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ASSEMBLY C CSI REPORT VOLUME 1 SOLID WASTE MANAGEMENT UNITS 15, 21 AND 26 MILLINGTON SUPPACT TN
11/1/1995
ENSAFE ALLEN AND HOSHALL

ASSEMBLY C-CSI REPORT
NAVAL SUPPORT ACTIVITY MEMPHIS
MILLINGTON, TENNESSEE

VOLUME I
SWMUs 15, 21, AND 26

CTO-094
Contract No. N62467-89-D-0318

Prepared for:

Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina

Prepared by:

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ASSEMBLY C CSI REPORT
NAVAL SUPPORT ACTIVITY MEMPHIS
MILLINGTON, TENNESSEE

RCRA FACILITY INVESTIGATION
SWMU 15 — N-94 UNDERGROUND TANK FARM

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Contract No. N62467-89-D-0318

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LIST OF ACRONYMS AND ABBREVIATIONS

BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure
bls	below land surface
CLEAN	Comprehensive Long Term Environmental Action Navy
cm/sec	centimeters per second
CSI	Confirmatory Sampling Investigation
CS/VP	Confirmation Study/Verification Phase
DPT	direct push technology
DQO	Data Quality Objectives
DRO	diesel-range organics
E/A&H	EnSafe/Allen & Hoshall
EAR	Environmental Assessment Report
FSA	full-scan analysis
GRO	gasoline-range organics
MCL	maximum contaminant level
N/A	not analyzed
ND	not detected
NSA	Naval Support Activity (formerly Naval Air Station)
PCBs	polychlorinated biphenyls
PID	photoionization detector
ppb	parts per billion
ppm	parts per million
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SIP	Site Investigation Plan
SOUTHNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SVOCs	semivolatile organic compounds
SWMU	solid waste management unit
SST	Subsurface Technologies, Inc.
TDEC	Tennessee Department of Environment and Conservation
TPH	total petroleum hydrocarbons
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
VSI	Visual Site Inspection

EXECUTIVE SUMMARY

The *Assembly C Site Investigation Plans* proposed two phases of investigation for the Confirmatory Sampling Investigation (CSI) at Solid Waste Management Unit (SWMU) 15. The first phase consisted of a soil and groundwater investigation using Direct Push Technology (DPT) equipment, which confirmed a release of contaminants at the site. Based on the results of the first phase, the second phase, a RCRA Facility Investigation (RFI), is required to define the nature and extent of the release. This report summarizes activities conducted during the CSI's first phase and outlines the proposed RFI activities.

Based on the results of the DPT investigation, a release of petroleum constituents has occurred onsite, associated with 10 former underground storage tanks (USTs) that stored aviation gasoline, lubricating oil, and, reportedly, a variety of liquid wastes. Analytical results indicate no volatile organic compounds (VOCs) in subsurface soil samples exceeded the risk-based concentrations (RBCs) for residential and industrial soil. However, select VOC concentrations in both loess and fluvial deposits groundwater exceed both the RBC for tap water and the maximum contaminant level (MCL) for drinking water. The VOC detected most frequently and at the highest concentration in groundwater is benzene, with concentrations ranging from 13.1 parts per billion (ppb) to 3,200 ppb in loess groundwater and from 9.7 ppb to 780 ppb in fluvial deposits groundwater. The RBC for benzene is 0.31 ppb and its MCL is 5 ppb. In addition to benzene, the following VOCs in loess groundwater exceeded their respective RBCs: ethylbenzene, total xylenes, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. In addition to benzene the following VOCs in fluvial deposits groundwater exceeded their respective RBCs: 1,2,4-trimethylbenzene and bromomethane.

