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SITE-SPECIFIC HEALTH AND SAFETY PLAN FOR PRELIMINARY CONTAMINATION ASSESSMENT PLAN NORTH FUEL FARM NAS CECIL FIELD FL

9/1/1994

ABB ENVIRONMENTAL

SITE-SPECIFIC HEALTH AND SAFETY PLAN

FOR

PRELIMINARY CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT TASK ORDER (CTO): 105

CONTRACT NUMBER: N62467-89-D-0317

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September 1994

TABLE OF CONTENTS

Site-Specific Health and Safety Plan
Naval Air Station Cecil Field
Jacksonville, Florida

TABLE OF CONTENTS

Site-Specific Health and Safety Plan
Naval Air Station Cecil Field
Jacksonville, Florida

LIST OF FIGURES

LIST OF TABLES

REFERENCES

The following chapters of the Comprehensive Long-term Environmental Action Navy (CLEAN) Program District I Generic Health and Safety Plan (HASP) are applicable for the work anticipated at the site:

- ✓ 2.0 AUTHORITY AND RESPONSIBILITY OF HEALTH AND SAFETY PERSONNEL
- ✓ 3.0 TRAINING PROGRAM
- ✓ 4.0 MEDICAL SURVEILLANCE PROGRAM
- ✓ 5.0 ENGINEERING CONTROLS
- ✓ 6.0 PERSONAL PROTECTIVE LEVEL DETERMINATION
- ✓ 7.0 MONITORING EQUIPMENT
- ___ 8.0 ZONATION
- ✓ 9.0 WORK PRACTICES
- ___ 10.0 CONFINED SPACE ENTRY PROCEDURES
- ___ 11.0 EXCAVATION AND TRENCHING
- ✓ 12.0 TEMPERATURE EXTREMES
  - ✓ HEAT STRESS
  - ___ COLD STRESS
- ✓ 13.0 DECONTAMINATION
- ✓ 14.0 EMERGENCY PLANNING
- ✓ 15.0 HEALTH AND SAFETY FORMS AND DATA SHEETS
  - ___ HEALTH AND SAFETY AUDIT FORM
  - ✓ ACCIDENT REPORT FORM
  - ✓ HEALTH AND SAFETY OFFICER (HSO) CHECKLIST FOR FIELD OPERATIONS
  - ✓ MATERIAL SAFETY DATA SHEETS
  - ___ LIQUI-NOX
  - ___ ETHYL ALCOHOL (denatured)
  - ___ TRISODIUM PHOSPHATE
  - ✓ OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) POSTER
  - ✓ DAILY HEALTH AND SAFETY AUDIT FORM
- ___ 16.0 RESPIRATORY PROTECTION PROGRAM
- ___ 17.0 OTHER
  - ___ ILLUMINATION
  - ___ SANITATION
  - ___ HEALTH AND SAFETY AUDIT PROCEDURES

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CAR	contamination assessment report
CARA	contamination assessment report addendum
CFR	Code of Federal Regulations
CLEAN	Comprehensive, Long-term Environmental Action, Navy
CNS	central nervous system
CTO	Contract Task Order
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
GC	gas chromatograph
HASP	Health and Safety Plan
HSM	Health and Safety Manager
HSO	Health and Safety Officer
HSS	Health and Safety Supervisor
NAS	Naval Air Station
NFFA	North Fuel Farm Area
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PAH	
PM	project manager
ppm	parts per million
RAP	Remedial Action Plan
USEPA	U.S. Environmental Protection Agency

1.0 GENERAL

1.1 SCOPE AND PURPOSE. This Health and Safety Plan (HASP) has been prepared in conformance with the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Program District I HASP and is intended to meet the requirements of 29 Code of Federal Regulations (CFR) 1910.120. As such, the HASP addresses those activities associated with field operations for this project. Compliance with this HASP is required for all ABB Environmental Services, Inc. (ABB-ES), personnel, contractor personnel, or third parties entering the site.

1.2 PROJECT PERSONNEL.

1.2.1 Project Manager The project manager (PM) is the individual with overall project management responsibilities. Those responsibilities as they relate to health and safety include provision for the development of this site-specific HASP, the necessary resources to meet requirements of this HASP, the coordination of staff assignments to ensure that personnel assigned to the project meet medical and training requirements, and the means and materials necessary to resolve any health and safety issues that are identified or that develop on the project.

1.2.2 General Site Supervisor The General Site Supervisor is either the PM or the PM's designee, who is onsite and vested with the authority by the PM to carry out day-to-day site operations, including interfacing with the site Health and Safety Officer (HSO).

1.2.3 Health and Safety Officer The HSO for this project has been designated by the PM with concurrence of the Health and Safety Supervisor (HSS) or Health and Safety Manager (HSM). The HSO will have at least an indirect line of reporting to the HSM through the HSS for the duration of his/her assignment as project HSO. The HSO is responsible for developing and implementing this site-specific HASP in accordance with the CLEAN HASP. The HSO will investigate all accidents, illnesses, and incidents occurring onsite. The HSO will also conduct safety briefings and site-specific training for onsite personnel. As necessary, the HSO will accompany all U.S. Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), or other governmental agency personnel visiting an ABB-ES site in response to health and safety issues. The HSO, in consultation with the HSS or HSM, is responsible for updating and modifying this HASP as site or environmental conditions change.

1.3 TRAINING. Training is defined under the CLEAN HASP. All personnel entering potentially contaminated areas of this site must complete a 40-hour training program and meet the requirements set by OSHA in standard 29 CFR 1910.120. Personnel without the required training **will not be permitted** in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange). Refer to Chapter 3.0 of the CLEAN HASP for further information.

All personnel assigned to an ABB-ES site must participate in the site-specific training presentation, which will cover major elements of the site HASP, as well as health and safety procedures regarding an individual's specific job responsibilities and tasks. The site HSO or health and safety designee will

provide this training before an individual is permitted to work in a downrange position.

1.4 **MEDICAL SURVEILLANCE**. All personnel entering potentially contaminated areas of this site will be medically qualified for site assignment through a medical surveillance program outlined in the CLEAN HASP. Personnel who have not received medical clearance **will not be permitted** in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange). Refer to Chapter 4.0 of the CLEAN HASP for further information.

2.0 FACILITY SITE CHARACTERIZATION AND ANALYSIS

2.1 SITE NAME, LOCATION, AND SIZE. The North Fuel Farm Area (NFFA) is located at Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. The base is situated in southwestern Duval County at the junction of Highway 228 (Normandy Boulevard) and 103rd Street.

2.2 SITE HISTORY AND LAYOUT. The NFFA consists of the North Fuel Farm, the Truck Stand adjacent to the North Fuel Farm, and eight sites along Sal Taylor Creek affected by the release of 900,000 gallons of JP-5 jet fuel from Tank 76E at the North Fuel Farm. The North Fuel Farm and the Truck Stand are located at the northeast corner of A Avenue and Loop Road at NAS Cecil Field (see Figure 2-1 in the North Fuel Farm Contamination Assessment Plan [CAP]). The sites along Sal Taylor Creek extend from the North Fuel Farm to the property boundary at the southwest part of the site, approximately 4,500 feet south of Lake Fretwell near the confluence of Rowell and Sal Taylor Creeks. Throughout the period the site has been in operation, releases of JP-5 jet fuel have reportedly occurred. The most recent major release occurred on February 9 and 10, 1991. An estimated 900,000 gallons of JP-5 jet fuel overflowed from and subsequently ruptured storage tank 76E, entering Sal Taylor Creek. JP-5 was observed at seven locations along Sal Taylor Creek where the released fuel pooled around dams and ponds. These seven areas are identified as the Avord Dam site, North Containment Pond site, Gate 10 Dam site, Alpha Dam site, Avord/Perimeter Road site, Possum Dam site, and Gate 14 Dam site.

Contamination assessment reports (CARs) for the JP-5 spill area and the seven dam sites along Sal Taylor Creek and a CAR addendum (CARA) for the Truck Stand facility (NFFA sites) were submitted to the Florida Department of Environmental Protection (FDEP) in July 1994. However, due to the recent discovery of a deep benzene plume located east of earth-mounted storage Tanks 76A and 76C, ABB-ES has requested that the contamination assessment and the Remedial Action Plan (RAP) for this facility be addressed as a single separate site, which will herein be designated as the North Fuel Farm site.

The North Fuel Farm. The North Fuel Farm is located at the northeast corner of A Avenue and Loop Road at NAS Cecil Field (see Figure 2-2 in the North Fuel Farm CAP). Numerous spills have occurred in the past. Anecdotal evidence suggests that in 1954 approximately 190,000 gallons of JP-5 were spilled from an unknown tank at the North Fuel Farm site. The two most recent major spills were on August 3, 1987, when an estimated 22,772 gallons of JP-5 were spilled, and on February 9 and 10, 1991, when an estimated 900,000 gallons were released. The field investigation conducted in December 1990 assessed the spills through 1990. Supplemental field investigations in July 1991 and February 1992 were conducted as preliminary assessments for the 1991 spill, which affected the sites along Sal Taylor Creek.

A CA was performed by ABB-ES in December 1990 and from June 1991 through February 1992. The objectives of the contamination assessment were to identify petroleum contaminants at the site, assess the degree and extent of petroleum contamination in soils and in the groundwater, and recommend a feasible course of action, if necessary, to attain compliance with State regulations.

Thirty-seven soil borings, 26 shallow monitoring wells, and 4 deep monitoring wells were installed at the site. Soil and groundwater quality samples were collected and analyzed for petroleum constituents of the kerosene analytical group as defined in Chapter 17-770, Florida Administrative Code (FAC).

The FDEP reviewed the CAR submitted by ABB-ES in July 1992 and recommended that additional soil borings and groundwater monitoring wells be installed and sampled to better delineate the extent of soil contamination and free product at the site. FDEP also recommended that the 900,000 gallon JP-5 fuel spill at the North Fuel Farm be assessed and that the comments to the North Fuel Farm CAR be incorporated into the CAR for the 900,000-gallon release.

ABB-ES returned to the North Fuel Farm in January 1994 and in May 1994 and installed seven shallow monitoring wells (CEF-076-31, CEF-076-32, CEF-076-34 through CEF-076-38), three intermediate monitoring wells (CEF-076-33D, CEF-076-39D, and CEF-076-40D), and one deep monitoring well CEF-076-41D. The shallow monitoring wells were installed to address FDEP comments and to delineate free product at the site. Intermediate and deep monitoring wells were installed to address FDEP comments and to delineate the deep benzene plume.

Due to the recent discovery of the deep benzene plume associated with the tank leaks which apparently occurred approximately 35 to 40 years ago at the North Fuel Farm, ABB-ES has requested that the contamination assessment and the RAP for the site be addresses as a single separate site, and additional delineation of the deep benzene plume be completed prior to submittal of a Technical Memorandum proceeded by a CAR and/or CARA.

