to the Site Manager, SSHO, and proper authorities. Once emergency response agencies have been notified, the CTO Manager, Program Manager, and Contracting Officer's Technical Representative (COTR) must be notified immediately.

12.3 MEDICAL EMERGENCIES

Personnel should always be alert for signs and symptoms of illnesses related to chemical, physical, and disease factors on-site. Severe injuries resulting from accidents and chemical overexposures must be recognized as emergencies and treated as such. At least two personnel currently trained in first aid (including bloodborne pathogen training) and CPR must be present on-site.

If a medical emergency occurs, the Site Manager or SSHO must sound the emergency alarm (e.g., air horn blast), upon which all work must stop and personnel must move to the decontamination area. Personnel with current first aid training must evaluate the injury or illness and determine its severity. Victims must be decontaminated prior to administering first aid (as long as this can be done without further injuring the victim). First aid should only be performed to limit further injury or stabilize the victim. Personnel are not to move or transport victims unless not doing so poses an immediate threat to their life, or if timely response of emergency medical services is impossible due to the remoteness of the site.

First aid equipment will be available at the following locations:

- First aid kit: One per field vehicle and contamination-reduction zone
- Fire extinguisher: One per field vehicle and contamination-reduction zone
- Eye wash bottles: Contamination-reduction zone
- Emergency alarm: Contamination-reduction zone

The Site Manager or SSHO must complete an Accident Investigation Report (Attachment H) and submit it to the CTO Manager and Program Manager. The Program Manager will submit the report to the COTR within 24 hours of the following types of incidents:

- Job-related injuries and illnesses.
- Accidents resulting in significant property damage.
- Accidents involving vehicles and/or vessels.
- Accidents in which there may have been no reportable injury or property damage, but which have a high probability of recurring with at least a moderate risk to personnel or property.
- An accident that results in a fatality or in the hospitalization of three or more employees must be reported within 8 hours to the U.S. Department of Labor

through the EA human resources representative. Subcontractors are responsible for notification of accidents involving their employees.

12.4 FIRE/EXPLOSION EMERGENCIES

Fire and explosion must be immediately recognized as an emergency. Although all vehicles will be equipped with fire extinguishers, only small fires should be suppressed in this manner. In cases of larger fires, personnel should be evacuated to a secure location and the fire department should be notified as soon as possible. Only persons trained in fire suppression/fire control should attempt to handle large fires. The necessary steps should then be taken to prevent or limit injury. The CTO Manager will be notified as soon as possible and, once control of the situation has been regained, will specify proper clean-up activities. All personnel must remain outside of the incident area until the area is deemed safe by the Site Manager and SSHO.

12.5 EMERGENCY TELEPHONE NUMBERS

The following list of emergency telephone numbers will be placed in the glove compartment of all field vehicles. This list is repeated in Table 12-1 to facilitate posting.

NAWCAD-Trenton Emergency

Communication Center:

Extension 5623

***Police:**

911 or (609) 882-1313

***Fire:**

911 or (609) 882-1313

***Ambulance:**

911 or (609) 882-1313

* Police, Fire, and Ambulance can be reached through the Emergency Communication Center.

Hospital (route to hospital is shown in Attachment G):

Mercer Medical Center

(609) 394-4009 (Emer. Room)

446 Bellevue Avenue

Trenton, New Jersey 08618

Northern Division Activity Coordinator:

Steve Hurff

(610) 595-0557, ext. 122

CTO Manager:

Steven Feldmann

(908) 665-2440 (work)

(908) 236-6759 (home)

Site Manager:

Ron Harwood

(908) 665-2440 (work)

(908) 940-9545 (home)

Site Safety & Health Officer:

Steven Feldmann (908) 665-2440 (work)
(908) 236-6759 (home)

Program Safety and Health Officer:

Kris Hoiem, CIH (410) 771-4950 (work)
(410) 357-5485 (home)

Program Manager:

Charles W. Houlik, Ph.D., CPG (410) 771-4950

EA Medical Services:

Division of Environmental Medicine (215) 955-8381
& Toxicology
Jefferson Medical College
Room 314 Jefferson Alumni Hall
1020 Locust Street
Philadelphia, PA 19107-9788

EA Corporate Medical Director:

Dr. Lance Simpson (215) 955-8381

In case of spill:

Steven Feldmann (908) 665-2440

In case of accident or exposure:

Ron Turner, EA Corporate (410) 584-7000
Safety and Health Officer

Poison Control Center:

(800) 822-9761

National Response Center:

(800) 424-8802

U.S. EPA (Region II)

(212) 637-3000

NJDEP

(609) 292-7172

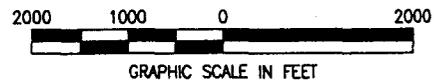
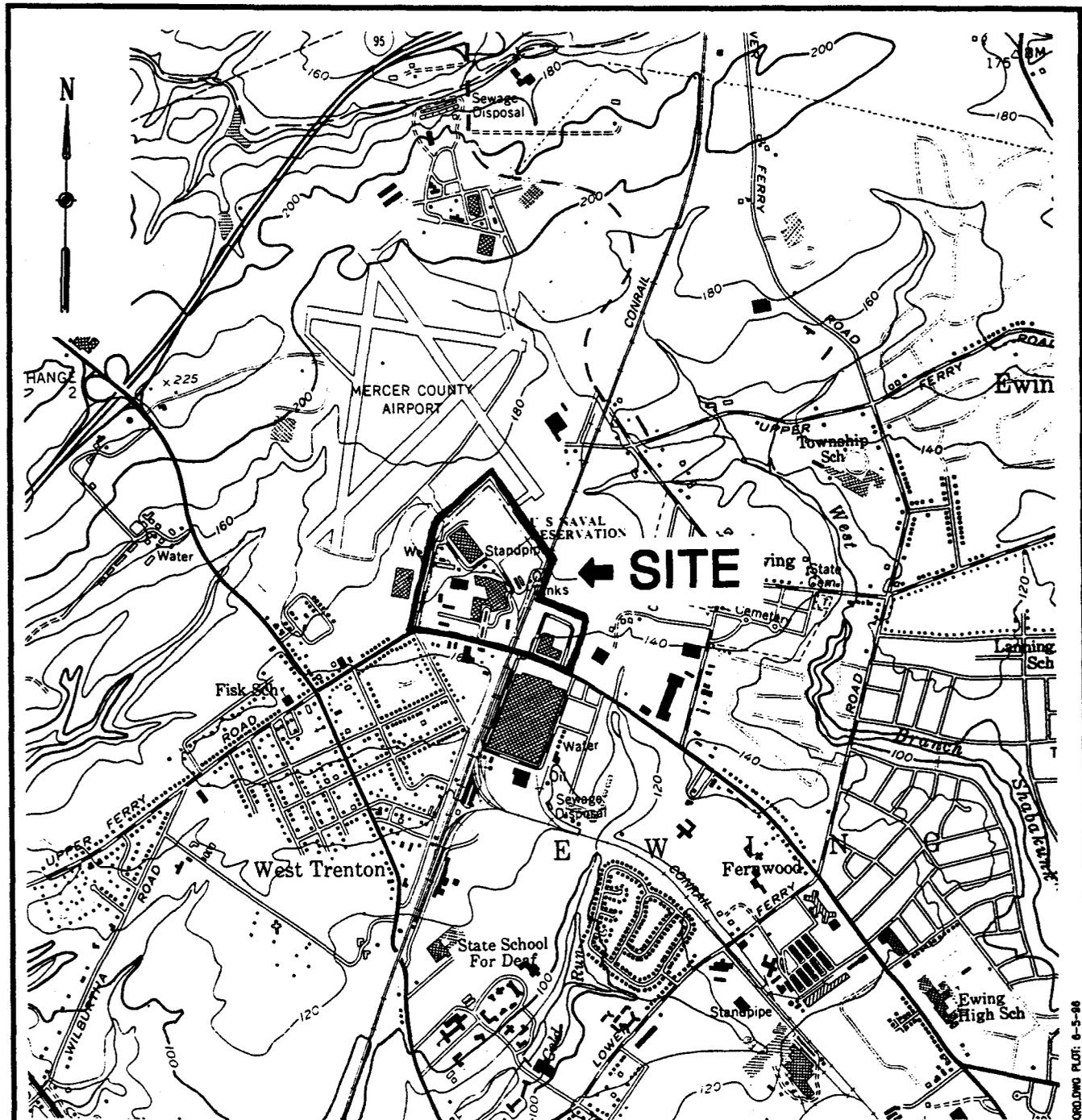
13. CONFINED SPACE ENTRY

No confined space entry will be permitted during EBS Phase II field activities. Should the need arise, an appropriate modification to this SSHERP will be made.