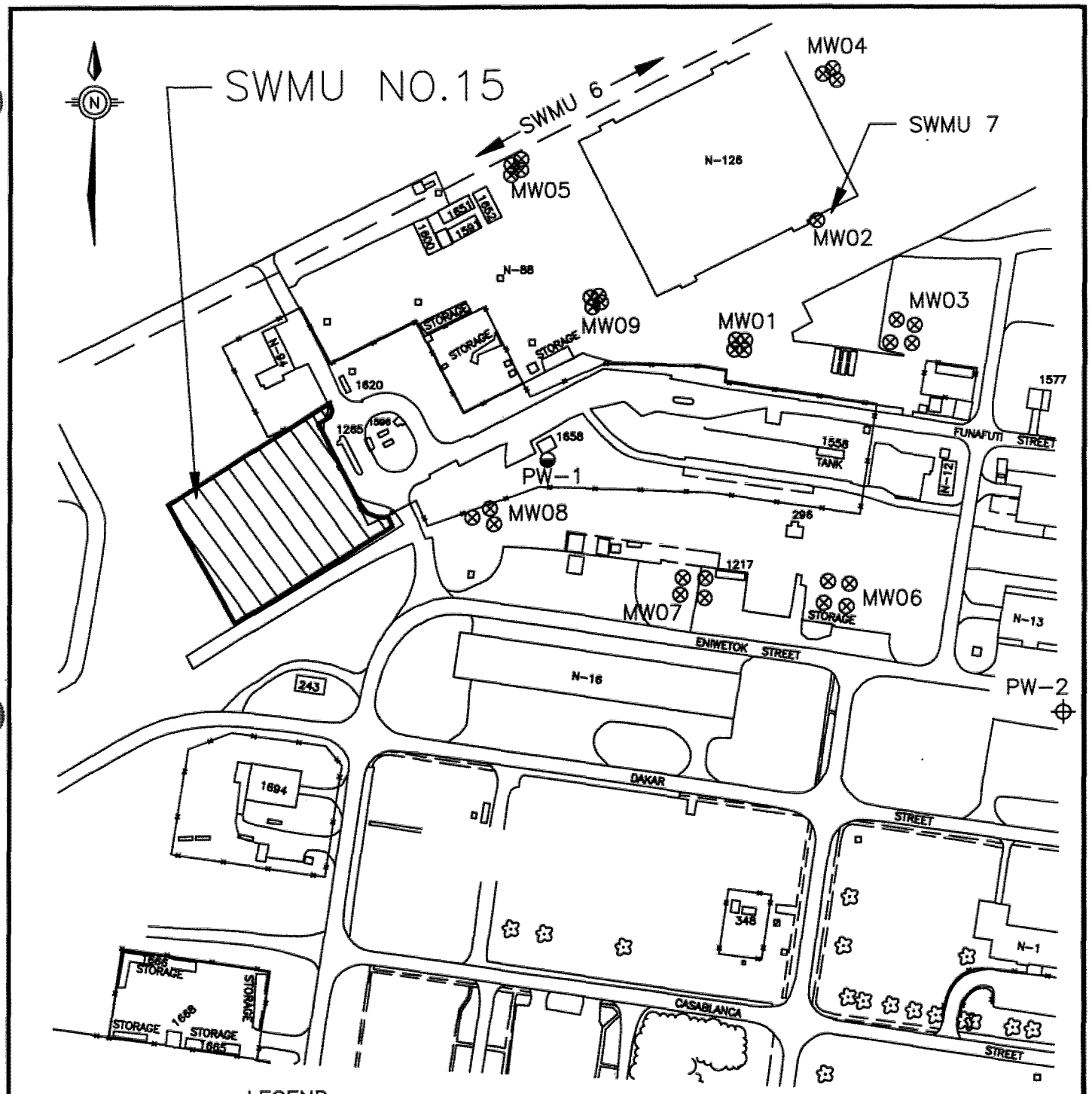
Section 7 of this report outlines the proposed RFI activities, which include advancing and sampling soil borings within the SWMU 15 boundary, a supplemental DPT groundwater investigation, and installing and sampling soil borings and monitoring wells outside of the SWMU 15 boundary to determine the nature and extent of hydrocarbon-related contamination. The results of the RFI will be compiled in an RFI Report.

1.0 INTRODUCTION

As part of the U.S. Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) program, the following Confirmatory Sampling Investigation (CSI) report has been prepared for Solid Waste Management Unit (SWMU) 15, the N-94 Underground Storage Tank Farm, on the Northside of Naval Support Activity (NSA) Memphis, Millington, Tennessee. Figures 1-1 and 1-2 provide a vicinity map of the former Naval Air Station and aerial photograph of SWMU 15, respectively.

As a result of the Base Closure and Realignment Act of 1990, a portion of NSA Memphis, which includes SWMU 15, will be closed and prepared for transfer to the City of Millington. Eight SWMU assemblies (i.e., groups) have been defined for the NSA Memphis RCRA Corrective Action Program. Four of these assemblies (A, B, C, and D) are on closing portions of the base and have been categorized and ranked according to their Base Realignment and Closure (BRAC) status. SWMU 15 is in Assembly C, which is composed of five SWMUs requiring CSIs to confirm whether a release of contaminants has occurred and, if so, whether RCRA Facility Investigation (RFI) characterization will be required. The remaining four assemblies (E, F, G, and H) are on portions of the base that will remain open. The investigation, undertaken by EnSafe/Allen & Hoshall (E/A&H), adhered to the requirements of the Hazardous and Solid Waste Amendments portion (HSWA-TN002) of RCRA Permit No. TN2-170-022-600 and applicable regulations.

The *Assembly C Site Investigation Plans* proposed two phases of investigation for the CSI at SWMU 15. The first phase consisted of a soil and groundwater investigation using Direct Push Technology (DPT) equipment, which confirmed a release of contaminants at the site. Based on the results of the first phase, the second phase, RFI characterization, is required to define the nature and extent of contamination at SWMU 15. This report summarizes the activities conducted during the CSI's first phase and outlines the proposed RFI activities.