2.3 SCOPE OF WORK (WORKPLAN). ABB-ES will conduct a contamination assessment at the site to evaluate the horizontal and vertical extent of potential petroleum contamination (particularly benzene) in soil and groundwater at the North Fuel Farm. The field investigation will consist of advancing 20 soil borings and collecting soil and groundwater samples with a hydropunch and split-spoon sampler. Borehole advancement will be accomplished using conventional hollow-stem auger drilling techniques. Soil samples will be obtained every 5 feet using split-spoons at each sampling location. An estimated 400 soil samples will be collected for lithologic description. Groundwater samples will be obtained every 20 feet from land surface to approximately 100 feet below land surface (bls) from each sampling location using a hydropunch. An estimated 100 groundwater samples will be collected. Groundwater samples will be analyzed in the field using a purge-and-trap gas chromatograph (GC). In addition, 10 of the 100 groundwater samples collected will be split and analyzed by an FDEP-approved laboratory to confirm the validity of the GC screening data.

3.0 TASK ANALYSIS

3.1 TASK ONE.

3.1.1 Hazardous Substances The contaminants of concern known or suspected to be present onsite, along with established exposure limits for those substances, are listed in Table 3-1.

Table 3-1
Contaminants of Concern

Site-Specific Health and Safety Plan
Naval Air Station Cecil Field
Jacksonville, Florida

Chemical	Approximate Odor Threshold (ppm)	Permissible Exposure Limits (ppm)	Threshold Limit Value (ppm)	Physical Characteristics	Dermal Toxicity	Remarks
Benzene	4.7	1	1	Colorless liquid, pleasantaromatic odor.	Moderate skin irritant.	Inhalation of large amounts attacks central nervous system (CNS); chronic poisoning causes leukemia.
Ethylbenzene	140	100	100	Colorless liquid, aromatic odor.	Moderate skin irritant.	Liquid blisters skin, inhalation results in dizziness, depression.
Toluene	0.17	100	100	Colorless liquid, pleasantaromatic odor.	Mild skin irritant.	Ingestion or aspiration can cause pulmonary edema, depressed respiration, kidney and liver damage.
Xylene	0.05	100	100	Colorless liquid, aromatic odor.	Moderate skin irritant.	Inhalation causes headache and dizziness; vapors irritate eyes; can be fatal if ingested.
Naphthalene	--	10	10	Colorless to brown solid with an odor of mothballs.	Moderate skin irritant	Inhalation causes headache and confusion; vapors irritate eyes.

Note: ppm = parts per million.

3.1.2 Site Risks The following are the health hazards and safety hazards that are expected to be encountered at the site.

3.1.2.1 **Health Hazards** Contaminants to which personnel may be exposed are JP-5 jet fuel and its constituents. JP-5 jet fuel is a kerosene based fuel. The primary constituents of JP-5 that represent potential health hazards are described below and summarized in Table 3-1.

BENZENE is a colorless liquid with a pleasant aromatic odor. It is a moderate irritant in small amounts both as a gas and as a liquid. If inhaled in large amounts, it attacks the central nervous system, possibly resulting in coma and/or respiratory arrest. Chronic poisoning causes leukemia.

ETHYLBENZENE is a colorless aromatic liquid. It is a moderate skin irritant in gaseous form. Inhalation of high concentrations of the gas may cause temporary

irritation of the nose, dizziness, and depression. The liquid form can blister the skin if not washed off immediately.

TOLUENE is a colorless liquid with a pleasant aromatic odor. It is a mild skin irritant. Inhalation of high concentrations of the gas can cause temporary smarting of the eyes or irritation of the respiratory system. If the liquid form is allowed to remain on the skin for a long period of time, smarting and reddening of the skin may occur. Ingestion or aspiration of the liquid causes depressed respiration and pulmonary edema and can result in kidney or liver damage.

XYLENE is a colorless, liquid with a sweet odor. It is a moderate skin irritant. When present as a gas in high concentrations, it can cause temporary slight smarting of the eyes or irritation of the respiratory system, headache, and dizziness. The liquid form may cause smarting or reddening of the skin if not washed off immediately. If the liquid is aspirated into the lungs, it can result in severe coughing, distress, and rapidly developing pulmonary edema. If ingested, nausea, vomiting, cramps, headache, and coma can occur and may be fatal. Ingestion may also result in kidney and liver damage.

POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs), for the purposes of this plan and study, include those listed as parameters for USEPA Method 610. Some of the more notable PAHs from this method include acenaphthene, anthracene, chrysene, fluorene, naphthalene, phenanthrene, and pyrene. Details of these compounds are listed in Chapter 4.0.

All activities at this site will be conducted in unconfined areas. This will minimize the chances of exposure of onsite personnel to either high vapor concentrations or strong liquid concentrations of any of the substances described above.

3.1.2.2 **Safety Hazards** Safety hazards include those hazards to which personnel may be exposed that are unrelated to hazardous wastes. These include hazards such as heat stress, snake bites, alligator and wild boar attacks, operation of and presence around heavy equipment, lifting of objects, and vehicle traffic. Extreme caution should be practiced by all personnel while conducting work around drill rigs, backhoes, and other heavy equipment. During hot days, personnel should take time to drink fluids and cool off to avoid overheating and symptoms related to heat stress. Personnel working in a boat or wading a stream will be required to wear life vests. While in heavy brush or in or near water, extreme care should be taken to avoid snakes, alligators, and other native wildlife.

Lifting of heavy objects should be done with caution. Personnel should assist one another with moving heavy objects or use the appropriate equipment to accomplish these tasks. During all site activities, personnel should be aware of the possibility of an encounter with poisonous snakes, particularly rattlesnakes in pine woods and water moccasins around water.

Power substations, power lines, underground utilities, and underground pipelines are to be avoided during drilling operations. Necessary work permits for activities at the Naval activities will be obtained from the Public Works Department or the appropriate department (e.g., fire department, etc.).

3.1.2.3 **Conclusions and Risk Assessment** Based on all of the available information (nature of the work, potential onsite chemicals and their properties, exposure limits, etc.), hazards associated with conducting the described field work are considered to be low, assuming appropriate health and safety practices are maintained.

3.1.3 **Protective Measures** The following are the protective measures that will be used at the site.

3.1.3.1 **Engineering Controls** Whenever needed, engineering controls (i.e., fans to blow volatilized chemicals away from the work area) will be used.

3.1.3.2 **Levels of Protection** A Level D work uniform will be used at the site. Level D protection should only be used when the atmosphere contains no known hazard; all potential airborne contaminants can be monitored; and work functions preclude splash, immersion, or the potential for unexpected inhalation or contact with hazardous levels of any chemical.

3.1.4 **Monitoring** It is intended that real time monitoring instrumentation will be used to monitor the work environment in order to ensure the appropriate level of protection for the site team.

3.1.4.1 **Air Sampling** To the extent feasible, the presence of airborne contaminants will be evaluated through the use of direct reading instrumentation. Information gathered will be used to ensure the adequacy of the levels of protection being used at the site, and may be used as the basis for upgrading or downgrading the levels of protection in conformance with action levels provided in this HASP and at the direction of the site HSO.

The following sampling equipment will be used at the site. Refer to Chapter 7.0 of the CLEAN HASP for information on the calibration and maintenance of the equipment.

1. Foxboro Organic Vapor Analyzer Model 128 (OVA)

If the OVA detects a steady measurable quantity of organic vapors greater than 5 parts per million (ppm; above background conditions) in the breathing zone, the field team will withdraw from the site until health and safety conditions at the site are reevaluated.

3.1.4.2 **Personal Monitoring** Personal monitoring will be undertaken to characterize the personal exposure of high risk employees to the hazardous substances they may encounter onsite. Personal monitoring will be conducted on a representative basis. Personnel who are represented by the sampling will be noted in field logs.

The following personal monitoring equipment will be used at the site. Refer to Chapter 7.0 of the CLEAN HASP for information on the maintenance and calibration of the equipment.

1. Thermoluminescent Dosimetry Body Badge

4.0 DATA SHEETS

5.0 SITE CONTROL

5.1 ZONATION. Due to the nature of the work (multiple soil borings and monitoring well sampling throughout the study area) and the properties of the potential chemicals found onsite, typical exclusion, contamination reduction, and support zones are not necessary or practical at all locations. Therefore, where appropriate, a "floating" exclusion zone in the perimeter of the sampling site will be established to eliminate access to the area by individuals not working on the project or involved in the assessment work. The perimeter will be at least 20 feet in radius and moved accordingly as the assessment points are moved.

5.2 COMMUNICATIONS. When radio communication is not used, the following air horn signals will be employed:

HELP	three short blasts	(. . .)
EVACUATION	three long blasts	(_ _ _)
ALL CLEAR	alternating long and short blasts	(_ . _ .)

5.3 WORK PRACTICES. General work practices to be used during ABB-ES projects are described in Chapter 9.0 of the CLEAN HASP. Work at the site will be conducted according to these established protocol and guidelines for the safety and health of all involved. Specific work practices necessary for this project or those that are of significant concern are described as follows.

- Work and sampling will be conducted in Level D clothing and equipment.
- While working in a boat or wading in a stream, all personnel will wear a life vest.

6.0 DECONTAMINATION AND DISPOSAL

All personnel and equipment leaving contaminated areas of the site will be subject to decontamination, which will take place in the contamination reduction zone. General decontamination practices used during ABB-ES projects are described in Chapter 13.0 of the CLEAN HASP.

6.1 PERSONNEL DECONTAMINATION. All personnel leaving the study area are subject to decontamination (as necessary). The decontamination procedure required will be determined by the nature and level of contamination found at the sites. At a minimum, site personnel will remove loose soil from boots and clothing before leaving the site. More thorough decontamination procedures will be observed as dictated by site conditions. These procedures are described in Chapter 13.0 of the CLEAN HASP.

6.1.1 Small Equipment Decontamination Small equipment will be protected from contamination as much as possible by keeping the equipment covered when at the site and placing the equipment on plastic sheeting, not on the ground. Sampling equipment used at the site will be used only once or will be field cleaned between samples with soapy water (Alconox), rinsed with clean water, rinsed with an approved Quality Assurance/Quality Control solvent, and final rinsed with organic free water.

6.1.2 Heavy Equipment Decontamination Drilling equipment will be protected from contamination as much as possible by placing the equipment on plastic sheeting, not on the ground. The drill rig and associated drilling equipment will be cleaned with high pressure water or high pressure steam followed by a soap and water wash and rinse. Loose material will be removed by brush. The person performing this activity will be at the level of protection used during the field investigation.

6.2 COLLECTION AND DISPOSAL OF DECONTAMINATION PRODUCTS. All disposable protective gear, decontamination fluids (for both personnel and equipment), and other disposable materials will be disposed of at the site. Decontamination fluids (e.g., isopropanol from split spoons and groundwater sampling pumps) will be stored in amber glass bottles. Disposable materials (e.g., gloves and Tyveks™) will be bagged and disposed of properly.

7.0 EMERGENCY AND CONTINGENCY PLANNING

This section identifies emergency and contingency planning that has been undertaken for operations at this site. Most sections of the CLEAN HASP provide information that would be used under emergency conditions. General emergency planning information is addressed in Chapter 14.0 of the CLEAN HASP. The following subsections present site-specific emergency and contingency planning information.

