

**THAMES RIVER
RAPID SEDIMENT CHARACTERIZATION PILOT STUDY**

HEALTH AND SAFETY PLAN

NAVAL SUBMARINE BASE – NEW LONDON, GROTON, CT

Prepared for:



**DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NORTHERN DIVISION**

10 Industrial Highway
Mail Stop, #82
Lester, PA 19113-2090

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Contract No. N62472-00-D-1300

Task Order 0005

Project No. G486305

June 2003

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FINAL

SITE-SPECIFIC HEALTH AND SAFETY PLAN

**Field Sampling Activities in Support of a Rapid Sediment Characterization Pilot Study at
the Naval Subase New London, Connecticut**

Project Number: G486305
Project Manager: Donald Gunster
Site Safety Officer: Elizabeth Vonckx
Date of Issue: June 10, 2003

Authorization:



Donald Cagle, CIH, Battelle Health & Safety Officer

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- Attachment B. Site-Specific Health and Safety Training Record Forms
- Attachment C. Tailgate Safety Meeting Record Form
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1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (S-HASP) delineates the basic safety requirements for field sampling activities to be performed at Naval Subbase New London (NSB-NLON) in June 2003. NSB-NLON is located along the Thames River within the towns of Ledyard and Groton, Connecticut. This field investigation is for a pilot study that will provide data to support the development of data quality objectives (DQOs) and Work Plan for a validation/investigation study. This S-HASP was prepared in compliance with the requirements of the 29 CFR 1910.120. This S-HASP should be used in conjunction with the Work Plan/Field Sampling Plan (WP/FSP).

The provisions set forth in this S-HASP apply to all Battelle staff and subcontractors (field personnel). Subcontractors may elect to modify these provisions, but only to upgrade or increase safety activities. It is noted that this S-HASP may not thoroughly address all hazards associated with any specialized subcontractor operations. In this situation, subcontractors shall be responsible for developing their own HASP and procedures to adequately address their scope of operations at this site.

This S-HASP addresses the expected potential hazards that may be encountered for this project. If unanticipated changes in site or working conditions occur which are not addressed by this plan, addenda will be provided.

1.1 Site Location and Background

Naval Subbase New London (NSB-NLON) is located along the east side of the Thames River and lies within the towns of Ledyard and Groton, CT. The Subbase was established in 1868, when the State of Connecticut gave the Navy 112 acres of land along the Thames River to build a Naval Station. In 1872, two brick buildings and a "T" shaped pier were constructed and the site was officially declared a Navy Yard. The site was initially used as a coaling station by Atlantic Fleet small craft. During World War I, the facility became the Navy's first Submarine Base. Following the war, the Navy established schools and training facilities at the base. By 1959, New London had become the largest submarine base in the world with 8,210 active personnel. Today, the base supports twenty one attack submarines and the Navy's nuclear research deep submersible NR-1. The base occupies more than 500 acres and has over 400 buildings with housing and support facilities for 10,000 active duty and civilian workers and their families.

The Lower Subbase is a narrow strip of land that generally forms the western boundary of NSB-NLON and parallels the Thames River. The field investigation will take place in Zones 4 and 7 of the Lower Subbase, and in the Pier 1 Marine Railway area.

1.2 Scope of Work

This project has been initiated to assist the Navy in the evaluation of sediment in specific areas of the Thames River adjacent to NSB New London that were identified as having data gaps.

The project will also assist the Navy in additional investigation of sediment in the Pier 1 Marine Railway area as a result of elevated levels of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals discovered in previous studies.

The primary objective of the field program is to conduct a Rapid Sediment Characterization (RSC) Pilot Study to support the development of data quality objectives (DQOs) and a Work Plan for a validation/investigation study. Seventy surface sediment samples will be collected from a 24-ft survey vessel using a Ponar or Van Veen grab sampler. The field crew will consist of a boat operator, one Battelle staff member, and one SPAWAR Systems Center (SSC SD) San Diego staff member. Samples will be homogenized and placed into glass jars. The field investigation is expected to take three or four days to complete.

2.0 PROJECT SAFETY AUTHORITY

Personnel responsible for project safety are the Project Manager, the Field Sampling Manager, and the Site Safety Officer or his/her designee.

The Project Manager is responsible for the provision and submittal of this plan. The Project Manager has the authority to provide for the auditing of compliance with the provisions of this plan, suspension or modification of work practices, and administration of disciplinary actions for individuals whose conduct does not meet the requirements set forth herein. The Project Manager may elect to give the Site Safety Officer authority to administer disciplinary actions for individuals whose conduct does not meet the requirements set forth herein.

The Field Sampling Manager is responsible for coordinating field logistics, providing the FSP to the field crew, conducting a kick-off meeting prior to sampling activities, and ensuring that the field team is adequately trained in field sampling procedures. He is responsible for ensuring that all technical logistics are identified and addressed and for arranging access to the naval facility, scheduling the sampling trip, arranging for equipment and vessels, and escorts, where required. He will verify that field equipment and instruments have been adequately maintained and tested, and that appropriate calibration and decontamination between sites and samples is conducted and documented. The Field Sampling Manager is responsible for ensuring that samples are collected, handled, preserved, and shipped as specified, and that documentation is detailed, accurate, and legally defensible. He is responsible for ensuring that samples are collected and handled under custody. He communicates directly with the field crew and reports to the Team Project Manager.