LEGEND

PW-1 ◒ PRODUCTION WELL

— — — UNDERGROUND STORM SEWER

⊗ MW01 EXISTING MONITORING WELL CLUSTER

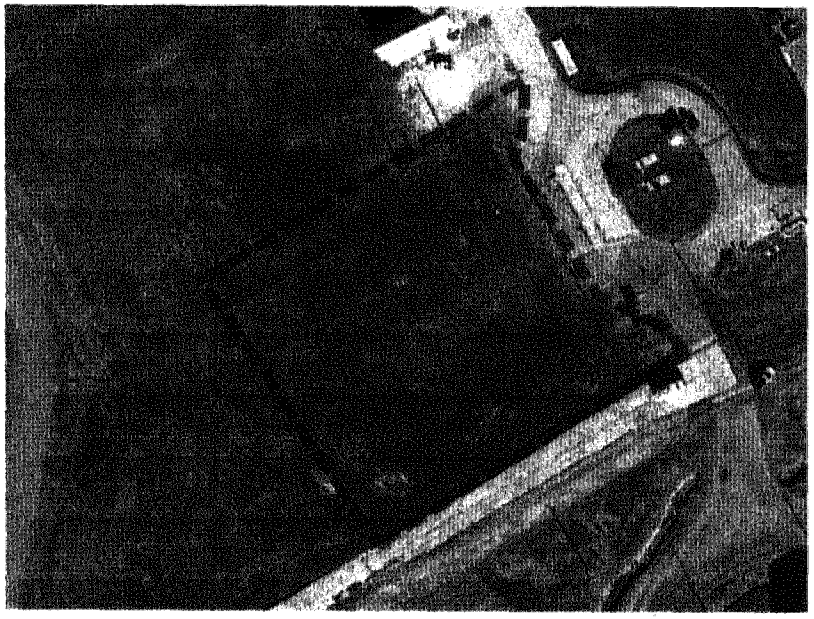
200 0 200

SCALE FEET

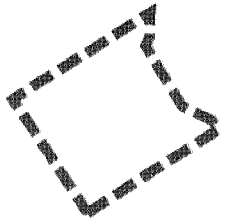
RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 1-1
VICINITY MAP
N-94 UNDERGROUND TANK FARM
SWMU 15

DWG DATE: 10/31/95 | DWG NAME: 94WLC15



SWMU 15 BOUNDARY



Photograph Scale

0 150 300 Ft.

RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TENNESSEE

FIGURE 1-2
DIGITAL ORTHOPHOTOGRAPH
N-94 UNDERGROUND TANK FARM
SWMU 15

2.0 SITE DESCRIPTION AND HISTORICAL SITE INFORMATION

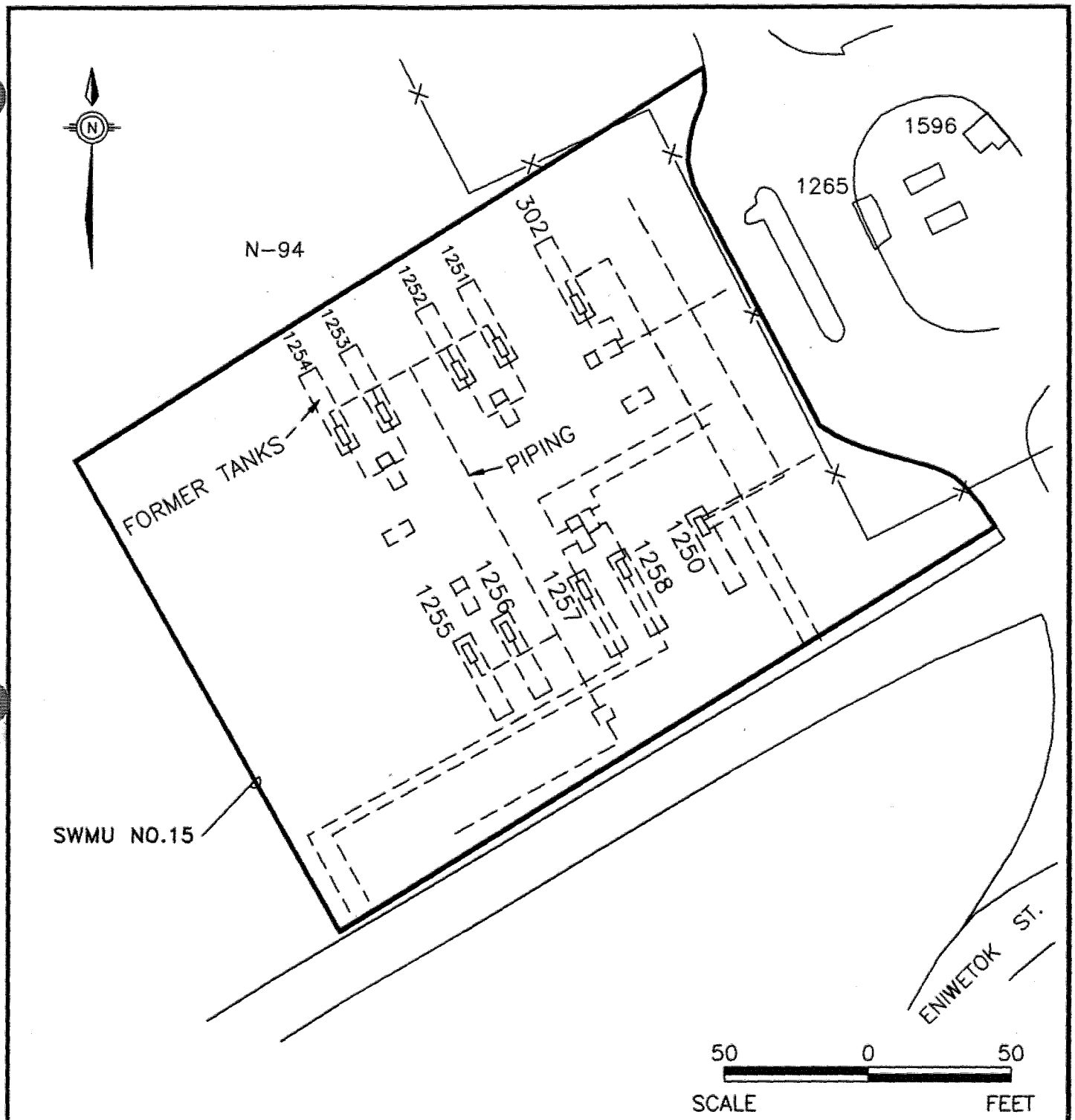
2.1 Site Description

SWMU 15 is a former fuel farm south of Building N-94, which occupies an approximately 40,000-square-foot grassy area in the central quadrant of the NSA Memphis Northside. The N-94 tank farm is approximately 1,000 feet southeast of the main runway and 250 feet northeast of Building 1671, due west of the intersection of Eniwetok Street and First Avenue. Figure 2-1 provides a site map of SWMU 15.

This area has been disturbed by past activities. The surface topography slopes gently to the west, with an approximate elevation difference of 4 feet between the east (280 feet above mean sea level [msl]) and west (276 feet msl) sides of the site. Surface water at the site drains west and southwest into the SWMU 6 drainage ditch, which is approximately 600 feet southwest of SWMU 15. Water in the SWMU 6 drainage ditch ultimately flows to North Fork Creek.

2.2 Historical Site Operations

Based on engineering diagrams, the SWMU contained 10 10,000- to 25,000-gallon underground storage tanks (USTs). Nine USTs reportedly stored aviation gasoline (Tank 302 and Tanks 1251 to 1258) and one UST stored lubricating oil (Tank 1250). These USTs, installed in 1943, supplied fuel and oil to approximately 75 remote fuel/oil pit boxes along the airport aprons on either side of the control tower (Building N-4). All the storage tanks were abandoned in 1986 and were removed, reportedly along with all associated UST piping, in early 1992 under the Navy's UST program. Between abandonment and eventual removal, five of the USTs at SWMU 15 (Tanks 1250, 1255, 1256, 1257, and 1258) were reportedly used to store liquid waste generated by the Aircraft Intermediate Maintenance Department. These liquid wastes may have included the following substances: paint waste, solvents, Freon, stripper, waste oil, waste gas, and waste alodine. Figure 2-1 shows the approximate former locations of the 10 USTs and their associated piping.



LEGEND

FORMER UNDERGROUND UST PIPING

1254 FORMER FUEL UST

RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 2-1
SITE MAP
N-94 UNDERGROUND TANK FARM
SWMU 15

DWG DATE: 10/06/95 | DWG NAME: 94DSM15

3.0 PRELIMINARY INVESTIGATIONS

Previous studies conducted at SWMU 15 include two Visual Site Inspections (VSI), one in 1985 prior to UST removal, and the second in 1990. Following the 1992 removal of the USTs, closure reports were submitted to the Tennessee Department of Environment and Conservation (TDEC). The following sections provide the results of the previous studies.

3.1 Visual Site Inspections — 1985 and 1990

During the 1985 VSI, several USTs at SWMU 15 were observed to contain gasoline mixed with water; the other tanks were empty. The 1990 VSI visual field inspections identified no obvious surface spills at the site (ERC/EDGe, 1990).

3.2 UST Closure Reports

The engineering design contractor for the Navy's UST program identified the underground tank farm at N-94 as a UST system (i.e., containing petroleum hydrocarbons only) and designated the 10 tanks for removal, unaware that the site, also classified as a SWMU, was to be investigated as part of the RCRA Corrective Action Program.

After sampling of tank contents indicated the presence of hazardous wastes, proposed actions regarding the UST removal were outlined in a February 11, 1992, Navy correspondence to the Tennessee Department of Environment and Conservation (TDEC) Solid Waste Management, Hazardous Waste Management Section. Appendix A contains a copy of the Navy correspondence. As outlined in the letter, TDEC and the Navy agreed to the following:

- All 10 N-94 USTs would be removed, and any tank contents or residual soil would be containerized, analyzed, and disposed of properly.

- Absorbents used to clean up any product encountered during excavation would be containerized and disposed of properly.

- A grab water sample would be collected from the water standing in each excavation and analyzed for hazardous waste constituents; however, no groundwater would be removed prior to backfilling.

- Four soil samples collected from the bottom of each excavation would be analyzed for hazardous waste constituents.

- Once the USTs were removed, the excavation would be backfilled with the excavated soil associated with tank removal.

- TDEC and the Navy agreed that any potential soil or groundwater contamination associated with N-94 would be investigated and remediated through the RCRA Corrective Action Program.