7.1 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS. The site HSO or the Health and Safety designee is the primary authority for directing operations at the site under emergency conditions. All communications both onsite and offsite will be directed through the HSO or designee.

7.2 EVACUATION. Evacuation procedures at the site will follow those procedures discussed in Chapter 14.5 of the CLEAN HASP for upwind withdrawal, site evacuation, and evacuation of the surrounding area. Evacuation from the base will be conducted by travelling along the perimeter road to the Avenue A gate or the main gate at Avenue D and exit the base onto 103rd Street (County Road 29).

7.3 EMERGENCY MEDICAL TREATMENT AND FIRST AID. Any personnel injured onsite will be rendered first aid as appropriate and transported to competent medical facilities for further examination and/or treatment. The preferred method of transport would be through professional emergency transportation means; however, when this is not readily available or would result in excessive delay, other transport will be authorized. Under no circumstances will injured persons transport themselves to a medical facility for emergency treatment.

8.0 ADMINISTRATION

8.1 PERSONNEL AUTHORIZED DOWNRANGE. Personnel authorized to participate in downrange activities at this site have been reviewed and certified for site operations by the PM and the HSS. Certification involves the completion of appropriate training, a medical examination, and a review of this site-specific HASP. All persons entering the site must use the buddy system, and check in with the Site Manager and/or HSO before going downrange.

CERTIFIED ABB ENVIRONMENTAL TEAM PERSONNEL:

*+ John Kaiser	*+ Heather Governick
*+ Jim Williams	*+ Jay Koch
*+ Jeffrey Tarr	*+ Pamela Wagner
*+ Adib Rahounji	*+ Celora Jackson
*+ Blake Svendsen	*+ Joseph Ullo
*+ Ken Busen	*+ Kelly Murray

OTHER CERTIFIED PERSONNEL:

* FIRST-AID-TRAINED
\+ CPR-TRAINED

8.2 HEALTH AND SAFETY PLAN (HASP) APPROVALS. By their signatures, the undersigned certify that this HASP will be used for the protection of the health and safety of all persons entering this site.

_____ _____
Health and Safety Officer Date

_____ _____
Project Manager Date

_____ _____
Health and Safety Manager/Supervisor Date

8.3 FIELD TEAM REVIEW. I have read and reviewed the health and safety information in the HASP. I understand the information and will comply with the requirements of the HASP.

NAME: _____

DATE: _____

SITE/PROJECT: _____

8.4 **MEDICAL DATA SHEET**. This Medical Data Sheet will be completed by all onsite personnel and kept in the Support Zone during site operations. It is not a substitute for the Medical Surveillance Program requirements consistent with the CLEAN HASP. This data sheet will accompany any personnel when medical assistance or transport to hospital facilities is required. If more space is required, use the back of this sheet.

Project: _____

Name: _____

Address: _____

Home Telephone: Area Code (___) _____

Age: _____ Height: _____ Weight: _____

In case of emergency, contact: _____

Address: _____

Telephone: Area Code (___) _____

Do you wear contact lenses? Yes ( ) No ( )

Allergies: _____

List medication(s) taken regularly: _____

Particular sensitivities: _____

Previous/current medical conditions or exposures to hazardous chemicals:

_____

Name of Personal Physician: _____

Telephone: Area Code (___) _____

8.5 EMERGENCY TELEPHONE NUMBERS.

(On base) Security	(904) 778-5381
(On base) Rescue	(904) 778-5212
Primary Hospital (St. Vincent's Hospital)	(904) 387-7395
Alternate Hospital (Riverside Hospital)	(904) 387-7070
Base Fire Department	(904) 778-5333
Poison Control Center	(800) 962-1253
National Response Center	(800) 424-8802
Regional USEPA Emergency Response	(800) 414-8802
Site HSO: Kelly Murray	(904) 656-1293
General Site Supervisor: Jeff Tarr	(904) 656-1293
Project Manager: John Kaiser	(904) 656-1293
ABB Environmental HSM: C.E. Sundquist	(207) 775-5401 x101

8.6 ROUTES TO EMERGENCY MEDICAL FACILITIES. The primary source of medical assistance for the site is:

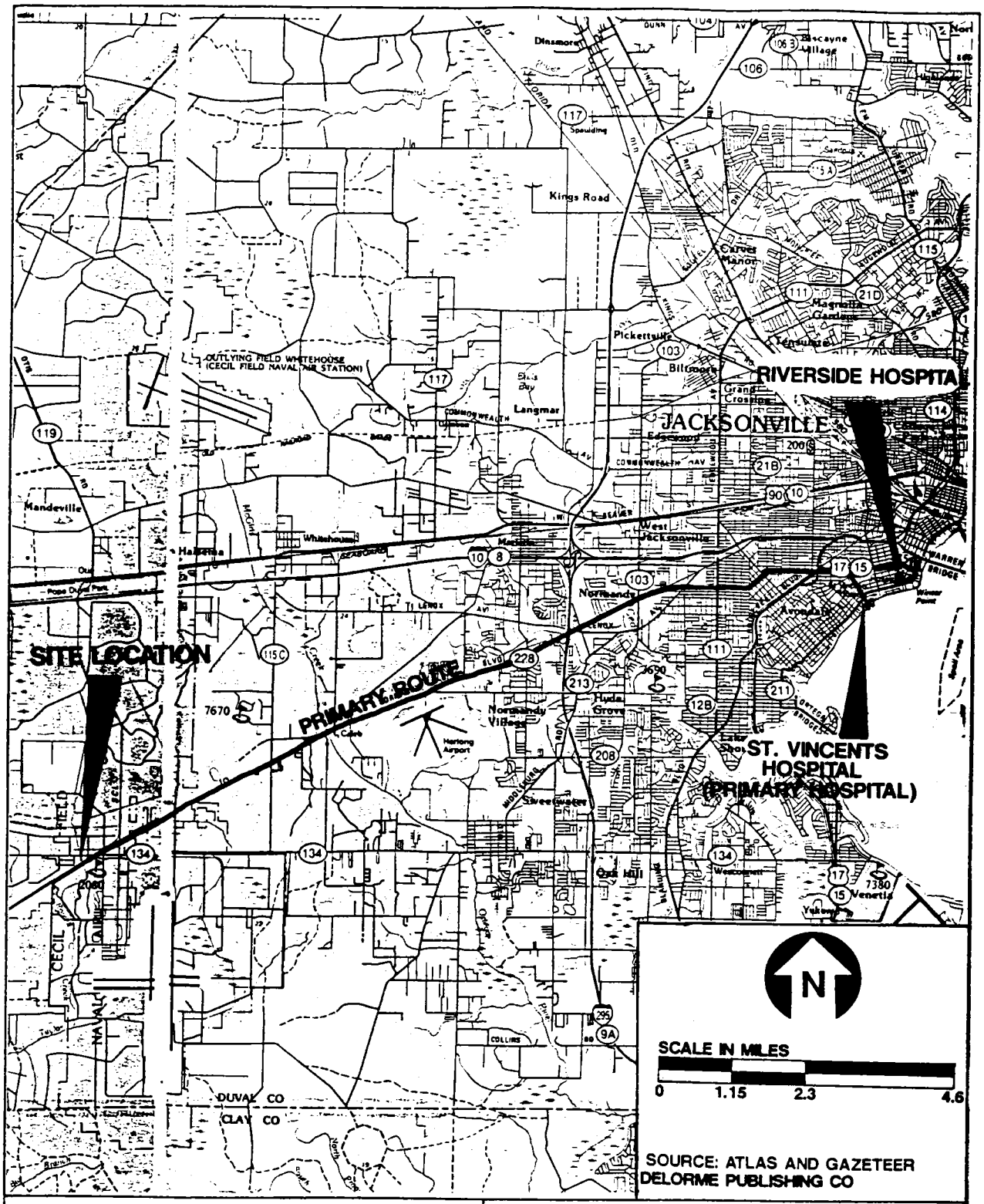
St. Vincent's Hospital
1800 Barrs Road
Jacksonville, Florida

DIRECTIONS TO PRIMARY HOSPITAL: Exit NAS Cecil Field via the main gate and travel northeast on Highway 228 approximately 12.5 miles to Barrs Road; turn right; travel 0.05 mile on Barrs Road. The hospital is on the right side of the road (see Figure 8-1).

The alternate source of medical assistance for the site is:

Riverside Hospital
2033 Riverside Avenue
Jacksonville, Florida

DIRECTIONS TO ALTERNATE HOSPITAL: Exit NAS Cecil Field via the main gate and travel northeast on Highway 228 approximately 13 miles to Margaret Street; turn right; travel 0.03 mile on Margaret Street. The hospital is on the right side of the street (see Figure 8-1).



ROUTE TO ST. VINCENTS HOSPITAL AND RIVERSIDE HOSPITAL

SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND

HEALTH AND SAFETY PLAN

NAVAL AIR STATION
CECIL FIELD
JACKSONVILLE, FLORIDA

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

EMPLOYERS

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm or employees. Employers must comply with occupational safety and health standards issued under the Act.

EMPLOYEES

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

INSPECTION

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

COMPLAINT

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides the employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

CITATION

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

PROPOSED PENALTY

The Act provides for mandatory civil penalties against employers of up to $7,000 for each serious violation and for optional penalties of up to $7,000 for each nonserious violation. Penalties of up to $7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $70,000 for each such violation. A violation of posting requirements can bring a penalty of up to $7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of $10,000 or up to six months in jail or both.

VOLUNTARY ACTIVITY

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for health such as training.

VOLUNTARY ACTIVITY

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State labor or Health department or a State university.

POSTING INSTRUCTIONS

Employees in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, Georgia	(404) 347-3573
Boston, Massachusetts	(617) 565-7164
Chicago, Illinois	(312) 353-2220
Dallas, Texas	(214) 767-4731
Denver, Colorado	(303) 844-3061
Kansas City, Missouri	(816) 426-5861
New York, New York	(212) 337-2378
Philadelphia, Pennsylvania	(215) 596-1201
San Francisco, California	(415) 744-6670
Seattle, Washington	(206) 442-5930

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Lynn Martin, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

To report suspected fire hazards, imminent danger safety and health hazards in the workplace, or other job safety and health emergencies, such as toxic waste in the workplace, call OSHA's 24-hour hotline: 1-800-321-OSHA.