14. SPILL CONTAINMENT PROCEDURES

Small incidental spills which do not cause injury to personnel or the environment should be cleaned as quickly as possible. Any waste shall be disposed of properly and labeled accordingly.

Large spills that may harm personnel or the environment should be dealt with at once. First aid shall be of primary importance. Spill containment procedures should follow, and emergency contacts can then be made. The Site Manager or SSHO will notify the EA Program Manager, the CTO Manager, and the Navy point of contact. Many hazardous chemicals are listed by the EPA as having Reportable Quantities (RQ). Any spill involving any of these chemicals in amounts of the RQ or greater should prompt Navy personnel to report to the appropriate federal, state, and local agencies. Emergency telephone numbers are provided in Section 12 and in Table 12-1.



SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP, QUADRANGLE PENNINGTON & TRENTON WEST, PA-NJ, PHOTOREVISED 1970/1981.



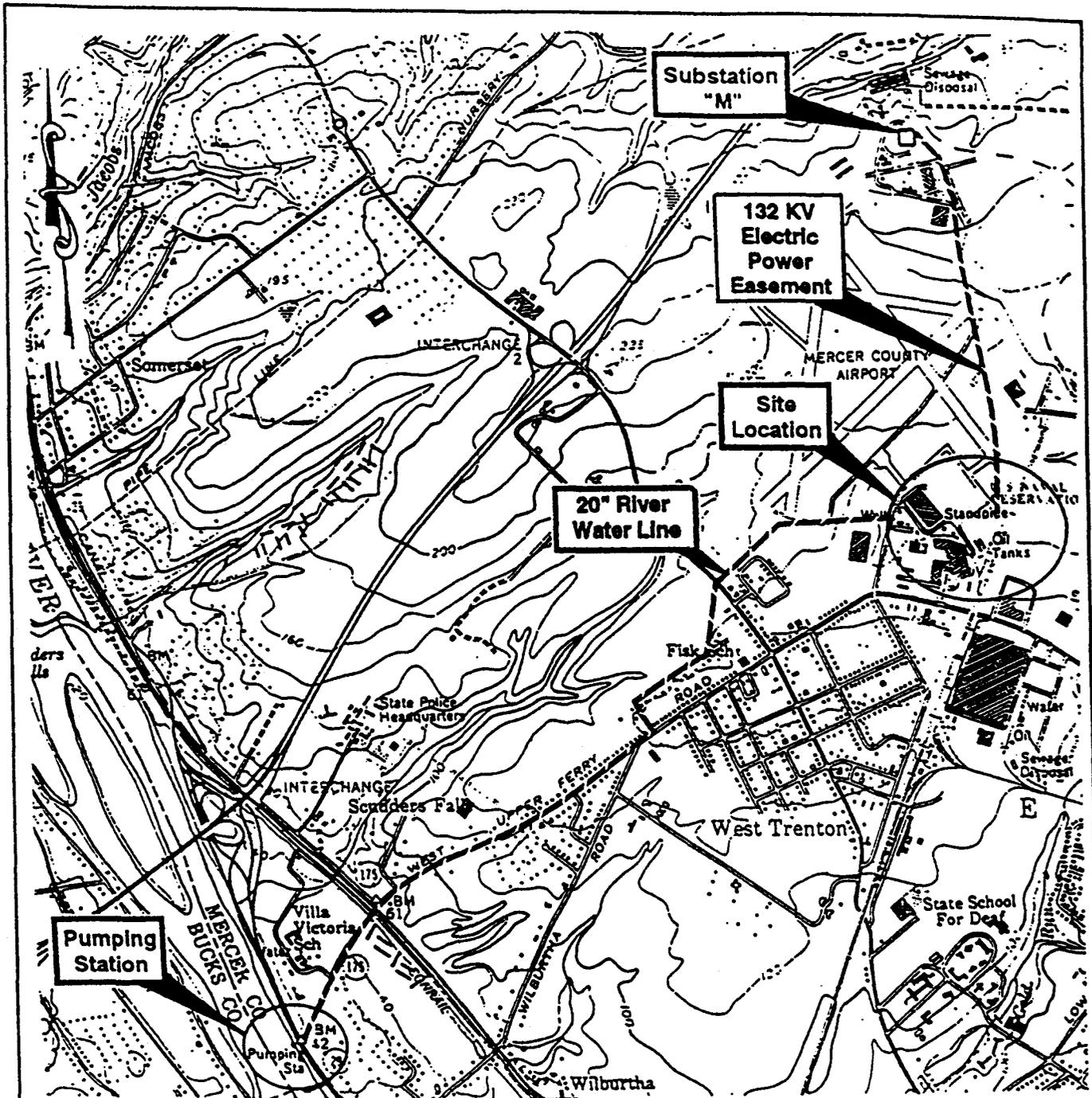
EA ENGINEERING,
SCIENCE, AND
TECHNOLOGY

SITE LOCATION MAP
NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

FIGURE 4-1

PROJECT MGR LF	DESIGNED BY JD	DRAWN BY CC	CHECKED BY SF	SCALE AS SHOWN	DATE 6-5-96	PROJECT NO 29600.43	FIGURE 4-1
-------------------	-------------------	----------------	------------------	-------------------	----------------	------------------------	---------------

FILE: F:\PROJ\29600.43\DWG\ASRD.DWG PLOT: 6-5-96



(Source: USGS 7.5 Minute Series Topographic Map)



EA ENGINEERING,
SCIENCE, AND
TECHNOLOGY, INC.

ACTIVITY SETTINGS
NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

FIGURE 4-2

PROJECT MGR NL	DESIGNED BY VM	DRAWN BY CAC	CHECKED BY JC	SCALE AS SHOWN	DATE 6-1-95	PROJECT NO 29600.48	FIGURE 4-2
-------------------	-------------------	-----------------	------------------	-------------------	----------------	------------------------	---------------

TABLE 5-1 LIST OF POTENTIAL ON-SITE HAZARDOUS SUBSTANCES

PCBs	Aluminum
Pesticides	Antimony
Fuel Oil	Arsenic
Waste Oil	Barium
Aviation Fuel	Beryllium
Ethylene and Propylene Glycol	Cadmium
Acetone	Chromium
Benzene	Cobalt
DEHP	Copper
Ethylbenzene	Iron
Carbon disulfide	Lead
beta-BHC	Magnesium
gamma-BHC	Manganese
1,1-Dichloroethane	Mercury
1,1-Dichloroethene	Nickel
1,2-Dichloroethene	Silver
1,1,1-Trichloroethane	Vanadium
Trichloroethylene	Zinc
Methyl ethyl Ketone	
2-methyl naphthalene	
Toluene	
Vinyl Chloride	
Xylenes	