The 10 USTs were removed and disposed of in February and March 1992 in accordance with the procedures outlined in the February 11, 1992, Navy correspondence to TDEC. The closure reports in Appendix A indicate that contaminated soil was observed during each UST excavation. The excavated soil was neither sampled nor field screened prior to backfilling because potentially contaminated soil would be investigated for remediation under RCRA. Rainwater that entered the excavated areas was pumped into onsite holding tanks and sampled. Based on the results of the analyses, the water was either disposed of in the sanitary sewer under an agreement with the City of Millington Sewer Department or transported to Laidlaw, Inc. of Nashville, Tennessee for disposal. Appendix A contains the Toxicity Characteristic Leaching Procedures (TCLP) analyses for water in holding tanks R-1, 33, and 46. This water, determined to be nonhazardous, was disposed of in the sanitary sewer system. In accordance with the agreement between TDEC and the Navy, each UST excavation was backfilled with the potentially contaminated soil associated with UST removal. Clean soil was used to backfill the remaining volume of the UST excavations.

The residual product in select USTs was analyzed for waste characterization prior to disposal. Analytical results on the contents of a liquid waste tank indicated the presence of a halogenated solvent (approximately 7 parts per million methylene chloride). Four closure soil samples were collected from the bottom corners of each UST excavation and analyzed for flash point; benzene, toluene, ethylbenzene, and xylenes; total petroleum hydrocarbons (TPH); volatile organic compounds (VOCs); semivolatile organic compounds (SVOCs); and TCLP metals. The closure soil samples contained several petroleum-related constituents, including toluene, ethylbenzene, xylenes, and TPH. Detected toluene concentrations ranged from 0.12 to 51.4 parts per million (ppm), ethylbenzene concentrations ranged from 1.66 to 6.3 ppm, and total xylenes concentrations ranged from 0.44 to 14 ppm. Detected TPH-low boiling fraction concentrations ranged from 0.33 ppm to 5,960 ppm, and TPH-high boiling fraction concentrations from 14.7 to 12,991 ppm. Methyl ethyl ketone was detected in three of the closure samples at concentrations ranging from 0.20 to 0.22 ppm, and 4-methyl-2-pentanone were detected in several samples at concentrations ranging from 0.12 to 8.8 ppm. Each closure report in Appendix A contains a summary of the soil sample analytical results.

4.0 FIELD INVESTIGATIONS AND METHODOLOGY

The CSI soil and groundwater sampling program was intended to confirm the absence or presence of contaminants associated with past activities at SWMU 15, including the storage of aviation gasoline, lubricating oil, and various liquid wastes. Specifically, the CSI objectives were:

- Determine the potential for surface and subsurface soil contamination, if any, associated with the use of potentially contaminated backfill soil.

- Identify and quantify subsurface soil contamination, if present, in the loess.

- Identify and quantify groundwater contamination, if present, in the loess and fluvial deposits.

This section summarizes the field sampling protocols employed during the first phase of the CSI, which were based on the U.S. Environmental Protection Agency (USEPA) and TDEC-approved *Comprehensive RFI Work Plan* (E/A&H, 1994) and *Assembly C Site Investigation Plans* (E/A&H, 1995). The soil and groundwater sampling tasks performed during the investigation followed the procedures outlined in the work plans.

General sampling protocols and rationale for the DPT subsurface soil and groundwater investigation are organized and presented in Sections 4.1 and 4.2, respectively, of this CSI report. Specific sampling protocols (sample handling, field Quality Assurance/Quality Control [QA/QC], and decontamination) are presented in Section 4.3. Section 5 of this report discusses the site-specific geologic and hydrogeologic information generated during the investigation, and Section 6 presents the analytical results and discusses the nature and extent of soil and groundwater contamination at SWMU 15.

Analytical Parameters

Soil and groundwater samples were collected during the DPT survey to determine the nature and extent of contaminants at SWMU 15. Each sample was transported to Hydrologic, Inc.'s onsite mobile laboratory for the immediate analysis of VOCs by USEPA Method 8021. Approximately 25% of the samples split for QA/QC purposes (duplicates) during the DPT survey were shipped to National Environmental Testing (NET) laboratory in Bedford, Massachusetts, for VOC analysis by Solid Waste 846 Method 8240. Soil and groundwater samples submitted to Hydrologic's onsite laboratory were analyzed using Level II-equivalent Data Quality Objectives (DQOs). Ninety-five percent of the soil and groundwater samples submitted to NET were analyzed using Level III-equivalent DQOs and 5% using Level IV-equivalent DQOs.

Validata Chemical Services of Norcross, Georgia, validated the results of the NET confirmation samples. Attachment 1 of Volume II contains the validation report, which indicates the overall data quality of the analytical work was considered satisfactory.

Direct Push Technology Methods

Between May 16 and May 23, 1995, E/A&H conducted a DPT survey at SWMU 15 to obtain subsurface soil and groundwater samples for VOC analyses. Subsurface Technologies, Inc. (SST), of Orlando, Florida, provided and operated the DPT equipment.