The Site Safety Officer is responsible for the dissemination of the information contained in this plan to all personnel assigned to the project, and to the responsible representative of each Battelle Navy subcontractor firm working on the project. The Site Safety Officer is also responsible for advising the Project Manager on health and safety matters. The senior field team member may also be designated as the Site Safety Officer. As such, he or she is responsible for maintaining, performing or providing the following as necessary:

- Verification of medical surveillance program examinations, and 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training for all on-site personnel.
- Daily tailgate discussion of the site safety plan. Documentation of tailgate safety meetings in field notebook.
- Documentation of all accidents or HASP violations.
- Emergency contacts as needed.
- Implementation of Decontamination/Contamination Reduction Procedures (see Sec. 9.0).
- On-site air monitoring as required.

The Site Safety Officer or his/her designee has the authority to suspend work any time he or she determines that the health and safety practices at the site are inadequate. In such cases the Site Safety Officer shall also inform the Project Manager of individuals whose conduct is not consistent with the requirements of the plan.

The Site Safety Officer has the responsibility to check in with the facility, Battelle and/or Navy safety contact each day before commencing field operations. The Site Safety Officer will disseminate any new information provided to the field team during tailgate safety meetings.

3.0 MEDICAL SURVEILLANCE

Any field personnel engaged in project operations that expose them to hazardous wastes, hazardous substances, or any combination of hazardous wastes or hazardous substances shall be participants in a Medical Surveillance program. These persons must be cleared by the examining physician(s) to wear respiratory protection devices and protective clothing for working with hazardous materials. The medical clearance shall be current within one year through at least the last day of field operations. The applicable requirements under the 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) and the Respiratory Protection Program 29 CFR 1910.134 will be observed.

All field personnel shall bring proof of required medical clearance to the job site for inspection before beginning work. The Site Safety Officer will be responsible for reviewing the proof of medical clearance in accordance with the requirements described above and documenting this review in the field notes before those persons can commence work.

4.0 SAFETY/ORIENTATION TRAINING

This section presents the general and site-specific training requirements for this project in accordance with regulatory, client, and/or Battelle requirements. All field personnel shall bring proof of required training to the job site for inspection before beginning work. The Site

Safety Officer will be responsible for reviewing the proof of training in accordance with the requirements described below and documenting this review in the field notes before those persons can commence work.

4.1 General Training Requirements

General training requirements that apply to field personnel on this project are described below.

4.1.1 HAZWOPER

Field personnel engaged in project operations that potentially expose them to hazardous wastes, hazardous substances, or any combination of hazardous wastes or hazardous substances shall have satisfied the following training requirements. These requirements must be satisfied in accordance with HAZWOPER (29 CFR 1910.120):

- Initial 40-hour HAZWOPER training, and
- Annual 8-hour HAZWOPER refresher training current within one year.

In addition, the Site Safety Officer and any other field personnel supervising hazardous waste workers must have completed the following training:

- Annual 8-hour HAZWOPER Supervisor training.

4.1.2 First Aid

At least one team member on every field team shall have current first aid training including adult CPR and bloodborne pathogens (BBP) required training. Current training for the purposes of this S-HASP is as follows: 1) First Aid training current within 3 years, 2) Adult CPR current within 1 year, and 3) BBP required training current within 1 year.

4.1.3 Respirator Training and Fit-Testing

It is not anticipated that any respirator training or fit-testing will be required for the Naval Subbase New London Pilot Study activities. However, if respirators are required, work will be suspended pending evaluation of site conditions and verification of training. Fit-testing shall be performed on the make, model and size of the full-face APR to be worn for any required task.

4.2 Site-Specific Training

All potential field personnel will review this S-HASP before commencing work as part of the site-specific safety training for this project. The Site Safety Officer will review the S-HASP before field operations begin and will conduct daily tailgate safety meetings to bring up appropriate health and safety concerns. Field personnel will certify their review by signing a HASP training record form (Attachment B) or signing the field notebook after the tailgate safety meeting. The Project Manager is responsible for distributing this S-HASP to

appropriate personnel and verifying review by obtaining signed review forms or copies of field notes. Signed review forms or copies of field notes will be placed in project files and in field personnel medical files.

Whenever a change of conditions on-site occurs that may affect safety, the Site Safety Officer or his/her designee will conduct a tailgate safety meeting if appropriate. Changing site conditions that may affect safety include the following:

- Change of field personnel;
- Change in work activity;
- Identification of new or unplanned hazards;
- Change in weather conditions; and
- Visitors on site.

All training sessions, safety meetings, and safety briefings will be documented by the Site Safety Officer or his designee in the field notebook, or on Tailgate Safety Meeting Record forms (Attachment C). Documentation will include a brief description of topics addressed and the signatures of all training attendees.

4.3 Navy Subcontractor Documentation

Navy subcontractor employees shall maintain proof of qualification and completion of all required training onsite. This information can be satisfied by either: (1) an employer's certification statement including a summary report of all required training and medical surveillance completion dates for each individual, or (2) individual training certificates and medical clearance reports for each individual.

5.0 HAZARD ASSESSMENT

This section discusses the identification of general, task, or activity-specific and site-specific hazards associated with planned field activities for this project. Physical, chemical, and biological hazards are addressed separately. A job hazard analysis was performed for boat operation and water safety (Attachment D). The job hazard analyses identifies the potential hazards associated with boat operation and water safety and includes a description of the control measures to be implemented, a list of equipment with any applicable inspection, and training requirements.

5.1 Physical Hazards

General physical hazards that may occur during field sampling activities could include the following:

- Impact and abrasion hazards from working with hand tools;
- Falling objects such as tools or equipment;
- Falls from elevations;
- Tripping over hoses, pipes, tools, equipment or uneven terrain;
- Slipping on wet or oily surfaces;
- Entanglement or injury from rotating equipment or energized parts;
- Exposure to noise generated by motors and pumps;
- Insufficient or faulty protective equipment;
- Insufficient or faulty operations, equipment, or tools; and
- Persons falling overboard hazards: hypothermia/undertow/riptide.