TABLE 5-2 POSSIBLE HAZARDOUS SUBSTANCES AT PHASE II EBS AOCs

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Volatile Organic Compounds (VOC)				
Acetone	1000 ppm	2,500 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, nose throat; Headache, dizziness; Dermatitis
DEHP	5mg/m ³	Ca 5000 mg/m ³	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, mucous membrane, carcinogen
Beta-BHC				
Gamma-BHC				
Carbon Disulfide	20 ppm	500 ppm	Inhalation, Absorption Ingestion, Skin/Eye Contact	Dizziness, headache; Parkinson-like syndrome; Coronary heart disease; Gastritis; Kidney, liver damage; Eye, skin burns; Dermatitis
1,1-Dichloroethene 1,1-DCE		4000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Eye irritant, Respiratory system, CNS depressant
Methyl naphthalene				
Methyl Ethyl Ketone	200 ppm	3000 ppm	Inhalation, Ingestion, Contact	Irritation of eyes, skin, and nose; headache, dizziness; vomit; dermatitis
Methyl chloroform (1,1,1-TCA)	350 ppm/450 ppm	1000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Headache, lassitude, CNS depressant, irritated eyes
1,1-Dichloroethane (1,1-DCA)	100 ppm	4000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritation of eyes, resp. system, CNS depressant
1,2-Dichloroethylene	200 ppm	1000 ppm	Inhalation, Ingestion, Contact	Irritated eyes, resp. system, CNS depressant
1,1,1-Trichloroethane	350 ppm	700 ppm	Inhalation, Ingestion, Contact	Irritation of eyes and skin; headache; CNS depressant; dermatitis; liver damage

TABLE 5-2 (Continued)

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Volatile Organic Compounds				
Trichloroethylene	100 ppm	Ca 1000 ppm	Inhalation, Absorption, Ingestion, Contact	Irritated eyes, skin; fatigue, tremor, nausea, vomit; cardiac arrhythmia, liver inj.
Vinyl chloride	1 ppm/5 ppm	Ca	Inhalation	Weakness, abdominal pain
Benzene	1 ppm/5 ppm	Ca 3000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, nose, resp. system, nausea, headache, fatigue, dermatitis
Ethylbenzene	100 ppm/125 ppm	2000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, mucous membranes, headache, dermatitis, narcosis, coma
Xylenes, total	100 ppm/150 ppm	1000 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Dizziness, excitement, drowsiness, irritated eyes, nose and throat, nausea, vomiting, abdominal pain, and dermatitis
Toluene <i>Skin</i>	50 ppm	2000 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Fatigue, weakness, confusion, euphoria, dizziness, insomnia, nervousness, muscle fatigue, dermatitis
Semivolatile Organic Compounds (SVOC)				
Semivolatile Organic Compounds (PAH)				
Benzo(b)fluoranthene	-	-	-	Suspected Human Carcinogen
Benzo(a)pyrene	-	-	-	Suspected Human Carcinogen
Chrysene	-	-	-	Suspected Human Carcinogen
Naphthalene	10 ppm/15 ppm	500 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Eye irritation, headache, confusion, vomiting, profuse sweating, abdominal pain

TABLE 5-2 (Continued)

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Polychlorinated Biphenyls (PCB)				
Aroclor 1242	1 mg/m ³	Ca 5 mg/m ³	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, chloracne, dermatitis, liver damage
Aroclor 1254	0.5 mg/m ³	10 mg/m ³	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, acne-form dermatitis, liver damage
Metals				
Arsenic (As)	0.01 mg/m ³	Ca 100 mg/m ³	Inhalation and Ingestion via particulates	Ulceration of nasal septum, dermatitis, gastrointestinal bleeding
Barium (Ba)	0.5 mg/m ³	1100 mg/m ³	Inhalation and Ingestion via particulates	Upper resp. irritation, muscle spasm, slow pulse, irritated eyes, skin
Beryllium (Be)	0.002-0.005 (C) mg/m ³	Ca 10 mg/m ³	Inhalation and Ingestion via particulates	Respiratory irritation, weakness, weight loss, carcinogen
Chromium (Cr), total	0.5 mg/m ³	250 mg/m ³	Inhalation and Ingestion via particulates	Histologic fibrosis of lungs
Copper (Cu)	1.0 mg/m ³	100 mg/m ³	Inhalation and Ingestion via particulates	Irritation of nasal membranes, pharynx, nasal perforation, eye irritation
Lead (Pb)	0.05 mg/m ³	700 mg/m ³	Inhalation and Ingestion via particulates	Lassitude, insomnia, pallor, anoxia, weight loss, constipation, abdominal pain, colic, anemia, wrist paralysis
Nickel (Ni) (insoluble/soluble)	1 mg/m ³ /0.1 mg/m ³	Ca 10 mg/m ³	Inhalation and Ingestion via particulates	Sensitive skin, asthma, nasal cavity irritation, pneumonitis, carcinogen
Mercury (Hg) <i>Skin</i>	0.01-0.03 mg/m ³	10 mg/m ³	Inhalation and Ingestion via particulates	Dizziness, nausea, vomiting, diarrhea, constipation, skin burns, emotional disturbance

TABLE 5-2 (Continued)

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Metals (continued)				
Selenium (Se)	0.2 mg/m ³	-	Inhalation and Ingestion via particulates	Irritation eyes, nose, and throat, headache, chills, dyspnea, bronchitis, metallic taste, garlic breath
Thallium (Tl) <i>Skin</i>	0.1 mg/m ³	20 mg/m ³	Inhalation and Ingestion via particulates	Nausea, diarrhea, abdominal pain, vomiting, tremor, chest pain, pulmonary edema

IDLH Immediately Dangerous to Life and Health
PEL Permissible Exposure Limit
TLV Threshold Limit Value
STEL Short Term Exposure Limit (15 min)
C Ceiling Limit
C₁ Carcinogen
CNS Central Nervous System
Skin Skin Irritant

Reference: NIOSH, *Pocket Guide to Chemical Hazards*, U.S. Department of Health and Human Services, June 1994.

TABLE 5-3 COOLING POWER OF WIND ON EXPOSED FLESH

ESTIMATED WIND SPEED (in mph)	ACTUAL TEMPERATURE READING (°F)												
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60	
	EQUIVALENT CHILL TEMPERATURE (°F)												
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60	
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68	
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95	
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112	
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121	
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133	
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140	
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145	
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148	
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.				
	Trenchfoot and immersion foot may occur at any point on this chart.												

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

TABLE 5-4 THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F(approx.)	Max. Work Period	No. of Breaks								
-26° to -28°	-15° to -19°	(Norm. Breaks) 1		(Norm Breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm. Breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min	4	30 min.	5	Non-emergency work should cease		Non-emergency work should cease			
-40° to -42°	-40° to -44°	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease			
-43° & below	-45° & below	Non-emergency work should cease									

Notes for Table 3:

- † 1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower. For example, at -35°C (-30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
2. The following is suggested as a guide for estimating wind velocity if accurate information is not available:
5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.
3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: 10 special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 W/m²; 2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m². In general the warmup schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the colder ranges, since windy conditions rarely prevail at extremely low temperatures.
4. TLVs apply only for workers in dry clothing.