ATTACHMENT B OVA HEADSPACE RESULTS, October and November, 1994

Table 3
Summary of OVA Headspace Soil Screening Results
Technical Memorandum
North Fuel Farm Deep Plume
Naval Air Station Cecil Field
Jacksonville, Florida
October-November, 1994

Sample I.D	Depth (feet)	Concentration (ppm)
HP-1	5-7	N/A
HP-1	10-12	110
HP-1	15-17	40
HP-1	20-22	250
HP-1	25-27	35
HP-1	32-34	2
HP-1	38-40	10
HP-1	43-45	130
HP-1	47-49	12
HP-1	52-54	1,300
HP-1	60-62	800
HP-1	65-67	140
HP-1	70-72	110
HP-1	75-77	9
HP-1	80-82	NO SAMPLE COLLECTED
HP-1	85-87	ND
HP-1	90-92	7
HP-1	95-97	10
HP-1	100-102	20
HP-2	10-12	280
HP-2	20-22	ND
HP-2	30-32	1,000
HP-2	40-42	300
HP-2	50-52	1,500
HP-2	60-62	200
HP-2	70-72	38

Sample I.D	Depth (feet)	Concentration (ppm)
HP-2	80-82	50
HP-2	90-92	90
HP-2	100-102	N/A
HP-3	5-7	ND
HP-3	10-12	ND
HP-3	15-17	ND
HP-3	20-22	ND
HP-3	25-27	ND
HP-3	30-32	ND
HP-3	35-37	ND
HP-3	40-42	ND
HP-3	45-47	ND
HP-3	50-52	ND
HP-3	55-57	ND
HP-3	60-62	ND
HP-3	65-67	ND
HP-3	70-72	15
HP-3	75-77	ND
HP-3	80-82	120
HP-3	85-87	50
HP-3	90-92	ND
HP-3	95-97	ND
HP-4	10-12	160
HP-4	20-22	1,800
HP-4	30-32	70
HP-4	40-42	800
HP-4	50-52	700
HP-4	60-62	850
HP-4	70-72	70
HP-4	80-82	48

Sample I.D	Depth (feet)	Concentration (ppm)
HP-4	90-92	44
HP-5	10-12	9
HP-5	20-22	ND
HP-5	30-32	1
HP-5	40-42	3
HP-5	50-52	10
HP-5	60-62	24
HP-5	70-72	16
HP-5	80-82	1
HP-5	90-92	2
HP-5	100-102	2
HP-6	10-12	10
HP-6	20-22	30
HP-6	30-32	15
HP-6	40-42	ND
HP-6	50-52	6
HP-6	60-62	ND
HP-6	70-72	ND
HP-6	80-82	ND
HP-6	90-92	ND
HP-6	100-102	ND
HP-9	10-12	16
HP-9	20-22	ND
HP-9	30-32	ND
HP-9	40-42	20
HP-9	50-52	7
HP-9	60-62	38
HP-9	70-72	18
HP-9	80-82	ND
HP-9	90-92	N/A

Sample I.D	Depth (feet)	Concentration (ppm)
HP-9	100-102	ND
HP-14	10-12	ND
HP-14	20-22	ND
HP-14	30-32	ND
HP-14	40-42	ND
HP-14	50-52	ND
HP-14	60-62	4
HP-14	70-72	5
HP-14	80-82	ND
HP-14	90-92	2
HP-15	10-12	ND
HP-15	20-22	3
HP-15	30-32	2
HP-15	40-42	ND
HP-15	50-52	ND
HP-15	60-62	ND
HP-15	70-72	ND
HP-15	80-82	ND
HP-15	90-92	ND

ppm = parts per million
N/A = Not analyzed
ND = None detected

ATTACHMENT C Soil and Groundwater GAS CHROMATOGRAPH (GC) SCREENING RESULTS, October and November, 1994

Table 4

Summary of Gas Chromatograph Analytical Data
Technical Memorandum
North Fuel Farm Deep Plume
NAS Cecil Field, Jacksonville, Florida
October-November, 1994

Saturated Soils										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenze		Total Xylenes		Total BTEX	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
HP-1, 5-7	ND		ND		ND		ND		ND	
HP-1, 10-12	ND		ND		ND		ND		ND	
HP-1, 15-17	ND		ND		ND		ND		ND	
HP-1, 20-22	ND		ND		ND		ND		ND	
HP-1, 25-27	ND		ND		ND		ND		ND	
HP-1, 32-34	ND		ND		ND		ND		ND	
HP-1, 38-40	ND		ND		ND		ND		ND	
HP-1, 43-45	ND		ND		ND		ND		ND	
HP-1, 47-49	ND		ND		ND		ND		ND	
HP-1, 52-54	ND		ND		ND		ND		ND	
HP-1, 55-57	5.4	4.3	ND		2.6	2.1	41	33	49	39
HP-1, 60-62	1.2	<1	ND		ND		18	14	19	<15
HP-1, 65-67	<1		ND		ND		1.4	1.2	1.4	1.2
HP-1, 70-72	ND		ND		ND		ND		ND	
HP-1, 75-77	ND		ND		ND		ND		ND	
HP-1, 80-82	ND		ND		ND		ND		ND	
HP-1, 85-87	ND		ND		ND		ND		ND	

Saturated Soils										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenze		Total Xylenes		Total BTEX	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
HP-1, 95-97	ND		ND		ND		ND		ND	
HP-1, 100-102	ND		ND		ND		ND		ND	
HP-2, 10-12	ND		ND		ND		ND		ND	
HP-2, 20-22	ND		ND		ND		ND		ND	
HP-2, 30-32	ND		ND		ND		ND		ND	
HP-2, 40-42	ND		ND		ND		ND		ND	
HP-2, 50-52	29	23	ND		ND		5.2	4.1	34	27
HP-2, 60-62	7.4	5.9	ND		ND		ND		7.4	5.9
HP-2, 70-72	ND		ND		ND		ND		ND	
HP-2, 80-82	ND		ND		ND		ND		ND	
HP-2, 90-92	ND		ND		ND		ND		ND	
HP-2, 100-102	ND		ND		ND		ND		ND	
HP-3, 5-7	ND		ND		ND		ND		ND	
HP-3, 10-12	ND		14	9.7	ND		ND		14	9.7
HP-3, 15-17	ND		63	45	ND		ND		63	45
HP-3, 20-22	ND		ND		ND		ND		ND	
HP-3, 25-27	ND		21	17	ND		ND		21	17
HP-3, 30-32	ND		ND		ND		ND		ND	
HP-3, 35-37	ND		ND		ND		ND		ND	
HP-3, 40-42	ND		ND		ND		ND		ND	
HP-3, 45-47	ND		ND		ND		ND		ND	

Saturated Soils										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenze		Total Xylenes		Total BTEX	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
HP-3, 50-52	ND		ND		ND		ND		ND	
HP-3, 55-57	ND		ND		ND		ND		ND	
HP-3, 60-62	ND		ND		ND		12	9.8	12	9.8
HP-3, 65-67	ND		ND		ND		<1		<1	
HP-3, 70-72	ND		ND		ND		ND		ND	
HP-3, 75-77	ND		ND		ND		ND		ND	
HP-3, 80-82	ND		ND		ND		ND		ND	
HP-3, 85-87	ND		ND		ND		ND		ND	
HP-3, 90-92	ND		ND		ND		ND		ND	
HP-3, 95-97	ND		ND		ND		ND		ND	
HP-4, 10-12	ND		ND		ND		14	11	14	11
HP-4, 20-22	ND		ND		ND		ND		ND	
HP-4, 30-32	ND		ND		ND		ND		ND	
HP-4, 40-42	ND		ND		ND		13	10	13	10
HP-4, 50-52	ND		ND		ND		ND		ND	
HP-4, 60-62	ND		ND		ND		19	15	19	15
HP-4, 70-72	ND		ND		ND		ND		ND	
HP-4, 80-82	ND		ND		ND		ND		ND	
HP-4, 90-92	ND		ND		ND		ND		ND	
HP-5, 10-12	ND		ND		ND		ND		ND	
HP-5, 20-22	ND		ND		ND		ND		ND	

Saturated Soils										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenze		Total Xylenes		Total BTEX	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
HP-5, 40-42	ND		ND		ND		ND		ND	
HP-5, 50-52	7.6	6.2	ND		<1		4.1 9.6	3.4 7.8	12 17	9.6 14
HP-5, 60-62	2.3	2.0	ND		ND		ND		2.3	2.0
HP-5, 70-72	ND		ND		ND		ND		ND	
HP-5, 80-82	ND		ND		ND		ND		ND	
HP-5, 90-92	ND		ND		ND		ND		ND	
HP-5, 100-102	ND		ND		ND		ND		ND	
HP-6, 10-12	ND		ND		ND		ND		ND	
HP-6, 20-22	ND		ND		ND		ND		ND	
HP-6, 30-32	ND		ND		ND		ND		ND	
HP-6, 40-42	ND		ND		ND		ND		ND	
HP-6, 50-52	ND		ND		ND		ND		ND	
HP-6, 60-62	ND		ND		ND		ND		ND	
HP-6, 70-72	ND		ND		ND		ND		ND	
HP-6, 80-82	ND		ND		ND		ND		ND	
HP-6, 90-92	ND		ND		ND		ND		ND	
HP-6, 100-102	ND		ND		ND		ND		ND	
HP-9, 10-12	ND		ND		ND		ND		ND	
HP-9, 20-22	ND		ND		ND		ND		ND	
HP-9, 30-32	ND		ND		ND		ND		ND	
HP-9, 40-42	ND		ND		ND		ND		ND	

Saturated Soils										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenze		Total Xylenes		Total BTEX	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
HP-9, 60-62	ND		ND		ND		ND		ND	
HP-9, 70-72	ND		ND		ND		ND		ND	
HP-9, 80-82	<1		ND		ND		<1		<2	
	1.1	<1					2.1	1.8	3.2	<2.8
HP-9, 90-92	1.6	1.3	ND		ND		ND		1.6	1.3
HP-9, 100-102	<1		ND		ND		ND		<1	
HP-14, 10-12	ND		ND		ND		ND		ND	
HP-14, 20-22	ND		ND		ND		ND		ND	
HP-14, 30-32	ND		ND		ND		ND		ND	
HP-14, 40-42	ND		ND		ND		ND		ND	
HP-14, 50-52	ND		ND		ND		ND		ND	
HP-14, 60-62	ND		ND		ND		ND		ND	
HP-15, 40-42	ND		ND		ND		ND		ND	
HP-15, 10-12	ND		ND		ND		ND		ND	
HP-15, 20-22	ND		ND		ND		ND		ND	
HP-15, 30-32	ND		ND		ND		ND		ND	

Saturated Soils										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenze		Total Xylenes		Total BTEX	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
HP-15, 40-42	ND		ND		ND		ND		ND	
HP-15, 50-52	ND		ND		ND		ND		ND	
HP-15, 60-62	ND		ND		ND		ND		ND	
HP-15, 70-72	ND		ND		ND		ND		ND	
HP-15, 80-82	ND		ND		ND		ND		ND	
HP-15, 90-92	ND		ND		ND		6.9	6.3	6.9	6.3

Notes: ND = Not detected.
E = Estimated value ±3 standard deviations above highest calibration standard.