Other site-specific hazards may include any of the following:

- Trip, slip, and fall hazards from walking and/or kneeling on potentially uneven, steep, and/or slippery terrain.
- Hypothermia from exposure to potentially cool air temperatures, immersion in cold water, and windy conditions;
- Sunburn, windburn; and
- Damage to eyes from sun exposure (UV radiation).

Safety precautions for general and site-specific hazards are addressed in Table 5-1 and Section 7.0 of this S-HASP.

**TABLE 5-1:
HAZARDS AND PROTECTIVE MEASURES
NAVAL SUBBASE NEW LONDON**

Potential Hazards	Methods to Ensure Worker Safety
Injuries caused by tripping or falling	Regular job site reconnaissance will be conducted to identify hazards. All work will be conducted in daylight hours.
Lifting, manual labor	The site SSO or designee will identify ergonomic factors and will develop measures to prevent injury. Proper lifting techniques and warm-up will be used before strenuous tasks. Special hand protection will be required where indicated.
Marine operations	Coordination with facility personnel, establishment of communications, and implementation of water safety requirements/measures will be used to ensure worker safety. All staff on watercraft shall be issued whistles prior to departure.
Skin and eye irritation from contact with chemicals	Workers will wear proper PPE dependent on the task (see Section 8.0), especially when collecting sediments.
Solar radiation	Protective clothing, eyewear, and/or sunblock will be worn.
Weather	If lightning or thunder is seen or heard, then all personnel will cease sampling and seek shelter until the threat of lightning strikes passes.
Heat Related Disorders	Depending on solar load, humidity, ambient air temperature, type of protective clothing and workload, it may be necessary to implement a work rest regime (see Section 7.0).
Biohazard or infectious materials	Gloves are to be worn when handling materials that are biohazard or infectious. Wash hands thoroughly after handling these materials and prior to eating or drinking. Do not eat or drink in areas where these materials are handled or stored. Disinfect work surfaces to prevent spread of contamination. Disinfect any wounds or cuts and prevent recontamination by using appropriate PPE. Seek medical attention as needed.
Stinging insects such as wasps and bees	The SSO will identify areas where workers could contact stinging insects and will determine actions needed to rectify the problem. Workers will not be allowed to work near insects where an unreasonable risk is present. Inquire if any workers are allergic.

Notes: SSO = Site Health and Safety Officer
PPE = Personal Protective Equipment

5.2 Chemical Hazards

Chemicals that have been detected in shoreline areas and therefore potentially present in sediments include metals, low and high molecular weight PAHs, total petroleum hydrocarbons, PCBs, and pesticides. For ease of reference, the potential hazards and protective measures used to mitigate hazards are provided in Table 5-1. A list of historical chemicals or constituents occurring at the site along with their toxicological properties is presented in Table 5-2. More details regarding specific chemicals expected to be present at the site are provided in the following sections.

5.2.1 Polycyclic Aromatic Hydrocarbons (PAH)

Polycyclic aromatic hydrocarbons are present in coal tar, petroleum hydrocarbons, and other sources and are used in a variety of industrial products. Some PAHs are recognized human carcinogens. Exposure by any route to PAHs and other recognized human carcinogens shall be maintained at the absolute practicable minimum level. Sampling will involve the collection of wet sediments using a grab sampler; therefore, the potential inhalation exposures to volatile organic compounds and PAHs should be minimal. Proper use of personal protective equipment (PPE) and personal hygiene practices will prevent exposure via skin absorption and ingestion.

5.2.2 Polychlorinated Biphenyls (PCB)

Polychlorinated biphenyls (PCBs), also referred to as Aroclors, are synthetic industrial products that have been commonly used as cooling fluids and electrical insulators. PCBs are common contaminants of oily-type waste and are found around railroad tracks and in industrial areas and dumps. PCBs are recognized environmental pollutants and human carcinogens. Work involving contact with PCBs exceeding 100 micrograms per gram (parts per million) may require special medical evaluation and approval of the Site Safety Officer.

PCBs are skin absorbable and appropriate precautions shall be implemented. Handling of samples that may be contaminated with PCBs shall be performed wearing appropriate PPE (gloves and safety glasses).

In addition, precautions should be implemented to prevent inhalation of dusts that may be contaminated with PCBs. Samples that are suspected to contain PCBs are to be processed in well-ventilated areas and hands are to be washed with soap and water after sample processing.

While OSHA has not set standards for each specific PCB, occupational exposures for chlorodiphenyl 42% chlorine and 54% chlorine are defined in 29 CFR 1910.1000 Table Z-1 Limits for air contaminants as $1\text{mg}/\text{m}^3$ and $0.5\text{mg}/\text{m}^3$ respectively.

**TABLE 5-2:
TOXICOLOGICAL PROPERTIES OF CHEMICAL COMPOUNDS POTENTIALLY
PRESENT IN NAVAL SUBBASE NEW LONDON SEDIMENTS**

Class/Compounds (examples)	Principal Routes of Entry	Acute Exposure Effects/Symptoms	Chronic Exposure Effects/Symptoms
ORGANIC COMPOUNDS			
Aromatic Hydrocarbons			
Benzene	Inh, Ing, Skin	Central nervous system (CNS) depression; skin, eyes & upper respiratory tract irritation	Carcinogen, blood change leukemogenic
Ethylbenzene	Inh, Ing, Skin	Skin, eyes, nose & throat irritation	Skin rash
N-hexane	Inh, Ing, Skin	CNS depression; eyes & nose irritation	Skin irritation peripheral neuropathy
Toluene	Inh, Ing, Skin	CNS depression; skin, eyes, and respiratory tract irritation	Dermatitis
Xylene	Inh, Ing, Skin	Dizziness; nose, throat, skin, and eye irritation; olfactory changes; irritant; poison; distortion; hallucination; central nervous system (CNS) effects	Cardiac arrhythmia
Polychlorinated biphenyls	Inh, Ing, Skin	Chloracne, rashes	Liver disorders, dermatitis, carcinogen
Petroleum Distillates			
Gasoline, Diesel	Inh, Skin, Ing.	Anesthesia, dizziness, headache, nausea, vomiting, sleepiness, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, cough	Dermatitis, headache, mood shifts, CNS effects, fatigue