TABLE 9-1 ENVIRONMENTAL MONITORING REQUIREMENTS

Task	Instrument	Frequency and Location	Action Levels	Required Response
Surficial Soil Sampling, Soil Boring, Ground Water Sampling	PID, Draeger Tube	Initially and at least every 15 minutes in the breathing zone	0-0.5 ppm	Continue sampling activity and monitoring. Stay upwind of sampling location.
			> 0.5 ppm above background in the breathing zone sustained for 5 minutes	Move to a safe upwind location and wait for levels to dissipate. Retest the area after 5-10 minutes. If levels have not dissipated use a Draeger tube to determine concentration of benzene and vinyl chloride in the breathing zone. Do not allow total VOC > 5 ppm without verifying vinyl chloride and benzene presence and concentration (ceiling for vinyl chloride is max. 5 ppm and STEL for benzene is 5 ppm).
			< 0.5 ppm vinyl chloride	Continue sampling activity, staying upwind of the sampling location; monitor frequently with PID to ensure < 0.5 ppm total VOC in breathing zone.
			< 1 ppm benzene < 0.5 ppm vinyl chloride, but 0.5-5 ppm total VOC	Upgrade to Level C, based on total VOC. Monitor with Draeger tube every 15 minutes for vinyl chloride and benzene. Alternatively, vent with fan to < 0.5 ppm total VOC
			0.5-5 ppm vinyl chloride or 1-5 ppm benzene or 5-20 ppm total VOC	Vent sampling location until < 0.5 ppm vinyl chloride and < 1 ppm benzene in breathing zone. Alternatively, upgrade to Level C for short-term completion of sampling activity (1 hour maximum with cartridge respirator).
> 5 ppm vinyl chloride or > 20 ppm total VOC	Evacuate to safe upwind location and wait for levels to dissipate. Contact the Site Safety and Health Officer and CTO Manager			

TABLE 9-1 (Continued)

Task	Instrument	Frequency and Location	Action Levels	Required Response
Surficial Soil Sampling, Soil Boring, Ground Water Sampling	CGI	Initially and every 15 minutes during soil disturbance.	0-10% LEL	Continue activity.
		Measure at surface of borehole.	10-20% LEL	Continuous monitoring. Prepare for shutdown.
		Initially when well is opened. Measure at opening.	> 20% LEL	Shutdown, evacuate, and contact SSHO and CTO Manager.
Mercury sampling	Mercury Meter	Initially and every 10 minutes in the breathing zone.	> 0.025mg/m ³	Shutdown, evacuate, and contact SSHO and CTO Manager.

TABLE 12-1 EMERGENCY TELEPHONE NUMBERS

	Name/Address	Phone Number
NAWCAD-Trenton Emergency Communication Center		Extension 5623
Police		911 or (609) 882-1313
Fire		911 or (609) 882-1313
Ambulance		911 or (609) 882-1313
Mercer Medical Center ^(a)	446 Bellevue Ave. Trenton, N.J. 08618	(609) 394-4009 (Emergency Room)
Northern Division Activity Coordinator:	Steve Hurff	(610) 595-0557, ext. 122
CTO Manager:	Steven Feldmann	(908) 665-2440 (work) (908) 236-6759 (home)
Site Manager:	Ronald Harwood	(908) 665-2440 (work) (908) 940-9545 (home)
Site Safety & Health Officer:	Steven Feldmann	(908) 665-2440 (work) (908) 236-6759 (home)
Program Safety & Health Officer:	Kris Hoiem, CIH	(410) 771-4950 (work) (410) 357-5485 (home)
Program Manager:	Charles W. Houlik, Ph.D., CPG	(410) 771-4950
EA Medical Services:	Division of Environmental Medicine & Toxicology Jefferson Medical College Room 314 Jefferson Alumni Hall 1020 Locust Street Philadelphia, PA 19107-9788	(215) 955-8381
EA Corporate Medical Director:	Dr. Lance Simpson 1020 Locust Street Philadelphia, PA 19107-9788	(215) 955-8381
In case of spill:	Steven Feldmann	(908) 665-2440

TABLE 12-1 (Continued)

	Name/Address	Phone Number
In case of accident or exposure: Ron Turner, EA Corporate Safety and Health Officer	Ron Turner EA Corporate Safety and Health Officer	(410) 584-7000
Poison Control Center:		(800) 822-9761
National Response Center:		(800) 424-8802
U.S. EPA (Region II)		(212) 637-3000
NJDEP		(609) 292-7172

(a) Directions to Hospital

Leave NAWCAD-Trenton turning left on Parkway Avenue to Lower Ferry Road. Take a right onto Lower Ferry Road. Then take a left onto Stuyvesant Avenue. Take a right onto Hermitage Avenue and then a left onto Rutherford Avenue. Mercer Hospital will be on the right side of the road.

ATTACHMENT A

SITE SAFETY, HEALTH, AND EMERGENCY RESPONSE PLAN REVIEW RECORD

ATTACHMENT B
PHYSICAL HAZARD INFORMATION SHEETS

PHYSICAL HAZARD INFORMATION SHEET: UNDERGROUND UTILITIES

Underground utilities pose hazards to workers involved in drilling, excavation, soil vapor contaminant analysis, and other invasive operations. These hazards include electrical hazards, explosion, and asphyxiation, as well as costly and annoying hazards associated with damaging communication, sewer, water, and/or irrigation lines.

The estimated location of underground installations, including sewer, telephone, fuel, oil, gas, electric, water lines, or other underground installations that reasonably may be expected to be encountered during invasive work shall be determined prior to the start of any invasive work. This may be determined by contacting appropriate utilities, contacting a utility clearance service, using site maps and prominent site features, using a pipe and cable locator, etc. Buried utilities encountered during invasive operations must be protected while digging to prevent risks to site personnel and damage to the utilities. The Activity must provide utility clearance prior to intrusive field work.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: ELECTRICAL HAZARDS

Overhead power lines, electrical wiring, electrical equipment, and buried cables pose risks to workers of electric shock, burns, muscle twitches, heart fibrillation, and other physical injuries, as well as fire and explosion hazards. In accordance with OSHA's standard for Electrical Safety-Related Work Practices (29 CFR 1910.331-.335), protective measures must be taken when working near live electrical parts, including but not limited to:

- Insulation and guarding of live parts;
- Grounding;
- De-energizing live parts followed by lockout/tagout to prevent inadvertent re-activation of the parts;
- Electric protective devices (e.g., insulated tools);
- Safe work practices, including:
 - Inspection of work area to identify potential spark sources;
 - Maintenance of a safe distance from all live electrical parts;
 - Proper illumination of work areas;
 - No "blind reaching" around live electrical equipment;
 - Provision of barriers, shields, or insulation to prevent inadvertent contact with live parts;
 - Use of nonconductive, intrinsically safe equipment near live parts.

Overhead lines pose electrical hazards at many sites, particularly for work involving the use of equipment with elevated parts (e.g., drill rigs, backhoes). If overhead lines cannot be de-energized prior to the start of work, the following minimum distances must be maintained between the lines and both site workers and the longest conductive object present (including vehicles with elevated structural parts):

- 10 ft from overhead lines with voltages of 50 kV or less.
- 10 ft plus 4 in. for every 10 kV over 50 kV for overhead lines with voltages greater than 50 kV. For example, the minimum distance that must be maintained from a 250-kV line is 16.5 ft.

EA personnel are not permitted to work on electric parts of equipment that have not been de-energized, locked out, and tagged by personnel trained to work with electrical equipment. No EA employee may work near energized exposed live parts without the use of any protective measures. Personal protective equipment designed to protect against electrical hazards may be specified for certain work operations. The Project Manager is responsible for ensuring that appropriate safety measures are implemented to protect against electrical safety hazards on their sites.

Lightning is a hazard during outdoor operations, particularly for workers handling metal equipment. To eliminate this hazard, weather conditions should be monitored and work suspended at the discretion of the SSHO during electrical storms.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: TRENCHING AND EXCAVATION HAZARDS

Open excavations and trenches pose a variety of hazards to site workers and equipment working near or inside them, including cave-in hazards (worsened by water accumulation in some excavations), contact with underground utilities, vehicle and pedestrian traffic hazards (see Physical Hazard Information Sheet), dangers from falling loads, hazardous atmospheres inside and emitted from excavations (see Chemical Hazards section of SHERP); stability of adjacent structures, and loose rock and soil. OSHA's standard for Excavations (29 CFR 1926.650-.652) must be enforced at excavation sites.