Groundwater										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenzene		Total Xylenes		Total BTEX	
	Run 1	Run 2	Run 1	Run 2	Run 1	Run 2	Run 1	Run 2	Run 1	Run 2
HP-4, 80 UNF.	5.8		ND		ND		59		65	
HP-1, 25 UNF.	6.8		11		ND		ND		18	
HP-3, 80 UNF.	ND		ND		ND		ND		ND	
HP-1, 60 UNF.	>1000 E		ND		ND		ND		>1000E	
HP-14, 20 UNF.	ND		ND		ND		ND		ND	
HP-4, 100 UNF.	ND		ND		ND		43	48	43	48
HP-1, 80 UNF.	15	15	ND		ND		ND		15	15
HP-5, 20 FIL.	ND		ND		ND		ND		ND	
HP-5, 60 FIL.	9.6		<1		8.1		65		<84	
HP-5, 40 UNF.	ND		ND		ND		ND		ND	
HP-5, 80 UNF.	ND		ND		ND		ND		ND	
HP-15, 40 UNF.	ND		ND		ND		ND		ND	
HP-6, 20 UNF.	ND		ND		ND		ND		ND	
HP-6, 60 UNF.	ND		ND		ND		ND		ND	

Groundwater										
Hydropunch Boring Location and Sampling Depths	Benzene		Toluene		Ethylbenzene		Total Xylenes		Total BTEX	
	Run 1	Run 2	Run 1	Run 2	Run 1	Run 2	Run 1	Run 2	Run 1	Run 2
HP-4, 20 FIL.	ND		ND		ND		ND		ND	
HP-6, 80 UNF.	ND		ND		ND		ND		ND	
HP-6, 100, UNF.	ND		ND		ND		ND		ND	
HP-5, 80, UNF.	ND		ND		ND		ND		ND	
HP-5, 100, UNF.	ND		ND		ND		ND		ND	
HP-9, 20, UNF.	ND		ND		ND		42		42	
HP-9, 60, UNF.	ND		ND		ND		ND		ND	
HP-9, 80, UNF.	383 E	425 E	1.7	2.5	11	15	94	127	490 E	570 E

Notes: ND = Not detected.
E = Estimated value ±3 standard deviations above highest calibration standard.

ATTACHMENT D LITHOLOGIC SOIL BORING AND MONITORING WELL LOGS

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-1	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** HSA/Mud Rotary
Installation date: 10/06/94	**Completion date:** 10/22/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
5	ND		80%	N/A	(5-7') CLAYEY-SAND: Brown, fine grained with silt, tree roots and organics, (swamp soil).		PT	12,8,10,9
10	ND		90%	110	(10-12') SAND: Brown, fine grained, poorly graded subangular to subrounded with organics.		SM	5,7,8,12
15	ND		80%	40	(15-17') SAND: Brown, fine grained, poorly graded.			N/A
20	ND		100%	250	(20-22') SAND: Brown, fine grained, poorly graded.			21,11,13,11
25	ND		N/A	35	(25-27') SAND: Brown, fine grained, poorly graded.			9,15,8,13
30	ND		20%	2	(32-34') SAND: Light gray, fine to medium grained, poorly graded.			29,33,50 (4")STP
35	ND		50%	10	(38-40') SAND: Light gray, fine grained with silt, poorly graded.			15,18,50 (4")STP
40	ND		40%	130	(43-45') SAND: Light gray, fine grained with silt, poorly graded, very dense. Slight hydrocarbon odor.			42,43,50 (4")STP
45	ND		50%	12	(47-49') SAND: Light gray, fine grained with silt, very dense. Hydropunch groundwater sample analyzed at 47'.			48,53,79 (5")STP
50	ND		100%	1300	(52-54') CLAYEY-SAND: Greenish-gray, fine grained with strong hydrocarbon odor.		SC	13,32,38,34

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-1	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** HSA/Mud Rotary
Installation date: 10/08/94	**Completion date:** 10/22/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
	48		50%	1000	(55-57') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, dense sand with soft clay. Very strong hydrocarbon odor.		SC	15,33,34,50 (4")
59	18.8		40%	800	(60-62') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, dense sand with soft clay. Very strong hydrocarbon odor. Hydropunch groundwater sample analyzed at 60'.			25,50,50 (3")STP
64	1.4		50%	140	(65-67') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, dense sand with soft clay. Hydrocarbon odor.			50,50,50 (5")STP
69	ND		20%	110	(70-72') CLAYEY-SAND: Light brown to greenish-gray, fine grained, very hard sand and stiff clay.			10,110,STOP
74	ND		50%	9	(75-77') SAND: Light brown, fine to medium grained with quartz		SP	6,50,50 (2")STOP
79	ND		N/A	N/A	(80-82') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 80'.			N/A
84	ND		40%	ND	(85-87') SAND: Greenish-gray to light brown, fine to medium grained, very dense, subrounded, poorly graded, trace of quartz.			40,80,80,STP
89	ND		70%	7	(90-92') SAND: Light brown, fine to medium grained with coarse grained quartz, loose-medium dense.			7,33,10,19
94	ND		100%	10	(95-97') SAND: Light brown, fine to medium grained with coarse grained quartz, dense, poorly graded, subrounded-rounded, very porous.			20,30,43,62
99	ND		100%	20	(100-102') SILTY-CLAY: Calcareous greenish-gray clay with pale yellow dolomite and gray limestone. 80% clay, 20% limestone/dolomite. Clay is pliable with low plasticity. Hydropunch groundwater sample analyzed at 100'.		CL	10,10,12,23
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-2	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/05/94	**Completion date:** 11/06/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		50%	280	(10-12') SILTY-SAND: Light brown, very fine to fine grained, loose, poorly graded.		SM	5,7,7,8
20	ND		80%	ND	(20-22') SILTY-SAND: Light brown, very fine to fine grained, loose to very loose, poorly graded. Hydropunch groundwater sample analyzed at 20'.			2,1,1,1
30	ND		80%	1,000	(30-32') CLAYEY-SAND: Greenish-gray, loose sand with soft green clay.		SC	3,5,4,8
40	ND		50%	300	(40-42') SILTY-SAND: Light gray to blue, very fine to fine grained with trace clay. Hydropunch groundwater sample analyzed at 40'.		SM	10,10,11,22
50	34.2		40%	1,500	(50-52') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, medium dense sand with soft green clay. Hydrocarbon odor detected.		SC	8,10,15,18

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-2	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/05/94	**Completion date:** 11/08/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ∇** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	7.4		100%	200	(60-62') CLAYEY-SAND: Greenish-gray to olive gray, fine to medium grained, medium dense. Hydrocarbon odor. Hydropunch groundwater sample analyzed at 80'.		SC	7,14,17,22
64								
69	ND		70%	38	(70-72') CLAYEY-SAND: Light brown to greenish-gray, fine to medium grained, very dense sand and stiff clay.			48,90,100,STOP
74								
79	ND		60%	50	(80-82') CLAYEY-SAND: Dark gray to olive gray. Sand is medium dense to loose. Clay is soft with thick stringers. Hydropunch groundwater sample analyzed at 80'.			7,14,24,32
84								
89	ND		80%	90	(90-92') CLAYEY-SAND AND DOLOMITE: Green clayey-sand with pale yellow dolomite and traces of gray limestone. 40% clayey-sand, 60% dolomite, <1% limestone.		GC	14,15,18,22
94								
99	ND		<5%	N/A	(100-102') CLAY: Calcareous greenish-gray clay with traces of fossiliferous pale yellow dolomite. Hydropunch groundwater sample analyzed at 100'.		CL	24,32,34,38
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-3	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/17/94	**Completion date:** 10/18/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 87ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
5	ND		40%	ND	(5-7') SILT: Dark brown, with organics.		OL	8,17,18,20
10	14		70%	ND	(10-12') SILTY-SAND: Dark brown, fine grained, very dense.		SM	10,35,28,28
15	83		80%	ND	(15-17') SILTY-SAND: Dark brown, fine grained, poorly graded.			9,15,30,12
20	ND		40%	ND	(20-22') SAND: Light gray, fine grained, dense, well-washed. Hydropunch groundwater sample analyzed at 23.5'.			21,23,30,37
25	21		50%	ND	(25-27') SAND: Light brown to greenish-gray, very dense, silty, well-washed.			17,20,45,50 (3")
30	ND		70%	ND	(30-32') SAND: Light brown to greenish-gray, very dense, silty, well-washed.			18,20,30,50 (4")
35	ND		40%	ND	(35-37') SAND: Brown, fine grained with silt, very dense, well washed.			30,25,50 (3")
40	ND		40%	ND	(40-42') SAND: Brown, fine grained with silt, very dense, well washed.			12,60 (5")
45	ND		100%	ND	(45-47') SAND: Brown, fine grained with silt, well-washed, poorly graded.			4,10,24,50 (2")
50	ND		50%	ND	(50-52') SAND: Light gray to greenish-gray, fine grained with silt, poorly graded. Slight hydrocarbon odor.			17,28,32,50 (2")

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-3	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/17/94	**Completion date:** 10/19/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 97ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
	ND		50%	ND	(55-57') CLAYEY-SAND: Greenish-gray, dense sand with soft clay. Slight hydrocarbon odor.		SM SC	12,19,32,28
59	12		80%	ND	(60-62') CLAYEY-SAND: Olive gray, dense sand with soft clay. Slight hydrocarbon odor. Hydropunch groundwater sample analyzed at 63.5'.			19,22,22,24
64	<1		30%	ND	(65-67') CLAYEY-SAND: Greenish-gray to olive gray, fine grained with silt, very dense sand with soft clay.			21,37,50 (4")
69	ND		10%	0.5	(70-72') CLAYEY-SAND: Light gray to greenish-gray, fine grained with silt, dense sand, soft clay, and traces of medium to coarse grained quartz. Hydrocarbon odor.			45,>50
74	ND		10%	ND	(75-77') SAND: Light gray, fine to medium grained with quartz.		SP	48,>50
79	ND		80%	120	(80-82') GRAVEL AND SAND: Greenish-gray to light brown, fine gravel sand with some silt and quartz grains. Traces of pale yellow dolomite and gray limestone. Very hard.		GM	85,85,120
84	ND		100%	50	(85-87') GRAVEL AND SAND: Light brown to greenish-gray, fine gravel sand with gravel size quartz grains, trace silt.			29,28,83,50
89	ND		100%	ND	(90-91') SAND: Light brown, coarse grained sand to fine grained gravel, trace silt. (91-92') CLAYEY-SAND: Greenish-gray with quartz grains throughout.			20,35,30,20
94	ND		100%	ND	(95-96.5') SANDY-GRAVEL: Greenish-gray, well graded, very loose- loose, fine grained gravel to coarse grained sand with trace silt, quartz, and phosphates.		GW	8,2,1,8
99								
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-4	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/23/94	**Completion date:** 10/24/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 1021t.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ▽** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	14		100%	180	(10-12') SILTY-SAND: Light brown, very fine to fine grained, loose, strong hydrocarbon odor.		SM	6,6,8,8
20	ND		100%	1800	(20-22') SILTY-SAND: Light brown, very fine to fine grained, very loose. Strong hydrocarbon odor. Hydropunch groundwater sample analyzed at 20'.			3,3,4,5
30	ND		50%	70	(30-32') SILTY-SAND: Greenish-gray, very fine to fine grained, medium dense to dense. Poorly graded, strong hydrocarbon odor.			10,20,38,55
40	13		70%	800	(40-42') SILTY-SAND: Light brown to 41.5, then green-gray from 41.5 to 42'. Very fine to fine grained, loose, poorly graded. Hydropunch groundwater sample analyzed at 40'.			5,10,10,11
50	ND		40%	700	(50-52') SILTY-SAND: Greenish-gray, fine grained, very dense, traces of clay. Strong hydrocarbon odor.			25,85,82,50