Table continued next page

Table 5-2 (continued)

Class/Compounds (examples)	Principal Routes of Entry	Acute Exposure Effects/Symptoms	Chronic Exposure Effects/Symptoms
Semivolatile Organic Compounds			
Polynuclear Aromatic Hydrocarbons (as PAHs)	Skin, Inh, Ing	Irritant to skin, vomiting, photosensitization, headache	As a class overall, can be considered mutagenic and tumorigenic with several compounds known carcinogens; also causes liver damage
INORGANIC COMPOUNDS			
Metals			
Arsenic	Skin, Inh, Ing	Irritates eyes, skin, and respiratory tract. May cause effects on gastrointestinal tract, cardiovascular system and central nervous system.	Skin dermatitis, sensitization, and pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment, and anemia. Cancer (skin, lung, lymphatic)
Chromium (VI)	Skin, Inh, Ing	Skin, respiratory tract irritation, dermatitis, skin ulceration	Carcinogen, lung and skin effects, nasal septum perforation
Chromium (III)	Skin, Inh, Ing	Skin, respiratory tract irritation	Lung disease
Copper	Inh, Inj	Metal fume fever, nausea vomiting, skin redness	Skin sensitization
Lead	Inh, Ing	GI distress, kidney failure	Neuropathy, CNS anemia
Mercury	Inh, Skin, Ing	Skin irritant. Inhalation of vapors may cause pneumonitis. May affect CNS and kidneys. Effect may be delayed.	Affects central nervous system and kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. May cause inflammation and discoloration of the gums.
Nickel	Skin, Inh, Ing	Skin, nasal irritation, respiratory tract irritation	Carcinogen, lung, GI system disease
Zinc	Inh, Ing	Metal fume fever, skin irritation	GI System effects, dermatitis

Notes:

Inh = Inhalation
 Ing = Ingestion
 Skin = Skin absorption

5.2.3 Petroleum Hydrocarbons

Petroleum hydrocarbons such as gasoline and diesel fuel may include a wide range of substances, some of which may pose substantive human health hazards. The aromatic volatile petroleum hydrocarbons including benzene, toluene, ethylbenzene, and xylene (BTEX) are generally of greater concern, in part because they are more likely to exist in the worker's breathing zone. In moderate exposures, BTEX compounds all produce similar acute effects including headache, narcosis, and anesthesia. Table 5-2 summarizes the exposure criteria and health effects of BTEX. Among the aromatic volatile petroleum hydrocarbons, benzene is the primary substance of concern because of its status as a known carcinogen and association with leukemia and aplastic anemia in chronic exposure situations.

The permissible exposure limits (PEL) set by OSHA and the American Conference of Industrial and Governmental Hygienists' (ACGIH) threshold limit values (TLV) for airborne exposure are provided in Table 5-3 for BTEX. Even high concentrations (ppm to percent level) of volatile organic compounds are not reasonably expected to present airborne concentrations at or approaching OSHA PELs or ACGIH TLVs considering the volume of sediments to be sampled and processed during field activities. Furthermore, all work will be conducted in open-air conditions. Considering the relative volatility of each compound in the sediment matrix and the open working conditions, these compounds are not reasonably expected to present inhalation exposures of concern to worker health and safety. Therefore, no air sampling is anticipated to be conducted. If organic odors are detected by the field sampling crew, sampling will cease and air monitoring equipment and respiratory protection acquired before sampling is resumed.

**TABLE 5-3.
OSHA PELs AND ACGIH TLVs FOR SELECTED VOLATILE ORGANIC
COMPOUNDS**

Compound	OSHA PELs		ACGIH TLVs	
	TWA ^a (ppm)	STEL ^b (ppm)	TWA ^a (ppm)	STEL ^b (ppm)
Benzene	1.0	5.0	0.5	2.5
Toluene	100	150	50	-
Ethylbenzene	100	125	100	125
Xylene (o-,m-,p- isomers)	100	150	100	150

^a TWA: Time weighted average is the employee's average airborne exposure in any 8-hour work shift of a 40-hour workweek, which shall not be exceeded.

^b STEL: Short-term exposure limit is the employee's 15-minute time weighted average airborne exposure which shall not be exceeded at any time during a workday.

Petroleum hydrocarbons can also be absorbed through the skin if contact with highly contaminated sediments is made. Dermal exposures will be controlled through the use of personal protective equipment (PPE) as described in Section 8.0.

5.2.4 Explosion and Fire

The types of hydrocarbons potentially expected to be present (gasoline and diesel fuel) are not expected to generate vapors at explosive concentrations during any of the tasks to be performed. All work will be conducted in open-air conditions. Therefore, the potential for vapors to reach explosive concentrations is minimal and vapor monitoring will not be necessary.

5.2.5 Heavy Metals

A variety of heavy metals may be encountered as contaminants in sediments. Some metals are highly toxic; other are also recognized human carcinogens. As most of these materials are not volatile unless heated to extremely high temperatures, control by proper use of PPE and personal hygiene practices will prevent significant exposure. Sampling will involve the collection of wet sediments using a grab sampler under ambient temperatures; therefore, the exposure to volatile metals, such as mercury should be negligible.