Personnel are not permitted underneath loads being removed from an excavation. When mobile equipment is operated adjacent to an excavation, or must approach the edge of an excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. Where the stability of adjacent building walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

Entry into Excavations: No site personnel are permitted to enter excavations without written permission of the EA Corporate Safety and Health Officer or his/her designee. Excavations must be inspected by a registered professional engineer (PE) prior to anyone entering an excavation. The PE must document his/her findings, including assumptions used in determining that the excavation is safe for entry and the conditions required for safe entry. If deemed necessary by the PE, protective systems (e.g., sloping, benching, and supports/shields) must be designed by a PE according to the requirements of 29 CFR 1926.652 and implemented prior to personnel entering the excavation. Excavations must also be inspected daily by the SSHO and the Site Manager to ensure that safe conditions documented by the PE remain intact and to identify potentially hazardous situations. Prior to personnel entering any excavation, access/egress methods must be investigated and implemented, including provisions for emergency exits from excavations. Loose rock and soil which could fall and injure personnel entering excavations must be removed or otherwise stabilized prior to entry. Personnel shall not work in excavations in which water has accumulated or is accumulating.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: VEHICLE AND PEDESTRIAN TRAFFIC

Traffic at certain sites, particularly active sites in busy areas, presents a hazard to site personnel. Equipment must be located in an area that does not present hazards to bystanders. Barriers must be used to separate the work areas from both vehicle and pedestrian traffic areas and to prevent inadvertent entry of either type of traffic into the work area. The demarcated area must include adequate buffer zones between the actual work area and traffic areas. Standard traffic cones are not considered adequate for these situations, due to their low vertical profile. Taller, 28-in. cones can be effectively modified with warning flags and barricade tape. Safety pennants and plastic or steel "A" frame type barricades may also be used in high traffic areas. Flashing warning lights may also be necessary. Barriers demarcating the work area and buffer zone are required even if the site is inactive during work operations.

Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

In excavation areas, excavated soil materials may be placed between the hole and traffic areas to act as a barrier to both vehicle and pedestrian traffic. Such material must be placed in a manner which will not pose engulfment hazards to either site workers or bystanders.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: BIOLOGICAL HAZARDS

Insect Bites/Stings. Protective outer clothing such as gloves, hardhats, and coveralls can help reduce the potential for insect bites and stings. Insect bite symptoms may include redness, rash, swelling, chills, fever, diarrhea, and vomiting. Any worker who has been bit or stung and shows symptoms of a severe reaction should seek medical assistance immediately. Workers who know of allergies they may have to insects must advise their employer prior to engaging in field activities, and they may want to carry antidote kits.

To prevent contact with disease-carrying ticks, wear long-sleeved shirts, long pants, and boots that extend above the ankle with socks pulled over pants cuffs. Permanone insecticide may be used to kill disease-bearing ticks and may be sprayed only on the outside of clothing (not directly on skin). Frequently check clothing, skin, and hair for the presence of ticks at the end of the work day. If a tick attaches to the body, remove by gently tugging with tweezers where the mouth parts enter the skin. Do not kill the tick prior to removal.

Poisonous Plants. Poisonous plants such as poison ivy may be present on certain sites during part of the year. Personnel should know how to recognize these plants and avoid contact. If contact occurs, affected areas must be washed with soap and water immediately.

Snakes/Rodents. Field workers may come into contact with snakes and rodents (rats, gophers, etc.). In case of a snake bite, which can be fatal, workers must immediately seek medical assistance and report the incident to the SSHO and Site Manager, according to the procedures delineated in the SHERP. Prompt medical attention is also required for rodent bites, because many rodents carry rabies and other diseases. Field workers must report rodent bites to the SSHO and Site Manager immediately, according to the SHERP requirements.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: GENERAL PHYSICAL HAZARDS

Hazardous waste and other field operation sites include many basic safety hazards, such as:

- Holes, ditches, etc., posing fall, cave-in, and other hazards;
- Precariously positioned objects, which may cause crushing or other injuries;
- Sharp objects (e.g., nails, metal shards, glass), which may cause cuts, injection, or other injuries;
- Slippery surfaces, posing slip and fall hazards;
- Steep grades and/or uneven terrain, posing slip, trip, and fall hazards;
- Unstable surfaces (e.g., walls that may cave-in, unstable underground structures) which may pose fall, crushing, or other injuries.

Basic safety hazards can directly injure workers and create additional hazards. For example, a person may trip due to uneven terrain, fall and be cut on rusty metal shards, and become inoculated with contaminants adhering to the metal.

PHYSICAL HAZARD INFORMATION SHEET: DRILLING

The selection of locations for each drilling activity site will take into account buried utility pipes, wires, conduits, and tanks, or other potentially dangerous structures. Overhead power lines and obstructions will also be surveyed. Prior to raising the mast, the area overhead and surrounding the rig will be checked by the drilling foreman and the Site Safety and Health Officer (SSHO). The longest conductive object on the drill rig will be located with a minimum of 10-ft clearance from overhead lines with voltages less than or equal to 50 kV. For lines with voltages exceeding 50 kV, the longest drill rig object must be at least 10 ft plus 4 in. for every 10 kV over 50 kV (e.g., for 250 kV line, clearance must be at least 16.7 ft). The client will inform EA of the voltages of any overhead lines in the vicinity of drilling operations.

When rotary drilling/sampling, drill rods will not be racked more than 1.5 times the height of the mast. During drilling operations and rig setup and takedown, all persons who enter the Exclusion Zone will wear hard hats, safety shoes/boots, and safety glasses/face shields to protect personnel from the physical hazards.

If during drilling there is any indication that underground tanks, drums, or other containers are being encountered, the drilling will be halted immediately and the SSHO shall notify the Program Safety and Health Officer. Indications that a waste container may have been encountered include (1) change in the speed or momentum of the auger, (2) visual examination of auger cuttings, (3) odor noted in the cuttings, and/or (4) the presence of airborne total volatile organics as measured with a direct-reading instrument.

Work around drilling equipment also involves basic safety hazards (e.g., snapping cables, slings, ropes, moving heavy equipment, slip and trip hazards, etc.). Accidents may include head injuries from falling tools and equipment, hand and feet injuries due to moving equipment, and crushing injuries from unstable equipment or careless moving of equipment. If possible, EA personnel must remain outside the turning radius of any large moving equipment. If this is not feasible then, at a minimum, EA personnel must maintain visual contact with the equipment operator at all times when equipment is active.

PHYSICAL HAZARD INFORMATION SHEET: DRUM HANDLING

Specific safe work practices for drum handling are:

- No manual lifting or moving of drums.
- No stacking drums on top of each other.
- Vehicle exhaust must have spark arresters in the Exclusion Zone.
- No spark sources in the Exclusion Zone. The SSHO shall inspect for matches, lighters, battery operated equipment, electrical equipment, sparking tools, and any other potential spark sources. All equipment must be rated intrinsically safe and hand tools must be non-sparking.
- Drums shall be opened, starting with the most downwind drum and working upwind. This will reduce exposure hazards to the drum opener.
- If remote opening is not feasible, the drum opener shall stand behind a plexiglass shield that is at least 18 in. wide and 6 ft tall to prevent splashes to the worker. A wider shield is preferable, but it may be necessary to cut indentations for the arms. All other personnel must stand at least 20 ft upwind.
- When drum opening, allow time for possible venting as soon as the seal is broken. Do not remove the bung or lid until any excess internal pressure has been relieved. Place the bung or lid on plastic sheeting downwind of the drum.
- If any pressurized drums are discovered, use remote opening and, if possible, open the drum without moving it. Instead, remove adjacent drums to create adequate space.
- Sample drums, starting with the downwind drum. Use a sturdy step stool as needed to facilitate sample collection.
- When sampling acids and corrosives use the plastic shield.
- Exercise great caution during sampling to avoid spills. Sample the waste oil drums to develop good technique prior to sampling the more potentially hazardous liquids.
- Non-essential personnel must remain at least 20 ft upwind from drum sampling activities.
- Replace the bung or lid as soon as the samples are collected. This reduces emissions.