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-4	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/23/94	**Completion date:** 10/24/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	19		100%	850	(80-82') SILTY-SAND: Light brown, fine grained with trace of green clay, loose to medium dense, strong hydrocarbon odor. Hydropunch groundwater sample analyzed at 80'.		SM	5,8,8,7
64								
69	ND		100%	70	(70-72') CLAY: Greenish-gray to dark gray, soft to medium stiff, highly plastic, fat clay.		CH	5,5,6,8
74								
79	ND		50%	48	(80-82') SHELL, SAND, CLAY, AND DOLOMITE/LIMESTONE: Light brown to greenish-gray clayey sand with shells, pale yellow dolomite and gray limestone. Large quartz grains and black phosphates, rounded to sub- rounded. 40% limestone/dolomite, 30% sand, 20% clay, 8% shell, 2% phosphate. Hydropunch groundwater sample analyzed at 80'.		GC	15,30,33,28
84								
89	ND		100%	44	(90-92') CLAYEY-SAND AND DOLOMITE: Greenish-gray, clayey-sand with yellow dolomite. 50% dolomite, 50% clayey-sand.			14,18,22,18
94								
99	N/A		N/A	N/A	(100-102') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 100'.			N/A
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-5	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/31/94	**Completion date:** 11/01/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ▽** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		80%	9	(10-12') SILTY-SAND: Dark brown, very fine to fine grained, loose, poorly graded, dense.		SM	22,28,28,33
20	ND		80%	ND	(20-22') SILTY-SAND: Brown to dark brown, very fine to fine grained, poorly graded, medium dense to loose. Hydropunch groundwater sample analyzed at 20'.			3,4,10,14
30	ND		30%	1	(30-32') SILTY-SAND: Greenish-gray, very fine to fine grained, dense with trace of clay.			4,24,33,40
40	ND		80%	3	(40-42') SILTY-SAND: Light brown to blueish-gray, very fine to fine grained, poorly graded, medium dense to dense. Hydropunch groundwater sample analyzed at 40'.			8,17,33,30
50	18.5		30%	10	(50-52') SILTY-SAND: Light brown to greenish-gray, very fine to fine grained with traces of green clay. very dense.			28,25,78

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-5	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/31/94	**Completion date:** 11/01/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	2.3		60%	24	(60-62') SAND: Light gray to light brown, fine to medium grained with trace silt, well-graded, very dense sand. Hydropunch groundwater sample analyzed at 60'.		SM	35,48,60,58
64							SW	
69	ND		50%	18	(70-72') CLAYEY-SAND: Light gray with green clay stringers, very dense sand, slight hydrocarbon odor.		SC	65,113,STOP
74								
79	ND		90%	1	(80-82') SAND: Light brown to light gray fine to medium grained with trace silt, poorly graded, dense to very dense sand. Hydropunch groundwater sample analyzed at 80'.		SP	9,15,88,88
84								
89	ND		20%	2	(90-92') SAND: Light gray to blue, coarse grained sand to fine grained gravel, trace silt and clay, very dense.		GC	55,110,STOP
94								
99	ND		70%	2	(100-101') SAND: Light brown coarse grained sand to fine grained gravel. (101-102') SAND: Greenish-gray to blue, medium to coarse grained sand with trace silt and clay. Hydropunch groundwater sample analyzed at 100'.			10,10,15,17
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-8	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/07/94	**Completion date:** 11/08/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ∇** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		50%	10	(10-12') SILTY-SAND: Brown, very fine to fine grained, loose to medium dense.		SM	9,13,12,9
20	ND		50%	30	(20-22') SILTY-SAND: Light brown, very fine to fine grained, poorly graded, loose, clean, well-washed. Hydropunch groundwater sample analyzed at 20'.			2,3,4,4
30	ND		60%	15	(30-32') CLAYEY-SAND: Greenish-gray, loose to medium dense sand with soft clay.		SC	3,8,11,12
40	ND		70%	ND	(40-42') CLAYEY-SAND: Light gray to blueish-green, medium dense sand with blueish-green clay. Hydropunch groundwater sample analyzed at 40'.			7,14,24,17
50	ND		50%	8	(50-52') CLAYEY-SAND: Greenish-gray to light gray to olive gray, loose to medium dense sand and medium stiff clay.			9,13,13,42

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-6	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/07/94	**Completion date:** 11/08/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		100%	ND	(60-62') SILTY-SAND: Brown to light brown, fine grained, poorly graded, loose to medium dense, trace of green clay. Hydropunch groundwater sample analyzed at 60'.		SC	3,3,10,22
64							SM	
69	ND		40%	ND	(70-72') CLAYEY-SAND: Light brown with green clay, fine to medium grained, very dense, well-washed, poorly graded.		SC	46,100,STOP
74								
79	ND		80%	ND	(80-82') SAND: Light brown, fine to medium grained, poorly graded, dense to very dense with traces of blue-green clay. Hydropunch groundwater sample analyzed at 80'.		SP	7,27,50,50 (2")
84								
89	ND		40%	ND	(90-92') SAND: Light brown to blueish-green to gray, medium to coarse grained sand, trace silt and clay, very dense.		GC	54,88,100,STOP
94								
99	ND		100%	ND	(100-101') SILTY-CLAY: Green, slightly plastic, soft to medium stiff with trace quartz and phosphates. Hydropunch groundwater sample analyzed at 100'.		CL	4,4,6,8
104								

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-9	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/08/94	**Completion date:** 11/08/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		60%	18	(10-12') SAND: Brown, fine grained with silt and organics, loose to medium dense.		SM	15,15,15,21
20	ND		50%	ND	(20-22') SAND: Light brown, fine grained with silt, loose. Hydropunch groundwater sample analyzed at 20'.			3,4,4,7
30	ND		40%	ND	(30-32') SAND: Light gray, fine grained with silt, loose, very porous.			5,5,5,7
40	ND		50%	20	(40-42') SAND: Light brown to light gray, fine grained with silt, very porous, very loose to loose. Hydropunch groundwater sample analyzed at 40'.			2,3,3,4
50	ND		30%	7	(50-52') CLAYEY-SAND: Greenish-gray to light gray, fine grained sand with green clay. (80% sand, 10% clay).		SC	22,44,30,48

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-9	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/08/94	**Completion date:** 11/09/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ▽** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		90%	38	(60-82') CLAYEY-SAND: Light brown, fine grained with trace clay to 81'. 81-82' is greenish-gray clayey sand, dense to very dense sand medium stiff clay. Hydropunch groundwater sample analyzed at 80'.		SC	8,19,58,50
64								
69	ND		70%	18	(70-72') CLAYEY-SAND: Greenish-gray, medium grained sand with coarse grained quartz, trace silt, very dense.			14,34,80,90 (2")
74								
79	3.2		100%	ND	(80-82') SAND: Light brown, medium to fine grained with some coarse grains, well graded, loose, subrounded to rounded. Hydropunch groundwater sample analyzed at 80'.		SW	8,10,15,28
84								
89	1.6		90%	N/A	(90-92') SAND: Brown to greenish-gray, coarse grained to medium grained with some fines, trace clay, very dense.		GC	24,30,70,120
94								
99	<1		90%	ND	(100-102') SILTY-CLAY: Greenish-gray, stiff, low to medium plasticity with poor porosity and permeability. Hydropunch groundwater sample analyzed at 100'.		CL	4,7,10,14
104								

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-14	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/25/94	**Completion date:** 10/26/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 92ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		50%	ND	(10-12') SILTY-SAND: Light brown to yellow-orange, very fine to fine grained, loose.		SM	5,6,7,8
20	ND		100%	ND	(20-22') SILTY-SAND: Light brown to yellow-orange, very fine to fine grained, loose. Hydropunch groundwater sample analyzed at 20'.			4,5,6,7
30	ND		40%	ND	(30-32') SILTY-SAND: Light brown to light gray, very fine to fine grained, dense, poorly graded.			18,32,43,45
40	ND		60%	ND	(40-42') SILTY-SAND: Light brown, very fine to fine grained, very loose, poorly graded. Hydropunch groundwater sample analyzed at 40'.			3,2,4,7
50	ND		30%	ND	(50-52') SILTY-SAND: Light gray to greenish-gray, very fine to fine grained, very dense. Traces of green clay.			22,80,100

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-14	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/25/94	**Completion date:** 10/26/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 821t.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ∇** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		40%	4	(60-62') SILTY-SAND: Light brown to greenish-gray, very fine to fine grained, with traces of green clay, medium dense. Hydropunch groundwater sample analyzed at 59'.		SM	15,18,22,30
64								
69	N/A		20%	5	(70-72') CLAYEY-SAND: Light gray sand with green clay, fine grained sand with silt, very dense sand and stiff clay.		SC	50,90,50 (1")
74								
79	N/A		80%	ND	(80-82') CLAYEY-SAND: Light gray to greenish-gray, fine to medium grained, medium dense sand, very soft green clay stringers, traces of large quartz. Hydropunch groundwater sample analyzed at 80'.			10,20,28,30
84								
89	N/A		40%	2	(90-91') SAND: Light brown to greenish-gray, coarse grained sand to fine grained gravel. (91-92') CLAYEY-SAND: Greenish-gray to light gray with very large quartz gravel, very dense. (100-102') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 99'.		GC	40,80,100,STOP
94								
99	N/A		N/A	N/A				N/A
104								

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-15	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/03/94	**Completion date:** 11/04/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 921t.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		80%	ND	(10-12') SILTY-SAND: Dark brown, very fine to fine grained, medium dense, with trace organics.		SM	9,17,17,17
20	ND		100%	3	(20-22') SILTY-SAND: Light brown, very fine to fine grained, loose. Hydropunch groundwater sample analyzed at 20'.			3,2,3,2
30	ND		50%	2	(30-32') SILTY-SAND: Light brown, very fine to fine grained, very dense sand with trace green clay.			17,40,110,STOP
40	N/A		50%	ND	(40-42') SILTY-SAND: Light brown to light gray with traces of green clay. Hydropunch groundwater sample analyzed at 40'.			N/A
50	ND		50%	ND	(50-52') SILTY-SAND: Light brown to light gray, very fine to fine grained, very dense with traces of green clay.			18,38,32,48

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-15	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/03/94	**Completion date:** 11/04/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 92ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		100%	ND	(60-62') SILTY-SAND: Light brown, very fine to fine grained, loose to medium dense. Hydropunch groundwater sample analyzed at 60'.		SM	3,4,8,18
64								
69	ND		70%	ND	(70-72') CLAYEY-SAND: Light brown to greenish-gray, very fine to fine grained sand with green clay stringers, very dense sand and stiff clay (90% sand, 10% clay).		SC	50,76,52,90
74								
79	ND		100%	ND	(80-82') SAND: Light brown, medium to fine grained, poorly graded, medium dense to loose. Hydropunch groundwater sample analyzed at 80'.		SP	3,6,11,17
84								
89	6.9		50%	ND	(90-92') SAND: Light brown to greenish-gray, coarse grained sand to fine grained gravel, well graded, dense, trace fines. (100-102') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 100'.		GW	40,67,100,STOP
94								
99	N/A		N/A	N/A				N/A
104								