The occupational airborne exposure action level to lead as established by OSHA is $30 \mu\text{g}/\text{m}^3$ average over an 8 hour period. Since these samples are wet sediments, the potential for airborne exposures at or above this level is not a risk factor. Still, as lead is expected to be a constituent present in these samples, and staff could potentially have minor exposure, they will be provided information on the content of Appendices A and B of the OSHA Lead Standard (29 CFR 1910.1025). These are the Substance Data Sheet for Occupational Exposure to Lead, and the Employee Standard Summary training. As an added precaution, proper protective equipment is required for handling of these samples. Proper PPE is to include protective gloves and safety glasses.

5.2.6 Unidentified Chemicals

Chemicals not previously identified or considered may be present in the sediments of Naval Subbase New London. Exposure by any route to unidentified chemicals shall be maintained at the absolute practicable minimum level to prevent casual contact with chemicals. Control by proper use of PPE and personal hygiene practices will prevent significant exposure.

Considering the small volume of sampling media to be disturbed, the type of media (wet sediments), the historical concentrations in shoreline areas of the site and the open working conditions of all field operations, significant inhalation exposures at or approaching OSHA or ACGIH exposure limits are not reasonably expected. However, skin or dermal absorption of the contaminants potentially present in sediments is considered a potential route of entry and will be controlled through the use of PPE (i.e., chemical resistant gloves, wet suits, and booties) as described in Section 8.0 of this S-HASP. Ingestion is not considered a significant route of entry for these chemicals on this project. However, the use of PPE and standard safety

procedures (no eating or drinking in operations areas) will minimize the potential for ingestion of sediment-associated contaminants.

5.3 Biological Hazards

Multiple biological hazards may be present at the Naval Subbase New London site and are identified in Table 5-1 along with control measures to be implemented. Field personnel shall carefully review this section.

5.3.1 Aquatic Life

Work in shallow bayous may expose personnel to a variety of aquatic hazards. Project personnel shall not wade barefoot while performing project work. Appropriate footwear includes boots or waders. Free swimming is prohibited.

Samples that are retrieved as part of the sample acquisition process, may contain organic materials that contain biohazard /infectious materials (such as partially decomposed animal or vegetative materials, or parasites). Gloves should be worn when handling these materials. Additionally, any open wound or punctures should be covered to prevent infection. All areas should be disinfected as needed to prevent the spread of potentially hazardous materials and to prevent the contamination of samples. In the event that someone receives a cut, puncture, or abrasion, appropriate first aid should be administered to prevent infection.

5.4 Task-Specific Hazards

The following tasks have specific hazards and control measures that are described below.

5.4.1 Boat Operation

A site-specific boat operation plan has been prepared for sampling activities on this project. The activity hazard analyses that will be performed for boating activities is presented in Attachment D, Boat Operation and Water Safety.

5.4.2 Work Over or Near Water

When working over or near water, there is a potential for employees to fall in and the danger of drowning exists. Work within 15 feet of unobstructed access to water shall be performed in accordance with the requirements given below. Except where employees are protected by continuous guardrails, safety belts, or nets, or work along beaches or similar shorelines, the following requirements shall be met by all personnel:

- Personnel will use the buddy system at all times.
- Swimming shall be prohibited for personnel, unless necessary to prevent injury or loss of life.

- All personnel shall wear an USCG Type V work vest of the type approved for special conditions.
- Each boat shall be supplied and equipped with the following:
 - Oars and oarlocks suitable attached (except on inboard powered boats)
 - Anchor
 - Fire extinguisher
 - One life preserver per person
 - First Aid kit

Persons shall refer to Attachment D for safety requirements when chartering or operating small craft.

6.0 AIR MONITORING AND CONTROL MEASURES

No area air monitoring is planned because inhalation exposures of concern are not reasonably anticipated for any of the project activities to be performed (see Section 5.2 of this S-HASP).

7.0 GENERAL PROJECT SAFETY REQUIREMENTS

7.1 General Safety Precautions

The project operations shall be conducted with the following minimum safety requirements employed:

- Smoking will not be permitted on project property or on board watercraft.
- Eating and drinking will be restricted to areas outside the operations area.
- Wearing loose clothing around operating machinery (engines, etc.) will be prohibited; loose hair shall be appropriately secured.
- Closed toe and heel shoes with good traction appropriate for walking on uneven surfaces will be worn.
- Long-sleeve shirts, long pants and sunscreen will be worn as appropriate to prevent sunburn/windburn.
- Layers of clothing are recommended to prevent hypothermia or heat stress.
- All personnel shall be required to wash or wipe hands and face before eating or drinking.
- Gross decontamination and removal of all personal protective equipment shall be performed prior to exiting the facility.

- The Site Safety Officer and all field employees will be responsible to identify and alert other field team members to physical hazards present at the site.

Additional safety precautions for specific operations are described in Section 8.0 of this S-HASP.

7.2 Symptoms of Chemical Exposure

Field operations personnel shall inform each other of non-visual symptoms that may indicate chemical exposure such as:

- Headaches;
- Dizziness;
- Difficulty breathing;
- Nausea;
- Blurred vision;
- Cramps;
- Irritation of eyes, skin, or respiratory tract;
- Changes in complexion or skin discoloration;
- Changes in apparent motor coordination;
- Changes in personality or demeanor;
- Excessive salivation or changes in papillary response; and
- Changes in speech ability or pattern.

7.3 Heat Stress

Adverse climate conditions such as heat are important considerations in planning and conducting site operations. Heat-related illnesses range from heat fatigue to heat stroke, with heat stroke being the most serious condition. The ambient temperature can cause physical discomfort, loss of efficiency, and personal injury, and can increase the probability of accidents. In particular, protective clothing that decreases the body's ventilation can be a significant factor leading to heat-related illnesses. To reduce the possibility of heat-related illness, workers should drink plenty of fluids and establish a work schedule that will provide sufficient rest periods for cooling down. Workers should be aware of signs and symptoms of heat-related illnesses, as well as first aid for these conditions. These are summarized in Table 7-1.