The DPT investigation was conducted with truck-mounted, hydraulically operated probes which collect subsurface information. The piezocone system, which consists of an electronic cone penetrometer, was used to obtain lithologic information by measuring and plotting point-stress, sleeve friction, and pore pressure as it was advanced from ground surface, through the loess, and into the upper fluvial deposits. The geocone sampler, which is a split-spoon sampler with a push plug on the leading end, was advanced and retracted to retrieve relatively undisturbed subsurface soil samples from specific depths at various locations throughout the SWMU. The GS-1 groundwater sampler obtained groundwater samples from specific depths in the loess and

upper fluvial deposits, with and without an applied vacuum, and generated hydraulic conductivity information when no vacuum was applied. Details for the DPT sampling methods were provided in Section 4.4.4.3 of the *Comprehensive RFI Work Plan*.

4.1 DPT Subsurface Soil Investigation

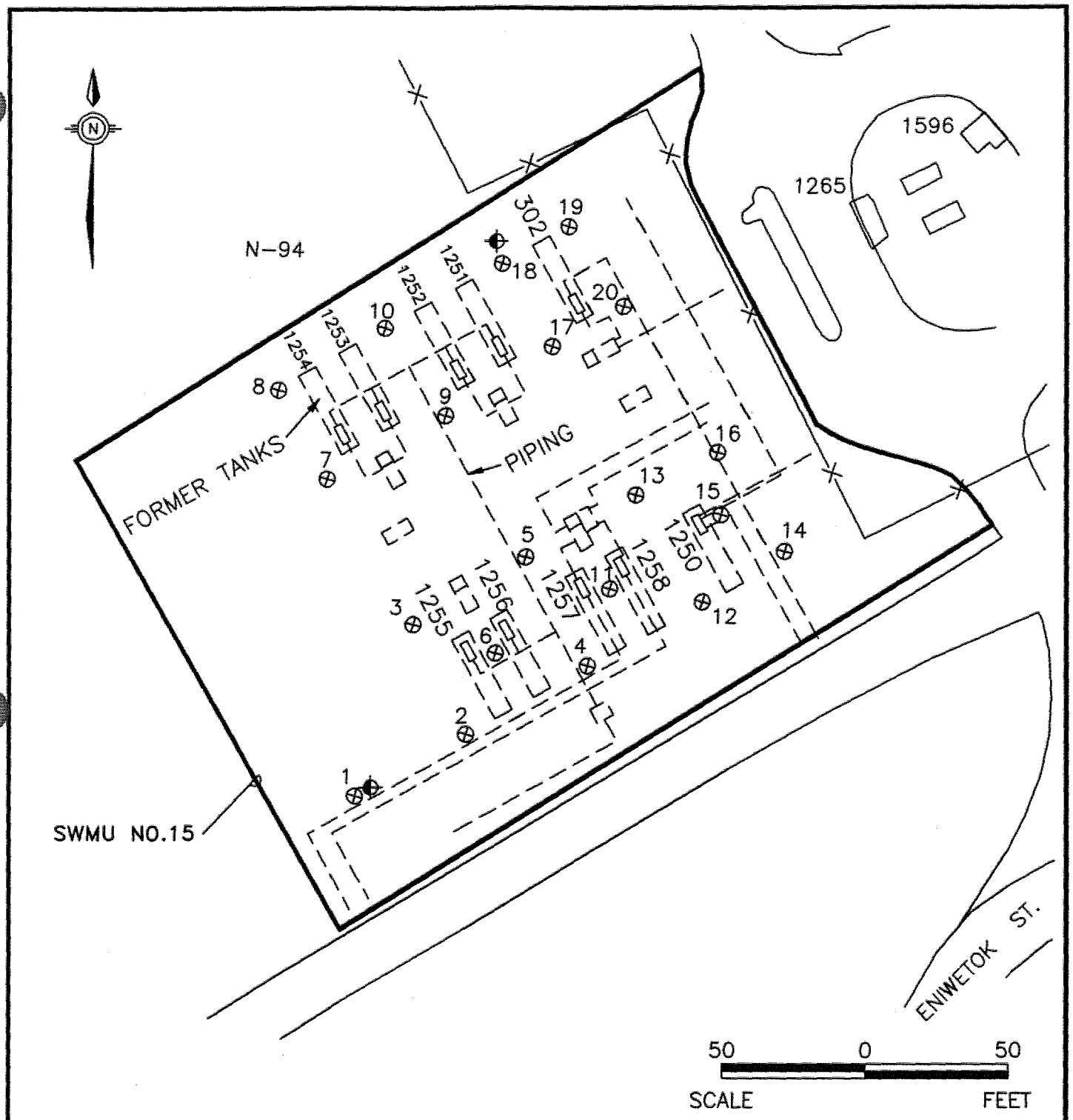
The DPT investigation assessed the nature and extent of contamination in subsurface soil above shallow groundwater in the loess. Twenty DPT sampling locations were proposed in the *Assembly C Site Investigation Plans*. As outlined in the work plan, at least three soil and/or groundwater samples collected from each proposed sampling point were submitted for onsite VOC analyses by Hydrologic. Figure 4-1 shows the sample locations.