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-1	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** HSA/Mud Rotary
Installation date: 10/06/94	**Completion date:** 10/22/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
5	ND		80%	N/A	(5-7') CLAYEY-SAND: Brown, fine grained with silt, tree roots and organics, (swamp soil).		PT	12,8,10,9
10	ND		90%	110	(10-12') SAND: Brown, fine grained, poorly graded subangular to subrounded with organics.		SM	5,7,8,12
15	ND		80%	40	(15-17') SAND: Brown, fine grained, poorly graded.			N/A
20	ND		100%	250	(20-22') SAND: Brown, fine grained, poorly graded.			21,11,13,11
25	ND		N/A	35	(25-27') SAND: Brown, fine grained, poorly graded.			9,15,8,13
30	ND		20%	2	(32-34') SAND: Light gray, fine to medium grained, poorly graded.			29,33,50 (4")STP
35	ND		50%	10	(38-40') SAND: Light gray, fine grained with silt, poorly graded.			15,18,50 (4")STP
40	ND		40%	130	(43-45') SAND: Light gray, fine grained with silt, poorly graded, very dense. Slight hydrocarbon odor.			42,43,50 (4")STP
45	ND		50%	12	(47-49') SAND: Light gray, fine grained with silt, very dense. Hydropunch groundwater sample analyzed at 47'.			48,53,79 (5")STP
50	ND		100%	1300	(52-54') CLAYEY-SAND: Greenish-gray, fine grained with strong hydrocarbon odor.		SC	13,32,39,34

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-1	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** HSA/Mud Rotary
Installation date: 10/08/94	**Completion date:** 10/22/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
	49		50%	1000	(55-57') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, dense sand with soft clay. Very strong hydrocarbon odor.		SC	15,33,34,50 (4")
59	18.8		40%	800	(60-62') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, dense sand with soft clay. Very strong hydrocarbon odor. Hydropunch groundwater sample analyzed at 60'.			25,50,50 (3")STP
64	1.4		50%	140	(65-67') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, dense sand with soft clay. Hydrocarbon odor.			50,50,50 (5")STP
69	ND		20%	110	(70-72') CLAYEY-SAND: Light brown to greenish-gray, fine grained, very hard sand and stiff clay.			10,110,STOP
74	ND		50%	9	(75-77') SAND: Light brown, fine to medium grained with quartz		SP	8,50,50 (2")STOP
79	ND		N/A	N/A	(80-82') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 80'.			N/A
84	ND		40%	ND	(85-87') SAND: Greenish-gray to light brown, fine to medium grained, very dense, subrounded, poorly graded, trace of quartz.			40,80,80,STP
89	ND		70%	7	(90-92') SAND: Light brown, fine to medium grained with coarse grained quartz, loose-medium dense.			7,33,10,19
94	ND		100%	10	(95-97') SAND: Light brown, fine to medium grained with coarse grained quartz, dense, poorly graded, subrounded-rounded, very porous.			20,30,43,82
99	ND		100%	20	(100-102') SILTY-CLAY: Calcareous greenish-gray clay with pale yellow dolomite and gray limestone. 80% clay, 20% limestone/dolomite. Clay is pliable with low plasticity. Hydropunch groundwater sample analyzed at 100'.		CL	10,10,12,23
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-2	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/05/94	**Completion date:** 11/08/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ∇** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		50%	280	(10-12') SILTY-SAND: Light brown, very fine to fine grained, loose, poorly graded.		SM	5,7,7,8
20	ND		80%	ND	(20-22') SILTY-SAND: Light brown, very fine to fine grained, loose to very loose, poorly graded. Hydropunch groundwater sample analyzed at 20'.			2,1,1,1
30	ND		60%	1,000	(30-32') CLAYEY-SAND: Greenish-gray, loose sand with soft green clay.		SC	3,5,4,8
40	ND		50%	300	(40-42') SILTY-SAND: Light gray to blue, very fine to fine grained with trace clay. Hydropunch groundwater sample analyzed at 40'.		SM	10,10,11,22
50	34.2		40%	1,500	(50-52') CLAYEY-SAND: Greenish-gray to olive gray, fine grained, medium dense sand with soft green clay. Hydrocarbon odor detected.		SC	8,10,15,18

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-2	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/05/94	**Completion date:** 11/08/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	7.4		100%	200	(80-82') CLAYEY-SAND: Greenish-gray to olive gray, fine to medium grained, medium dense. Hydrocarbon odor. Hydropunch groundwater sample analyzed at 80'.		SC	7,14,17,22
64								
69	ND		70%	38	(70-72') CLAYEY-SAND: Light brown to greenish-gray, fine to medium grained, very dense sand and stiff clay.			48,90,100,STOP
74								
79	ND		60%	50	(80-82') CLAYEY-SAND: Dark gray to olive gray. Sand is medium dense to loose. Clay is soft with thick stringers. Hydropunch groundwater sample analyzed at 80'.			7,14,24,32
84								
89	ND		80%	90	(90-92') CLAYEY-SAND AND DOLOMITE: Green clayey-sand with pale yellow dolomite and traces of gray limestone. 40% clayey-sand, 60% dolomite, <1% limestone.		GC	14,15,18,22
94								
99	ND		<5%	N/A	(100-102') CLAY: Calcareous greenish-gray clay with traces of fossiliferous pale yellow dolomite. Hydropunch groundwater sample analyzed at 100'.		CL	24,32,34,38
104								

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-3	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/17/94	**Completion date:** 10/18/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 97ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
5	ND		40%	ND	(5-7') SILT: Dark brown, with organics.		OL	8,17,18,20
10	14		70%	ND	(10-12') SILTY-SAND: Dark brown, fine grained, very dense.		SM	10,35,28,28
15	83		80%	ND	(15-17') SILTY-SAND: Dark brown, fine grained, poorly graded.			9,15,30,12
20	ND		40%	ND	(20-22') SAND: Light gray, fine grained, dense, well-washed. Hydropunch groundwater sample analyzed at 23.5'.			21,23,30,37
25	21		50%	ND	(25-27') SAND: Light brown to greenish-gray, very dense, silty, well-washed.			17,20,45,50 (3")
30	ND		70%	ND	(30-32') SAND: Light brown to greenish-gray, very dense, silty, well-washed.			18,20,30,50 (4")
35	ND		40%	ND	(35-37') SAND: Brown, fine grained with silt, very dense, well washed.			30,25,50 (3")
40	ND		40%	ND	(40-42') SAND: Brown, fine grained with silt, very dense, well washed.			12,80 (5")
45	ND		100%	ND	(45-47') SAND: Brown, fine grained with silt, well-washed, poorly graded.			4,10,24,50 (2")
50	ND		50%	ND	(50-52') SAND: Light gray to greenish-gray, fine grained with silt, poorly graded. Slight hydrocarbon odor.			17,28,32,50 (2")

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-3	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/17/94	**Completion date:** 10/19/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 97ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
	ND		50%	ND	(55-57') CLAYEY-SAND: Greenish-gray, dense sand with soft clay. Slight hydrocarbon odor.		SM SC	12,19,32,28
59	12		80%	ND	(60-62') CLAYEY-SAND: Olive gray, dense sand with soft clay. Slight hydrocarbon odor. Hydropunch groundwater sample analyzed at 63.5'.			19,22,22,24
64	<1		30%	ND	(65-67') CLAYEY-SAND: Greenish-gray to olive gray, fine grained with silt, very dense sand with soft clay.			21,37,50 (4")
69	ND		10%	0.5	(70-72') CLAYEY-SAND: Light gray to greenish-gray, fine grained with silt, dense sand, soft clay, and traces of medium to coarse grained quartz. Hydrocarbon odor.			45,>50
74	ND		10%	ND	(75-77') SAND: Light gray, fine to medium grained with quartz.		SP	48,>50
79	ND		80%	120	(80-82') GRAVEL AND SAND: Greenish-gray to light brown, fine gravel sand with some silt and quartz grains. Traces of pale yellow dolomite and gray limestone. Very hard.		GM	85,85,120
84	ND		100%	50	(85-87') GRAVEL AND SAND: Light brown to greenish-gray, fine gravel sand with gravel size quartz grains, trace silt.			29,28,83,50
89	ND		100%	ND	(90-91') SAND: Light brown, coarse grained sand to fine grained gravel, trace silt. (91-92') CLAYEY-SAND: Greenish-gray with quartz grains throughout.			20,35,30,20
94	ND		100%	ND	(95-98.5') SANDY-GRAVEL: Greenish-gray, well graded, very loose- loose, fine grained gravel to coarse grained sand with trace silt, quartz, and phosphates.		GW	8,2,1,8
99								
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-4	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/23/94	**Completion date:** 10/24/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
							SM	
10	14		100%	180	(10-12') SILTY-SAND: Light brown, very fine to fine grained, loose, strong hydrocarbon odor.			8,8,9,8
20	ND		100%	1800	(20-22') SILTY-SAND: Light brown, very fine to fine grained, very loose. Strong hydrocarbon odor. Hydropunch groundwater sample analyzed at 20'.			3,3,4,5
30	ND		50%	70	(30-32') SILTY-SAND: Greenish-gray, very fine to fine grained, medium dense to dense. Poorly graded, strong hydrocarbon odor.			10,20,38,55
40	13		70%	800	(40-42') SILTY-SAND: Light brown to 41.5, then green-gray from 41.5 to 42'. Very fine to fine grained, loose, poorly graded. Hydropunch groundwater sample analyzed at 40'.			5,10,10,11
50	ND		40%	700	(50-52') SILTY-SAND: Greenish-gray, fine grained, very dense, traces of clay. Strong hydrocarbon odor.			25,85,82,50

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-4	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/23/94	**Completion date:** 10/24/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ▽** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	19		100%	850	(80-82') SILTY-SAND: Light brown, fine grained with trace of green clay, loose to medium dense, strong hydrocarbon odor. Hydropunch groundwater sample analyzed at 80'.		SM	5,8,8,7
64								
69	ND		100%	70	(70-72') CLAY: Greenish-gray to dark gray, soft to medium stiff, highly plastic, fat clay.		CH	5,5,6,6
74								
79	ND		50%	48	(80-82') SHELL, SAND, CLAY, AND DOLOMITE/LIMESTONE: Light brown to greenish-gray clayey sand with shells, pale yellow dolomite and gray limestone. Large quartz grains and black phosphates, rounded to sub- rounded. 40% limestone/dolomite, 30% sand, 20% clay, 8% shell, 2% phosphate. Hydropunch groundwater sample analyzed at 80'.		GC	15,30,33,28
84								
89	ND		100%	44	(90-92') CLAYEY-SAND AND DOLOMITE: Greenish-gray, clayey-sand with yellow dolomite. 50% dolomite, 50% clayey-sand.			14,18,22,16
94								
99	N/A		N/A	N/A	(100-102') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 100'.			N/A
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-5	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/31/94	**Completion date:** 11/01/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ∇** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
							SM	
10	ND		80%	9	(10-12') SILTY-SAND: Dark brown, very fine to fine grained, loose, poorly graded, dense.			22,26,28,33
20	ND		80%	ND	(20-22') SILTY-SAND: Brown to dark brown, very fine to fine grained, poorly graded, medium dense to loose. Hydropunch groundwater sample analyzed at 20'.			3,4,10,14
30	ND		30%	1	(30-32') SILTY-SAND: Greenish-gray, very fine to fine grained, dense with trace of clay.			4,24,33,40
40	ND		80%	3	(40-42') SILTY-SAND: Light brown to blueish-gray, very fine to fine grained, poorly graded, medium dense to dense. Hydropunch groundwater sample analyzed at 40'.			8,17,33,30
50	18.5		30%	10	(50-52') SILTY-SAND: Light brown to greenish-gray, very fine to fine grained with traces of green clay. very dense.			28,25,78