**TABLE 7-1.
HEAT STRESS SYMPTOMS AND FIRST AID**

Condition	Signs	Symptoms	Response
Heat Rash or Prickly Heat	Red rash on skin.	Intense itching and inflammation.	Increase fluid intake and observe affected worker.
Heat Cramps	Heavy sweating, lack of muscle coordination.	Muscle spasms, and pain in hands, feet, or abdomen.	Increase fluid intake and rest periods. Closely observe affected worker for more serious symptoms.
Heat Exhaustion	Heavy sweating; pale, cool, moist skin; lack of coordination; fainting.	Weakness, headache, dizziness, nausea.	Remove worker to a cool, shady area. Administer fluids and allow worker to rest until fully recovered. Increase rest periods and closely observe worker for additional signs of heat exhaustion. If symptoms of heat exhaustion recur, treat as above and release worker from the day's activities after he/she has fully recovered.
Heat Stroke	Red, hot, dry skin; disorientation; unconsciousness.	Lack of, or reduced, perspiration; nausea; dizziness and confusion; strong, rapid pulse.	Immediately contact emergency medical services by dialing 911. Move the victim to a cool, shady location and observe for signs of shock. Attempt to comfort and cool the victim by administering small amounts of cool water (if conscious), loosening clothing, and placing cool compresses at locations where major arteries occur close to the body's surface (neck, underarms, and groin areas). Carefully follow instructions given by emergency medical services until help arrives.

Because the occurrence of heat stress depends on a variety of factors, all workers, even those not wearing PPE, should be monitored. Monitoring for heat stress will be initiated when the ambient temperature exceeds 70 degrees Fahrenheit. To monitor workers, heart rate will be measured as follows:

- Count the radial pulse during a 30-second period as early as possible in the rest period.
- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

Initially, the frequency of physiological monitoring will depend on the air temperature, humidity and level of physical work. The length of the work cycle will be governed by the results of the required physiological monitoring. A rest period of 10 minutes per hour will be the initial work/rest regimen and will be adjusted as necessary by actual field conditions.

7.4 Hypothermia

There is also a potential for hypothermia from exposure to potentially cool air temperatures, windy conditions and low water temperatures. The signals of hypothermia include shivering, numbness, glassy stare, reduction of rational decision-making, apathy, weakness, impaired judgment, or a loss of consciousness. To care for workers that have hypothermia, the following steps should be taken:

- Gently move the person to a warm place.
- Remove any wet clothing from the person and dry the person.
- Warm the person SLOWLY by wrapping them in blankets or by putting dry clothing on the person.
- Hot water bottles and chemical hot packs may be used when the person is first wrapped in a towel or blanket.
- DO NOT WARM PERSON TOO QUICKLY, such as immersing him or her in warm water. Rapid warming can cause dangerous heart rhythms.

8.0 PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

PPE consists of standard safety equipment required on the site and special safety equipment required for specific tasks or activities. Navy contractors and sub-contractors (field personnel) will provide their own PPE. All field personnel are expected to come to work with proper safety equipment as specified in this HASP to be provided by their respective employers. In addition, all field personnel entering the Site shall comply with any task-specific safety requirements.

The level of equipment required at the Site will depend on the activities being performed. This level may be revised as conditions change as determined by the SSO. The PPE selection will be determined based on its potential use, and the manufacturer's permeation and degradation properties for the contaminants being worked with. A description of the proposed initial PPE for all fieldwork at this Site and for sample collection activities is presented below.

The minimum required protective clothing for all fieldwork at the Naval Subbase New London consists of the following:

- Safety glasses;
- Leather work boots with steel toe and shank;

- Long pants;
- Short-sleeved shirt or short-sleeved T-shirt;
- Personal Flotation Device;
- Protective gloves-leather and/or chemical resistant
- Ear plugs (as required); and
- Rubber over-the-sock boot with steel toe and shank (optional).

9.0 DECONTAMINATION/CONTAMINATION REDUCTION PROCEDURES

Boots, clothing, gloves, and other equipment can become contaminated by direct exposure to potentially contaminated sediments. Decontamination of PPE will consist of washing PPE with soap and water to remove sediment. These activities will occur on the watercraft to prevent the transport of contaminants off the site unless in an approved container or other approved method. A decontamination station will be designated, configured, and secured at the site if appropriate. Contaminated disposable PPE or clothing will be placed in appropriate storage or disposal receptacles and removed from the site within 90 days to a proper disposal facility. All decontamination fluids and solids will be controlled and contained in appropriate containers and removed from the site within 90 days to a proper disposal facility.

10.0 EMERGENCY RESPONSE PROCEDURES

Project personnel shall carefully review the aforementioned procedures. This section describes emergency equipment to be taken into the field and site-specific procedures to be followed in case of an emergency.

10.1 Emergency Equipment

First aid and bloodborne pathogen (BBP) kits will be taken into the field each day during sampling and related field activities. To assure immediate access to first aid and BBP supplies, kits will be provided for each field team if these teams will be working in separate locations. Portable fire extinguishers will be available in all areas where gas powered pumps or engines will be used.

10.2 General Emergency Procedures

In the event of a fire, explosion, physical injury or illness due to physical or chemical exposure, the appropriate parties should be contacted using the phone numbers listed at the end of this section. In addition to notifying the Naval Subbase New London Contact, the site safety officer or designee shall notify the Battelle Health & Safety Officer (Donald Cagle) and the Project

Manager (Patricia White) as soon as possible after appropriate emergency services have been notified and appropriate measures taken to protect people, environment, and property. Weather radios, two-way radios and/or cell phones will be in working condition and available on all watercraft used for field sampling activities.