4.1.1 Subsurface Soil Sampling Rationale

Before collecting subsurface soil and groundwater samples, SST performed two piezocone soundings (PO-1 and PO-18) on the north and south sides of the site to develop a tentative lithologic profile. Figure 4-1 shows the piezocone locations, and Appendix B contains the piezocone file information and plots. Based on anticipated lithology generated by the piezocone plots, previous investigations at other NSA Memphis Northside SWMUs, and nearby U.S. Geological Survey (USGS) monitoring wells, groundwater in the loess was anticipated to be between 13 and 17 feet bls, and groundwater in the fluvial deposits was anticipated to be at 40 feet bls. The following sections provide details regarding the subsurface soil sampling procedures.

4.1.2 Subsurface Soil Sample Collection Methodology

An E/A&H geologist logged and processed the subsurface soil samples for field screening and submittal to the analytical laboratory. SST collected the samples with the DPT rig using a 2-foot long, 2-inch outside diameter, split-spoon geocone sampler. Upon retrieval, the sampler was opened, and the soil immediately screened for VOCs using an HNu (model GP 101, with a 10.2 eV lamp) photoionization detector (PID).



LEGEND

⊗ DPT SAMPLE LOCATION

PIEZOCONE LOCATION

FORMER UNDERGROUND UST PIPING

1254 FORMER FUEL UST

RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 4-1
DPT SAMPLE LOCATIONS
N-94 UNDERGROUND TANK FARM
SWMU 15

DWG DATE: 10/06/95 | DWG NAME: 94RDS15

A representative sample of the soil was collected and placed in a jar for onsite VOC analysis. Twenty-five percent of the soil samples were split for offsite laboratory analysis. A description of each soil sample; the field screening results; and sample location, designation, and time collected were recorded in the field logbook.

Subsurface soil samples were collected as outlined in the *Assembly C Site Investigation Plans* in the shallow interval (5 to 7 feet bls, which is below the clean soil used to fill the excavations after the USTs were removed) and from just above the water table (if a loess water sample could not be collected). Exceptions to the sampling intervals occurred at Locations 2 and 15, where shallow subsurface soil samples were collected from the 7- to 9-foot interval due to poor sample recovery.

4.2 DPT Groundwater Investigation

The DPT groundwater investigation focused on two water-bearing zones: the near-surface loess (the most likely zone containing contaminants associated with UST fuel storage activities) and the underlying fluvial deposits (which are a preferential zone of groundwater flow and a potential route for contaminant transport). The water-bearing zones at NSA Memphis are described in Section 5, Geology and Hydrogeology.

4.2.1 Groundwater Sampling Rationale

As described in Section 4.1.1, two DPT piezocones were advanced at SWMU 15 to determine the depth of potential water-bearing zones in the loess and fluvial deposits (Figure 4-1). Based on the piezocone results and observations made while installing nearby monitoring wells, depth to groundwater in the loess was anticipated to be between 13 and 17 feet bls and depth to groundwater in the fluvial deposits approximately 40 feet bls.

Where possible, a groundwater sample was collected from the loess deposits. Loess groundwater samples could be obtained at only five of the 20 proposed sampling locations. As

outlined in the *Assembly C Site Investigation Plans*, a soil sample was collected in the loess at each location where a groundwater sample could not be obtained. Groundwater samples were collected from the fluvial deposits at each of the 20 proposed sampling locations at depths ranging from 35 to 52 feet bls. Figure 4-1 shows the DPT groundwater sampling locations.

4.2.2 Groundwater Sample Collection Methods

Groundwater samples were collected during the DPT investigation using the GS-1 groundwater sampler. The SST technician advanced the GS-1 to approximately 17 feet bls at each sampling location to collect a groundwater sample from the loess and to sampler refusal (between 36 and 52 feet bls) to obtain a groundwater sample from the fluvial deposits. The volume of groundwater entering the GS-1 was monitored on the on-board computer screen. When approximately 300 milliliters of groundwater had entered the sampler, the GS-1 was retracted. Groundwater samples were collected directly from the sampler by inserting a new piece of Teflon tubing into the bottom port of the GS-1 and decanting the groundwater directly into the sample vials to minimize the loss of VOCs.

If no groundwater entered the GS-1 after 30 minutes, a vacuum was applied to the sampling device. After a waiting period (typically 20 to 30 minutes), if no water had entered the sampler, it was raised one foot in an attempt to find a water-bearing zone. After an additional waiting period (typically 15 minutes), if no water entered the sampler, a subsurface soil sample was collected from the loess. In certain instances (when time permitted), SST left the GS-1 sampler in the ground overnight to collect a loess groundwater sample.