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-5	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/31/94	**Completion date:** 11/01/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	2.3		80%	24	(80-82') SAND: Light gray to light brown, fine to medium grained with trace silt, well-graded, very dense sand. Hydropunch groundwater sample analyzed at 80'.		SM	35,48,80,58
64							SW	
69	ND		50%	18	(70-72') CLAYEY-SAND: Light gray with green clay stringers, very dense sand, slight hydrocarbon odor.		SC	85,113,STOP
74								
79	ND		90%	1	(80-82') SAND: Light brown to light gray fine to medium grained with trace silt, poorly graded, dense to very dense sand. Hydropunch groundwater sample analyzed at 80'.		SP	9,15,88,88
84								
89	ND		20%	2	(90-92') SAND: Light gray to blue, coarse grained sand to fine grained gravel, trace silt and clay, very dense.		GC	55,110,STOP
94								
99	ND		70%	2	(100-101') SAND: Light brown coarse grained sand to fine grained gravel. (101-102') SAND: Greenish-gray to blue, medium to coarse grained sand with trace silt and clay. Hydropunch groundwater sample analyzed at 100'.			10,10,15,17
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-6	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/07/94	**Completion date:** 11/08/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Initial depth to ▽** ft.
		Geologist: Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
5							SM	
10	ND		50%	10	(10-12') SILTY-SAND: Brown, very fine to fine grained, loose to medium dense.			9,13,12,9
15								
20	ND		50%	30	(20-22') SILTY-SAND: Light brown, very fine to fine grained, poorly graded, loose, clean, well-washed. Hydropunch groundwater sample analyzed at 20'.			2,3,4,4
25								
30	ND		80%	15	(30-32') CLAYEY-SAND: Greenish-gray, loose to medium dense sand with soft clay.		SC	3,8,11,12
35								
40	ND		70%	ND	(40-42') CLAYEY-SAND: Light gray to blueish-green, medium dense sand with blueish-green clay. Hydropunch groundwater sample analyzed at 40'.			7,14,24,17
45								
50	ND		50%	6	(50-52') CLAYEY-SAND: Greenish-gray to light gray to olive gray, loose to medium dense sand and medium stiff clay.			9,13,13,42

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-6	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/07/94	**Completion date:** 11/08/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		100%	ND	(60-62') SILTY-SAND: Brown to light brown, fine grained, poorly graded, loose to medium dense, trace of green clay. Hydropunch groundwater sample analyzed at 60'.		SC SM	3,3,10,22
64								
69	ND		40%	ND	(70-72') CLAYEY-SAND: Light brown with green clay, fine to medium grained, very dense, well-washed, poorly graded.		SC	48,180,STOP
74								
79	ND		80%	ND	(80-82') SAND: Light brown, fine to medium grained, poorly graded, dense to very dense with traces of blue-green clay. Hydropunch groundwater sample analyzed at 80'.		SP	7,27,50,50 (2")
84								
89	ND		40%	ND	(90-92') SAND: Light brown to blueish-green to gray, medium to coarse grained sand, trace silt and clay, very dense.		GC	54,88,100,STOP
94								
99	ND		100%	ND	(100-101') SILTY-CLAY: Green, slightly plastic, soft to medium stiff with trace quartz and phosphates. Hydropunch groundwater sample analyzed at 100'.		CL	4,4,6,8
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-9	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/08/94	**Completion date:** 11/09/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		80%	18	(10-12') SAND: Brown, fine grained with silt and organics, loose to medium dense.		SM	15,15,15,21
20	ND		50%	ND	(20-22') SAND: Light brown, fine grained with silt, loose. Hydropunch groundwater sample analyzed at 20'.			3,4,4,7
30	ND		40%	ND	(30-32') SAND: Light gray, fine grained with silt, loose, very porous.			5,5,5,7
40	ND		50%	20	(40-42') SAND: Light brown to light gray, fine grained with silt, very porous, very loose to loose. Hydropunch groundwater sample analyzed at 40'.			2,3,3,4
50	ND		30%	7	(50-52') CLAYEY-SAND: Greenish-gray to light gray, fine grained sand with green clay. (90% sand, 10% clay).		SC	22,44,30,46

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-9	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/08/94	**Completion date:** 11/09/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 102ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		90%	38	(60-62') CLAYEY-SAND: Light brown, fine grained with trace clay to 61'. 61-62' is greenish-gray clayey sand, dense to very dense sand medium stiff clay. Hydropunch groundwater sample analyzed at 60'.		SC	8,19,58,50
64								
69	ND		70%	18	(70-72') CLAYEY-SAND: Greenish-gray, medium grained sand with coarse grained quartz, trace silt, very dense.			14,34,80,90 (2")
74								
79	3.2		100%	ND	(80-82') SAND: Light brown, medium to fine grained with some coarse grains, well graded, loose, subrounded to rounded. Hydropunch groundwater sample analyzed at 80'.		SW	8,10,15,28
84								
89	1.8		90%	N/A	(90-92') SAND: Brown to greenish-gray, coarse grained to medium grained with some fines, trace clay, very dense.		GC	24,30,70,120
94								
99	<1		90%	ND	(100-102') SILTY-CLAY: Greenish-gray, stiff, low to medium plasticity with poor porosity and permeability. Hydropunch groundwater sample analyzed at 100'.		CL	4,7,10,14
104								

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-14	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/25/94	**Completion date:** 10/28/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 92ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
							SM	
10	ND		50%	ND	(10-12') SILTY-SAND: Light brown to yellow-orange, very fine to fine grained, loose.			5,6,7,8
20	ND		100%	ND	(20-22') SILTY-SAND: Light brown to yellow-orange, very fine to fine grained, loose. Hydropunch groundwater sample analyzed at 20'.			4,5,6,7
30	ND		40%	ND	(30-32') SILTY-SAND: Light brown to light gray, very fine to fine grained, dense, poorly graded.			18,32,43,45
40	ND		60%	ND	(40-42') SILTY-SAND: Light brown, very fine to fine grained, very loose, poorly graded. Hydropunch groundwater sample analyzed at 40'.			3,2,4,7
50	ND		30%	ND	(50-52') SILTY-SAND: Light gray to greenish-gray, very fine to fine grained, very dense. Traces of green clay.			22,80,100

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-14	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 10/25/94	**Completion date:** 10/26/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 92ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		40%	4	(60-62') SILTY-SAND: Light brown to greenish-gray, very fine to fine grained, with traces of green clay, medium dense. Hydropunch groundwater sample analyzed at 59'.		SM	15,18,22,30
64								
69	N/A		20%	5	(70-72') CLAYEY-SAND: Light gray sand with green clay, fine grained sand with silt, very dense sand and stiff clay.		SC	50,90,50 (1")
74								
79	N/A		80%	ND	(80-82') CLAYEY-SAND: Light gray to greenish-gray, fine to medium grained, medium dense sand, very soft green clay stringers, traces of large quartz. Hydropunch groundwater sample analyzed at 80'.			10,20,28,30
84								
89	N/A		40%	2	(90-91') SAND: Light brown to greenish-gray, coarse grained sand to fine grained gravel. (91-92') CLAYEY-SAND: Greenish-gray to light gray with very large quartz gravel, very dense. (100-102') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 89'.		GC	40,80,100,STOP
94								
99	N/A		N/A	N/A				N/A
104								

Project: NAS Cecil Field **Technical Memorandum**		**Hydropunch I.D.:** HP-15	
Site: North Fuel Farm Deep Plume		**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08516.41
Drilling contractor: Alliance Environmental Services, Inc.		**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/03/94	**Completion date:** 11/04/94	**Well development date:** N/A	
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 82ft.	**Initial depth to ▽** ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID		**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
10	ND		80%	ND	(10-12') SILTY-SAND: Dark brown, very fine to fine grained, medium dense, with trace organics.		SM	9,17,17,17
20	ND		100%	3	(20-22') SILTY-SAND: Light brown, very fine to fine grained, loose. Hydropunch groundwater sample analyzed at 20'.			3,2,3,2
30	ND		50%	2	(30-32') SILTY-SAND: Light brown, very fine to fine grained, very dense sand with trace green clay.			17,40,110,STOP
40	N/A		50%	ND	(40-42') SILTY-SAND: Light brown to light gray with traces of green clay. Hydropunch groundwater sample analyzed at 40'.			N/A
50	ND		50%	ND	(50-52') SILTY-SAND: Light brown to light gray, very fine to fine grained, very dense with traces of green clay.			18,38,32,48

Project: NAS Cecil Field **Technical Memorandum**	**Hydropunch I.D.:** HP-15	
Site: North Fuel Farm Deep Plume	**Client:** SOUTHNAVFACENGCOM	**Project no.:** 08518.41
Drilling contractor: Alliance Environmental Services, Inc.	**Drill rig:** ATV, B-57	**Drilling method:** Mud Rotary
Installation date: 11/03/94	**Completion date:** 11/04/94	**Well development date:** N/A
Casing ID: N/A	**Screened int.:** N/A	**Total depth:** 92ft.
TOC elev.: ft.	**Monitor instrument/OVD type:** Porta-FID	**Geologist:** Jeff Tarr

Depth (ft.)	Headspace Field GC BTEX (ppb)	Sample	Recovery	Headspace (ppm)	Geologic Description and Remarks	Lithologic symbol	Soil class.	Blows/6-in.
59	ND		100%	ND	(60-62') SILTY-SAND: Light brown, very fine to fine grained, loose to medium dense. Hydropunch groundwater sample analyzed at 60'.		SM	3,4,8,18
64								
69	ND		70%	ND	(70-72') CLAYEY-SAND: Light brown to greenish-gray, very fine to fine grained sand with green clay stringers, very dense sand and stiff clay (90% sand, 10% clay).		SC	50,76,52,90
74								
79	ND		100%	ND	(80-82') SAND: Light brown, medium to fine grained, poorly graded, medium dense to loose. Hydropunch groundwater sample analyzed at 80'.		SP	3,8,11,17
84								
89	6.9		50%	ND	(90-92') SAND: Light brown to greenish-gray, coarse grained sand to fine grained gravel, well graded, dense, trace fines. (100-102') NO SAMPLE COLLECTED. Hydropunch groundwater sample analyzed at 100'.		GW	40,87,100,STOP
94								
99	N/A		N/A	N/A				N/A
104								