10.3 BBP Control Plan

All personnel should be aware of the potential to transmit disease from contact with body fluids. Personnel should assume that all bodily fluids are potentially infectious and use appropriate precautions. Controls to be considered are as follows:

- Use of the victim's hand to control initial bleeding;
- Use of available protective gear (Tyvek[®], gloves) to prevent contact;
- Wash promptly after contact with body fluids;
- Use barrier mask while giving CPR;
- Decontaminate any area contaminated with bodily fluids with a 10:1 solution of water to bleach as soon as possible.

10.4 Medical Emergency Procedures

For injuries or illness other than very minor cuts or scrapes, a physician's attention is required. **For treatment of potentially life-threatening injury or illness, call 911 for assistance.**

For treatment of minor injuries or illness, personnel should be transported to the Pequot Health Center in Groton, CT. Directions to the Pequot Health Center are provided below, and maps are provided in Attachment A.

**TABLE 10-1:
EMERGENCY TELEPHONE NUMBERS**

Emergency Assistance		911
Pequot Health Center (closest emergency room)		(860) 446-8265
Lawrence and Memorial Hospital (alternate emergency room)		(860) 442-0711
Ambulance		911
Police		911
Fire Department		911
Naval Subbase New London Contact - Dick Conant		(860) 694-5176
Neptune and Company - Dean Neptune or Greg McDermott		(703) 690-6868
RCRA Hotline		(800) 424-9346
EPA National Response Center		(800) 424-8802
Poison Control Center		(800) 523-2222
Office of Emergency Services		(800) 852-7550
CHEMTREC		(800) 424-9300
Battelle Duxbury Office		(781) 934-0571
Battelle Project Manager – Patty White	(Office)	(781) 952-5279
	(Cell)	(508) 563-6948
Battelle Program Manager – Donald Gunster	(Office)	(781) 952-5378
	(Cell/Pager)	(617) 435-8444
Battelle Health & Safety Officer – Don Cagle	(Office)	(614) 424-5917
	(Cell)	(614) 206-9527

HOSPITAL INFORMATION

CLOSEST EMERGENCY ROOM:

Pequot Health Center

52 Hazelnut Hill Road

Groton, CT 06340

Phone: 860-446-8265

EMERGENCY ROOM HOURS: 7:00AM to 11:00PM

- Exit Naval Subbase New London on Crystal Lake Road (south edge of base).
- Turn right on CT-12.
- Continue on US-1.
- Bear right to take the I-95 North ramp towards Providence.
- Merge onto I-95 N.
- Take the CT-117 exit towards Groton Long Pt./Noank, exit 88.
- Turn right on North Road.
- Bear left on Hazelnut Hill Road.

Total estimated time: 10 minutes

Total distance: 4.8 miles

ALTERNATE EMERGENCY ROOM:

Lawrence and Memorial Hospital

365 Montauk Ave.

New London, CT 06320

Phone: 860-442-0711

EMERGENCY ROOM HOURS: OPEN 24 HOURS

- Exit Naval Subbase New London on Crystal Lake Road (south edge of base).
- Turn right on CT-12.
- Bear right on US-1 South.
- Take the I-95 South ramp and merge onto I-95 South.
- Take the 84S-N-E/CT-32 exit towards Hodges Sq/State Pier.
- Continue on Williams St.
- Turn left on Huntington St.
- Turn right on Jay St.
- Continue on Truman St.
- Turn right on Bank St.
- Turn left on Montauk Ave.

Total estimated time: 15 minutes

Total distance: 6.7 miles

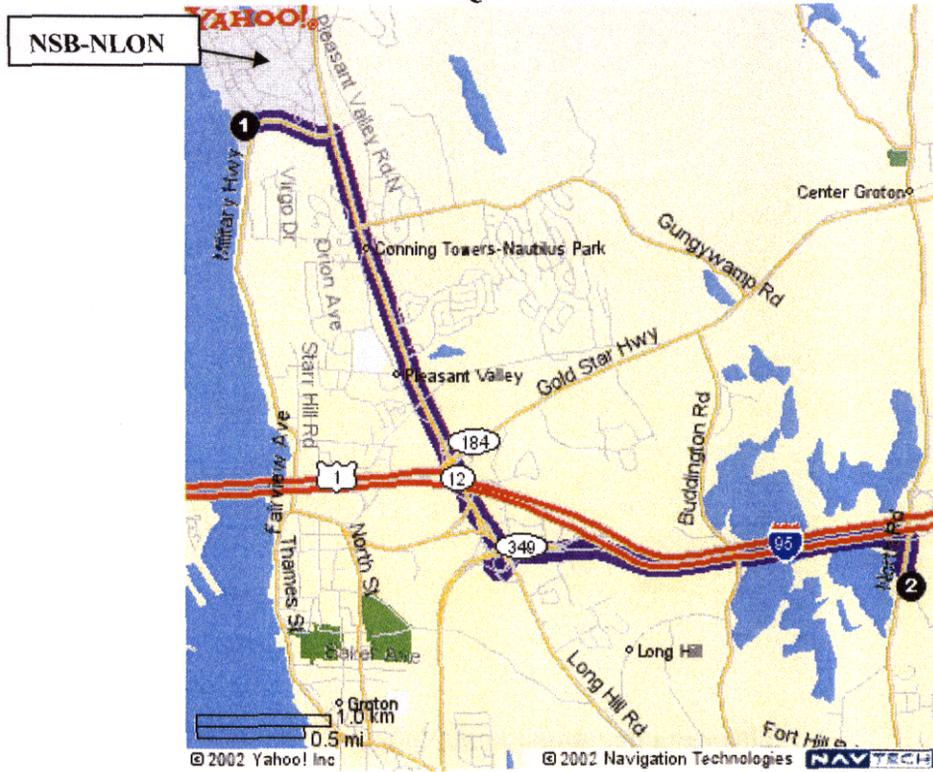
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ATTACHMENT A