Site personnel should look constantly, closely, and carefully for these basic safety hazards and immediately inform the SSHO of any conditions that they feel may be hazardous.

PHYSICAL HAZARD INFORMATION SHEET: HEAVY EQUIPMENT HAZARDS

The use of heavy equipment (e.g., backhoes, dump trucks, generators, compressors, etc.) may pose a variety of health and safety hazards to site workers.

All heavy equipment work must be conducted only by trained, experienced personnel. Equipment backing up, swinging loads, buckets, booms, and counter-weights pose serious hazards to ground personnel. If possible, personnel must remain outside the turning radius of any large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator when the equipment is active.

No personnel are permitted to work underneath heavy equipment, because this practice poses serious crushing hazards.

Belts, pulleys, sheaves, gears, chains, shafts, clutches, drums, flywheels, and other moving parts of equipment can pose injury hazards. No guard, safety appliance, or other device may be removed or made ineffective unless repairs or maintenance are required, and then only after power has been shut off and locked out. Safety devices must be replaced once repair/ maintenance is complete.

Exhaust from all equipment powered by steam or combustion engines must be properly located so that release of exhaust does not endanger workers or obstruct the view of the operator. Gasoline-operated equipment must be re-fueled properly to prevent fire hazards; power must be off, no smoking allowed, and proper dispensing equipment must be used.

When not operational, equipment shall be set and locked so that it cannot be activated, released, dropped, etc. Backhoe buckets must be lowered to the ground.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: NOISE HAZARDS

Work around large equipment often creates excessive noise. The effects of noise can include:

- Workers being startled, annoyed, or distracted;
- Physical damage to the ear, pain, and temporary and/or permanent hearing loss;
- Communication interference that may increase potential hazards due to the inability to warn of danger and provide for proper safety precautions to be taken.

If workers are subjected to noise exceeding an 8-hour time-weighted average (TWA) sound level of 85 dBA (decibels on the A-weighted scale), feasible administrative or engineering controls shall be instituted to reduce noise levels to or below the permissible values. All personnel exposed to excessive noise levels shall be provided with and shall wear a hearing protection device which effectively protects the workers. OSHA regulations on noise can be found in 29 CFR Part 1910.95.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: FIRE/EXPLOSION HAZARDS

Explosion and fire hazards may be present at various sites due to ignition of chemicals, agitation of shock-sensitive compounds, the sudden release of materials under pressure, etc. All site operations must be conducted in accordance with local fire codes and regulations. Continuous monitoring for combustible gases is required at sites where such gases may be present during spark-generating operations. Fire extinguishers and other fire-fighting provisions may also be necessary. Site personnel must be trained in the use of such fire-fighting equipment prior to the start of work operations. Site-specific requirements for monitoring and fire emergency equipment must be specified in the SHERP.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: MATERIAL
HANDLING/MOVING/LIFTING

Improper materials handling accounts for a large number of occupational injuries. Materials handling at hazardous waste sites can vary from heavy equipment handling to manually handling items. Hazards associated with materials handling include physical injury, detonation, fire, explosion, and vapor generation.

When using equipment to move materials, proper work practices must be followed. Equipment used must be designed for the task to be performed. Equipment must be inspected regularly by the SSHO and the Site Manager, and damaged or defective equipment must be removed from service. Planning is critical when handling materials. The Site Manager, in conjunction with the CTO Manager, must plan where the materials are to be moved, taking into consideration the current location of such materials and hazards associated with moving them. Routes for moving materials must be clearly outlined, with paths cleaned of all obstructions so materials may be transported.

Injuries to the back and abdominal muscles from improper lifting of loads is one of the most common occupational injuries reported. Such injuries can range from relatively mild strains to major permanently disabling injuries. Before lifting any load, personnel should consider the overall weight, distribution of weight, unwieldiness or awkwardness of the load, distance to be carried, obstacles to be negotiated, site conditions, and visibility. Loads should be inspected for slivers, sharp edges, slippery surfaces, etc. prior to lifting.

Loads should be lifted using the power of the leg muscles rather than the back, stomach, or arm muscles. Approach the item to balance the load evenly. Never bend over when lifting. The back should be kept straight and the arms nearly parallel with the body. The knees should be bent to grasp the load. Lifting should be done by straightening the legs, holding the load as close to the body as possible and the back remaining as straight as possible.

Bulky, heavy loads should be handled by at least two people, ensuring that the load is level and evenly distributed between all personnel helping to carry it. All carriers should know the destination and path for the load.

Site-Specific Hazards and Protective Measures: _____

PHYSICAL HAZARD INFORMATION SHEET: COLD STRESS

Cold stress hazards are most likely to occur at low temperatures or low wind chill factors, with wet, windy conditions also contributing to risks. All personnel should be familiar with cold stress symptoms, which include:

- **Hypothermia:** Cold-induced decreasing of the core body temperature that produces shivering, numbness, drowsiness, and muscular weakness. If severe enough, it can lead to unconsciousness and death.
- **Frostbite:** Constriction of blood vessels in the extremities, decreasing the supply of warming blood. May result in formation of ice crystals in the tissues, causing tissue damage. Condition may range from frostnip which is a numbing of extremities, to deep-freezing tissue beneath the skin. Symptoms include white or grayish skin, blisters, numbness, mental confusion, failing eyesight, fainting, shock, and cessation of breathing. Death may occur from heart failure.

Pain in the extremities may be the first warning of cold stress, and precautions (see below) should be taken to reduce exposure. Maximum severe shivering must be taken as a sign of immediate danger to the worker, and exposure to cold must be immediately terminated. Personnel exhibiting signs and symptoms of cold stress must be removed from the site, decontaminated, and given appropriate first aid. Emergency medical services must be contacted if symptoms are severe (e.g., more than numbness of the extremities or shivering). When air temperatures are less than 36 F (including wind chill), workers who become immersed in water or whose clothing becomes wet must be immediately provided a change of clothing and be treated for hypothermia.

To prevent cold stress when air temperature is less than 40 F (including wind chill), personnel should wear layers of loose-fitting clothing including insulated coveralls, head covering, and boots. Protection of the hands, feet, and head is particularly important because these are likely to be injured first by cold. However, actual injury to hands, feet, and head is not likely to occur without prior development of early signs of hypothermia such as numbing and shivering. Bare skin contact with cold surfaces (below 20 F) must be avoided. Personnel should wear wind-resistant outer shell to decrease wind chill effects. No continuous exposure to cold is permitted when the air speed and temperature results in an equivalent chill temperature of -25°F or less.

A temperature-dependent work regimen limiting lengthy periods of outdoor activity may be necessary. Workers entering heated shelters should remove the outer layer of clothing and loosen remaining clothing to permit sweat evaporation. Dehydration must be avoided by drinking warm drinks or soups.

ATTACHMENT C

EA SITE WORKER TRAINING AND PHYSICAL EXAMINATION RECORD

SITE WORKER TRAINING AND PHYSICAL EXAMINATION RECORD

Site Name: NAWCAD-Trenton
 Project No.: 29600.48

CTO No.: 0048
 Task No.: _____

No employees other than those listed below are permitted to work in the exclusion zone or contamination reduction zone without prior written approval by the CTO Manager or SSHO. The date of the latest listed item should be given for each person listed.

Name	HAZWOPER 40-Hour Initial	HAZWOPER Annual	First Aid(a)	CPR(a)	Supervisor(b)	Medical Exam	Fit- Test(c)

- (a) At least two people onsite must have current certification in First Aid/CPR for all tasks.
- (b) At a minimum, the site manager must have had supervisor's training.
- (c) When air-purifying respirators are required, fit-testing should be done within last 12 months.

ATTACHMENT D
ENVIRONMENTAL MONITORING RECORD

ENVIRONMENTAL MONITORING RECORD

Site Name: NAWCAD-Trenton
Project No.: 29600.48

CTO No.: 0048
Task No.: _____

INSTRUMENT: _____

CALIBRATION: Gas: _____ Conc: _____ Span: _____

Time	Monitoring Location	Reading	Corrective Action Taken(a)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Changes in PPE Level	Work Operation	Reason For Change
_____	_____	_____
_____	_____	_____
_____	_____	_____

Comments: _____

(a) Corrective actions taken must be documented whenever readings at or above action levels are reached.

Recorded By: _____
Site Safety & Health Officer

Date: _____

ATTACHMENT E
CALIBRATION PROCEDURES

STARTUP AND CALIBRATION PROCEDURE FOR
THE HNU PHOTOIONIZATION DETECTOR,
MODELS HW-101 AND PI-101

STARTUP:

1. Connect the probe to the readout assembly, making sure that the red interlock switch is depressed by the ring on the connector.
2. Turn the function switch to BATT. The needle should move to green region. If not, the battery needs to be recharged.
3. Zero Set--Turn the function switch to STANDBY. Allow the instrument to warm up at least 1 minute. Set the zero point with the ZERO set control.

CALIBRATION:

1. Fill empty Tedlar bag with 100 ppm isobutylene gas standard (used to calibrate HNU to 55 ppm). Attach probe to Tedlar bag. Do not connect HNU probe directly to isobutylene tank.
2. Turn the Function Switch to the 0-200 range position and note the meter reading. If meter does not read 55 ppm, use the SPAN Control Knob to set the meter reading at 55 ppm. Lock the SPAN Control Knob.
3. Record identity and concentration of calibration gas and the SPAN Control setting on the Environmental Monitoring Record each time the instrument is calibrated.
4. Re-calibrate the HNU each time the instrument is turned off. Place the instrument on STANDBY when not in active use during the work day.

CAUTION: Check the battery charger frequently throughout the work period--do not allow the needle to fall below the green line when the function switch is on BATT. If needles approach the left range of this green line, stop and recharge the instrument.

Probe must be attached to the readout assembly, with the interlock switch fully depressed, in order to recharge the instrument.

STARTUP AND CALIBRATION PROCEDURE FOR MODELS OVA-128 AND 128-GC CENTURY ORGANIC VAPOR ANALYZER

STARTUP:

1. Connect the probe/readout assembly to the Sidepack Assembly by attaching both the sample line and the electronic jack.
2. Move the Instr/Batt Switch to the BATT position and check that readout needle moves beyond the white "batt check" line.
3. Move the Instr/Batt Switch to the "On" position and warm up at least 5 minutes.
4. Turn the Pump Switch on, set Sidepack Assembly in upright vertical position, and make sure that sample flow rate is approximately 1.5-2.5 units. If less, check filters.
5. Set CALIBRATE Switch to the X1 position, and use CALIBRATE knob to set meter to read 0.
6. Open the HYDROGEN TANK VALVE one or two turns. [Hydrogen Tank pressure should read at least 1,500 psi if 8-hour supply is desired. Otherwise, shut down instrument and fill tank with hydrogen.] Open HYDROGEN SUPPLY VALVE one or two turns. Hydrogen Supply Pressure Indicator should read between 8 and 12 psi.
7. Wait approximately 1 minute, then depress IGNITER Button until hydrogen flame lights (meter needle will jump upscale and faint "pop" may be heard if flame ignites). Do not depress igniter more than 6 seconds. If flame does not light, wait 1 minute and try to re-ignite.
8. Use CALIBRATE knob to "zero" out background by setting CALIBRATE Switch to X1 and reading zero on meter. To avoid false flame out alarm, set meter to 1 ppm with CALIBRATE knob and make differential readings.

CALIBRATION:

1. Fill empty Tedlar bag with 100 ppm methane gas standard.
2. Use Tygon Tubing to connect bag to probe on OVA Readout Assembly. Never connect the OVA directly to methane gas tank.
3. Set CALIBRATE Switch to X10 and read meter. If meter does not read 100 ppm, use the GAS SELECT KNOB to set the readout meter to correspond to 100 ppm. Lock the GAS SELECT KNOB.
4. RECORD identity of calibration gas, concentration, and GAS SELECT reading on Environmental Monitoring Record each time instrument is calibrated.

START-UP CALIBRATION PROCEDURE FOR
MODEL HX-251 INDUSTRIAL SCIENTIFIC
CGI/O₂ METER

START-UP:

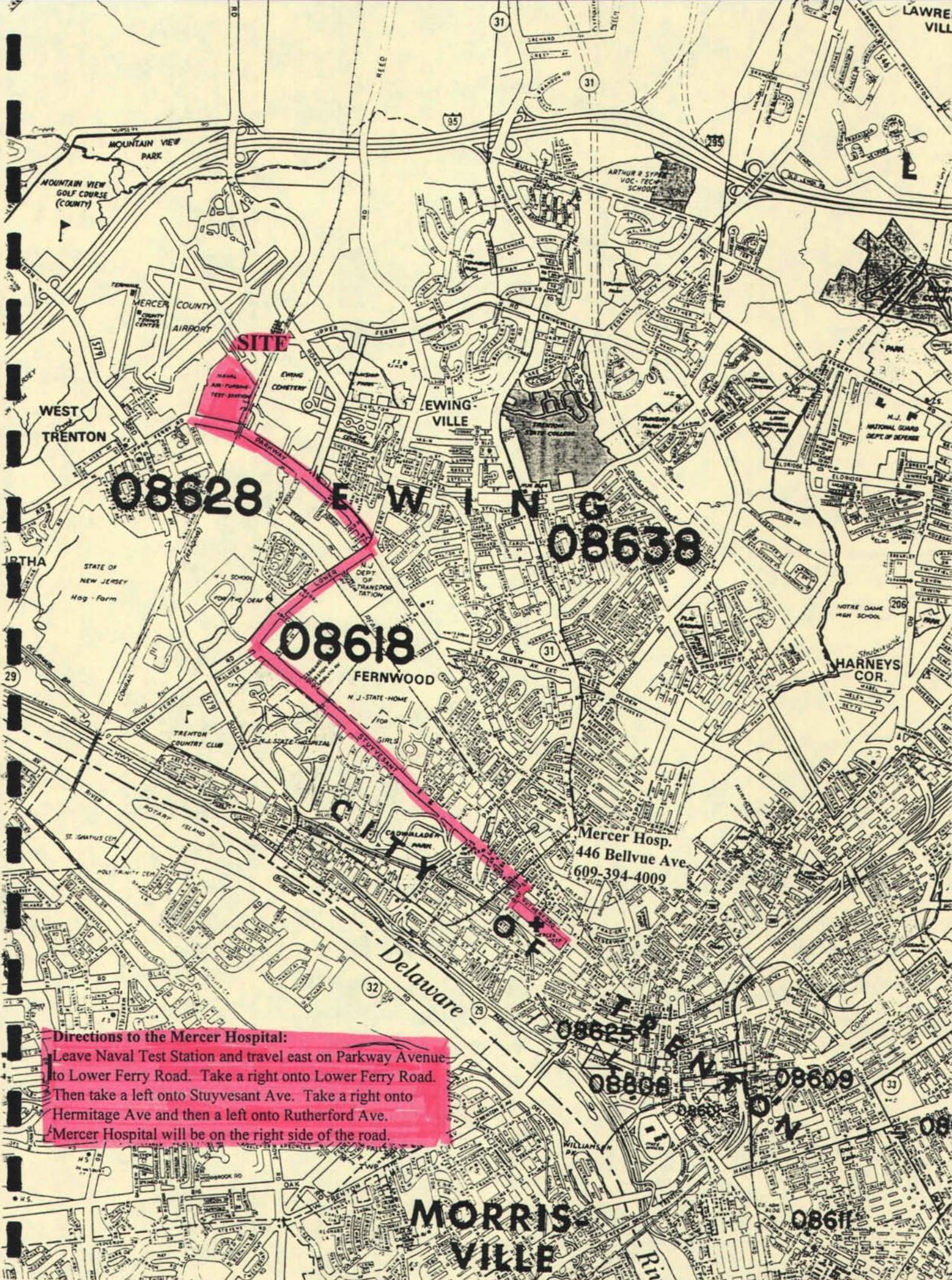
1. Ensure that batteries for both the meter and pump (if to be used with meter) have been fully charged (at least overnight).
2. Turn screw on bottom of meter and rotate metal plate 180 degrees. Tighten screw. Alarm should sound briefly and digital readout should appear.
3. Depress OX switch and ensure that meter reads 20-21 percent. If necessary, loosen metal plate and use small screwdriver to adjust the OX screw until desired oxygen reading appears.
4. Depress LEL switch and ensure that meter reads 0. If necessary, loosen metal plate and use small screwdriver to adjust the ZERO screw until meter reads 0.