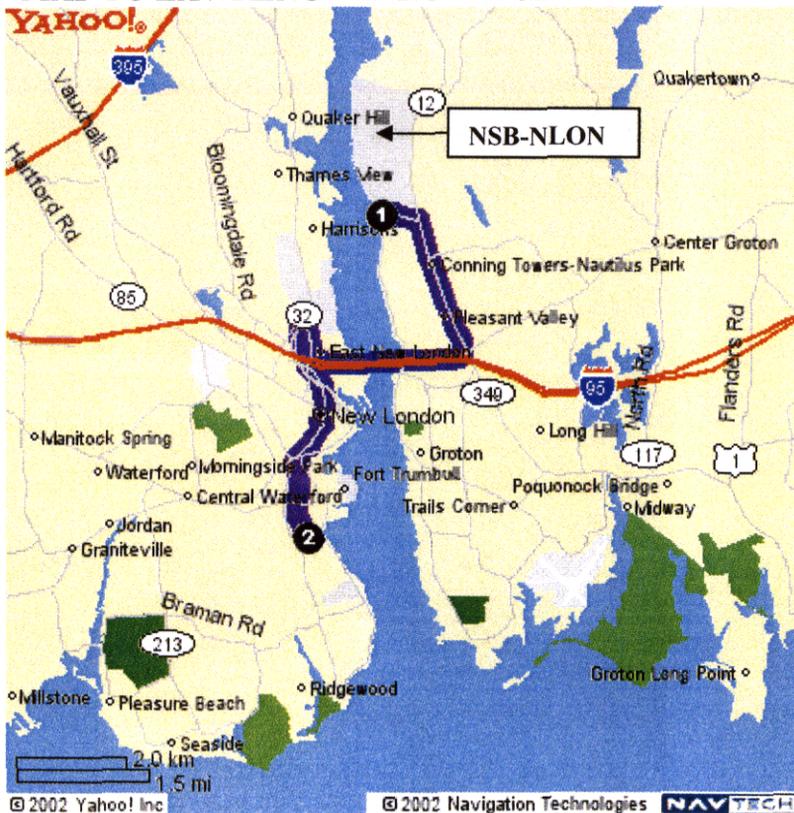
SITE LOCATION MAP AND HOSPITAL LOCATION MAP

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MAP TO PEQUOT HEALTH CENTER



MAP TO LAWRENCE AND MEMORIAL HOSPITAL



ATTACHMENT B

SITE-SPECIFIC HEALTH AND SAFETY TRAINING RECORD FORMS

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**SITE-SPECIFIC HEALTH AND SAFETY PLAN (HASP)
TRAINING RECORD**

HASP Title/Revision No. Health and Safety Plan for Sampling Activities in Support of the Rapid Sediment Characterization Pilot Study (Draft, February 24, 2003).

Site Safety Officer

G486305
Project Number

I have read the HASP presented herein and fully understand the material covered. I understand that I am responsible for compliance with the requirements of this HASP and I agree to abide by the same. I also had the opportunity to discuss the information presented in the HASP, and to ask any questions about the information that I want clarified. I understand that this record will become a permanent part of my employee health and safety training file.

Date	Print Name	Signature
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ATTACHMENT C

TAILGATE SAFETY MEETING RECORD FORMS

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ATTACHMENT D

**ACTIVITY HAZARD ANALYSIS
FOR
BOAT OPERATION AND WATER SAFETY**

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Table D-1. Activity Hazard Analysis for Boat Operation and Water Safety.

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<p><i>Identify the principal steps involved and the sequence of work activities</i></p> <ol style="list-style-type: none"> 1. Engine start-up. 2. Engine operation. 3. Boat handling. 4. Sampler handling. 	<p><i>Analyze each principal step for potential hazards</i></p> <ol style="list-style-type: none"> 1. & 2. Possible fire hazard. 2. Running out of fuel during operation. 3. a) Slip and fall hazards including falling overboard. b) Collisions with other vehicles. c) Stranding on mudflat. 4. Improper operation. 	<p><i>Develop specific controls for each potential hazard</i></p> <ol style="list-style-type: none"> 1. & 2. Cut engine while fueling. 2. Check oil and fuel prior to leaving dock. 3. a) Use handholds, wear shoes with good traction, and approved life jacket. b) Be aware of surroundings. c) Pay attention to tides. 4. Sampler shall only be operated by experienced users or under the close supervision of experienced users.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p><i>List equipment to be used in the work activity</i></p> <ol style="list-style-type: none"> 1. USCG Type III life jackets. 2. GPS/depth finder. 3. Anchor and tie-lines. 4. Fire extinguisher. 5. Extra fuel. 6. Radio/cell phone/horn. 7. Tools. 8. First Aid Kit. 9. Grab sampler. 	<p><i>List inspection requirements for the work activity</i></p> <ol style="list-style-type: none"> 1. Check for wear and operation of buckles. 2 - 9. Check prior to leaving dock to assure operational and in good working condition. 	<p><i>List training requirements, including hazard communication</i></p> <ol style="list-style-type: none"> 1. Boat operator shall have experience operating similar vessels under similar conditions.

Source: Engineer Manual 385-1-1, Safety and Health Requirements Manual, U.S. Army Corps of Engineers, September 3, 1996.