CALIBRATION:

1. If oxygen reading in Step 3 was taken in normal ambient environment, no further calibration of the oxygen meter is needed.
2. Fill Tedlar bag with calibration gas standard (must be in percent concentrations - calibration gas tank label should indicate percent LEL of calibration gas).
3. If meter is to be used in passive mode (i.e. no sampling pump), attach calibration cup to top of meter and attach to Tedlar bag using Tygon tubing. If sampling pump is to be used, attach pump to meter and attach filling Tedlar bag to pump inlet.
4. Depress LEL switch and note the meter reading. If necessary, adjust the small LEL screw underneath the metal plate as required to make meter reading correspond with calibration gas concentration.
5. Record identity of calibration gas, concentration and calibration date on the Environmental Monitoring Record each time the instrument is calibrated.

ATTACHMENT F
SITE ENTRY AND EXIT LOG

ATTACHMENT G
ROUTE TO HOSPITAL



SITE

NAVAL AIR TUNNEL TEST STATION

08628

EWING

08638

08618

FERNWOOD

CITY OF TRENTON
Delaware

Mercer Hosp.
446 Bellvue Ave.
609-394-4009

08625

08608

08609

08611

MORRISVILLE

Directions to the Mercer Hospital:
Leave Naval Test Station and travel east on Parkway Avenue to Lower Ferry Road. Take a right onto Lower Ferry Road. Then take a left onto Stuyvesant Ave. Take a right onto Hermitage Ave and then a left onto Rutherford Ave. Mercer Hospital will be on the right side of the road.

ATTACHMENT H
ACCIDENT INVESTIGATION REPORT



I am seeking medical treatment for a work related injury/illness.

Please forward all bills/invoices/correspondence to:

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

CORPORATE OFFICE

11019 MCCORMICK ROAD

HUNT VALLEY, MD 21031

ATTENTION: Amy Hansell

(410) 584-7000



ACCIDENT/LOSS REPORT

THIS REPORT MUST BE COMPLETED BY THE INJURED EMPLOYEES SUPERVISOR AND FAXED TO EA CORPORATE HUMAN RESOURCES WITHIN 24 HOURS OF ANY ACCIDENT. THE FAX NUMBER IS (410) 771-1780.

NOTE WHENEVER AN EMPLOYEE IS SENT FOR MEDICAL TREATMENT FOR A WORK RELATED INJURY OR ILLNESS, PAGE 4 OF THIS REPORT MUST ACCOMPANY THAT INDIVIDUAL TO ENSURE THAT ALL INVOICES/BILLS/CORRESPONDENCE ARE SENT TO CORPORATE CENTER FOR TIMELY RESPONSE.

DATE OF ACCIDENT: _____ TIME OF ACCIDENT: _____
EXACT LOCATION WHERE ACCIDENT OCCURRED (including street, city and state):

NAME OF INJURED EMPLOYEE: _____

HOME ADDRESS: _____

HOME PHONE: _____ DATE OF BIRTH: _____

AGE: _____ SEX: M F MARITAL STATUS: _____

SOCIAL SECURITY NUMBER: _____ DATE OF HIRE: _____

NUMBER OF DEPENDENTS: _____

EMPLOYEES JOB TITLE: _____

DEPT. REGULARLY EMPLOYED: _____

EXPLAIN WHAT HAPPENED (include what the employee was doing at the time of the accident and how the accident occurred):

DESCRIBE THE INJURY AND THE SPECIFIC PART OF THE BODY AFFECTED (i.e. laceration, right hand, third finger, second joint):

OBJECT OR SUBSTANCE THAT DIRECTLY INJURED EMPLOYEE: _____

NAME AND ADDRESS OF THE PHYSICIAN (if medical attention was administered):

PLEASE ATTACH THE PHYSICIANS WRITTEN RETURN TO WORK SLIP

NOTE A PHYSICIANS RETURN TO WORK SLIP IS REQUIRED PRIOR TO ALLOWING THE WORKER TO RETURN TO WORK

IS THE EMPLOYEE EXPECTED TO LOSE AT LEAST ONE FULL DAY OF WORK? _____

WAS THE EMPLOYEE ASSIGNED TO RESTRICTED DUTY? _____

NUMBER OF DAYS AND HOURS EMPLOYEE USUALLY WORKS PER WEEK: _____

LIST ALL PPE EMPLOYEE WAS WEARING AND ALL SAFETY DEVICES IN USE AT THE TIME OF THE ACCIDENT:

DESCRIBE THE PREVENTIVE MEASURES TAKEN TO AVERT A RECURRENCE OF THIS TYPE OF INCIDENT: _____

DATE WHEN MEASURES WERE IMPLEMENTED AND BY WHOM: _____

AUTOMOBILE ACCIDENT INFORMATION

AUTHORITY CONTACTED AND REPORT # _____

EA EMPLOYEE VEHICLE YEAR, MAKE AND MODEL _____

V.I.N. _____ PLATE/TAG # _____

OWNER'S NAME AND ADDRESS: _____

DRIVER'S NAME AND ADDRESS: _____

RELATION TO INSURED: _____ DRIVER'S LICENSE # _____

DESCRIBE DAMAGE TO YOUR PROPERTY: _____

DESCRIBE DAMAGE TO OTHER VEHICLE OR PROPERTY: _____

OTHER DRIVER'S NAME AND ADDRESS: _____

OTHER DRIVER'S PHONE: _____

OTHER DRIVER'S INSURANCE COMPANY AND PHONE: _____

LOCATION OF OTHER VEHICLE: _____

NAME, ADDRESS AND PHONE OF OTHER INJURED PARTIES: _____

WITNESSES

NAME: _____ PHONE: _____

ADDRESS: _____

STATEMENT: _____

SIGNATURE: _____

NAME: _____ PHONE: _____

ADDRESS: _____

STATEMENT: _____

SIGNATURE: _____

NAME OF SUPERVISOR: _____

DATE OF THIS REPORT: _____ REPORT PREPARED BY: _____

I have read this report and the contents as to how the accident/loss occurred is accurate to the best of my knowledge.

Signature: _____
Injured Employee

Date: _____