4.3 Sampling Protocol

All sampling activities adhered to the approved *Comprehensive RFI Work Plan* (E/A&H, 1994) and the *Assembly C Site Investigation Plans* (E/A&H, 1995). Sample handling was minimized. When transferring material from the sampling device to containers, the operation was conducted expediently, in as clean an environment as possible. A new pair of disposable gloves was

donned before collecting each subsurface soil and groundwater sample. Empty containers were kept packaged until used, at which time they were placed on ice and isolated in coolers. Subsurface soil samples for VOC analysis were placed in sample bottles immediately upon collection to minimize the loss of volatile constituents. Samples for TPH and SVOC analyses were homogenized in a stainless-steel mixing bowl and placed in the appropriate containers. Groundwater samples were obtained directly from the GS-1 groundwater sampler.

4.3.1 QA/QC Samples

During the DPT investigation, QA/QC samples were collected to test the level of reproducibility attainable in the sampling and analytical processes. QA/QC samples were analyzed for VOCs as were the associated environmental samples. Soil and groundwater *duplicate* samples collected at a frequency of 25% during the DPT investigation were submitted to the offsite laboratory (NET) for confirmation analysis. Attachment 1 of Volume II contains the data validation report Assembly C confirmation samples. The analytical results of the duplicate samples are discussed in Section 6, Nature and Extent of Contamination.

4.3.2 Sample Processing and Chain-of-Custody Procedure

Sample containers requiring chemical preservation (i.e., hydrochloric acid for aqueous samples) were pre-preserved by the testing laboratory and shipped to E/A&H in sealed packages. Sample containers were labeled with the sample identification number, date, sampler's name, and requested analytical parameter then placed in a cooler immediately following collection. Each sample was logged in the sample logbook. Samples for onsite laboratory analysis were transported by the E/A&H geologist directly to the onsite lab. The Hydrologic chemist recorded each sample in a sample logbook immediately upon receipt.

Samples for offsite laboratory analysis were prepared for shipment by wrapping each sample container individually in bubble wrap, placing it in a resealable plastic bag, and packing it on ice inside a sturdy cooler. Cooler lids were secured with packing tape and sealed with signed

custody seals. Packaged samples were then shipped overnight via FedEx priority service for next morning delivery. The offsite laboratory was notified the day of shipment of the number of samples submitted. All sample shipments were reported to have arrived at NET in good condition and at the appropriate temperatures.

To ensure the integrity of the sample transfer process, a strict chain-of-custody procedure was implemented. This procedure was initiated in the field for each sampling event and conducted through custody transfer to the analytical laboratory. A chain-of-custody form was completed for each batch of samples, itemizing sample numbers, containerization, preservatives, analyses requested, date and time of sampling, and FedEx shipping number. Custody transfers were recorded by signature, date, and time of relinquishment, and receipt of custody by the parties involved.

4.3.3 Sample Labeling

All samples collected in the field were labeled with an alphanumeric code that identifies the site, sample type, and sample location. The first three digits identify the site location, and the fourth digit identifies the sample matrix. The last six digits identify the sample location and sample interval. For example, the sample label "015G010045" designates a SWMU 15 groundwater sample collected from Location 10 at a depth of 45 feet bls.

4.4 Grouting Procedures

SST filled each DPT boring with neat cement grout to land surface following sample collection.

4.5 Decontamination Procedures

SST's downhole field equipment was decontaminated in accordance with guidelines set forth in the *Assembly C Site Investigation Plans*. All downhole and sampling equipment was decontaminated before and after each use at either the central decontamination pad set up at the N-7 aircraft wash rack or at the decontamination pad east of SWMU 40 across First Avenue.

Rinse water generated from decontamination activities stored in a 1,200-gallon holding tank at the central decontamination pad was discharged to the sanitary sewer system after a VOC scan and approval from the City of Millington's wastewater consultant, Fisher & Arnold, Inc.

Decontamination procedures for downhole equipment consisted of the following steps:

- High-pressure wash with a hot mixture of soap and water
- Rinse with potable water
- Rinse with deionized organic-free water
- Rinse twice with pesticide-grade isopropyl alcohol
- Rinse with deionized organic-free water
- Wrap with aluminum foil or plastic

A new pair of disposable latex gloves was donned before handling decontaminated sampling equipment. Subsurface soil samples were collected directly from the split-spoon sampler and groundwater samples directly from the GS-1 groundwater sampler; therefore, no investigation-derived waste (IDW) was generated from these sampling activities.

5.0 GEOLOGY AND HYDROGEOLOGY

5.1 Regional Geology and Hydrogeology

The general hydrogeology of the Memphis area is discussed in detail in Section 2.11 and a conceptual model of the hydrogeology at the NSA is presented in Section 2.12 of the *Comprehensive RFI Work Plan* (E/A&H, 1994). Updated information is available in the *Hydrogeology of Post-Wilcox Group Stratigraphic Units in the Area of the Naval Air Station Memphis, Near Millington, Tennessee* (Kingsbury and Carmichael, 1995). On the basis of this updated information, the hydrogeology of NSA Memphis is re-summarized below.

The two stratigraphic units investigated during the RFIs at NSA Memphis are the loess/alluvial deposits of Pleistocene and Holocene age and the underlying fluvial deposits of Pleistocene to Pliocene age. The loess — eolian deposits consisting of silt, silty clay, clay, and minor amounts of sand — is the principal unit occurring at land surface throughout the NSA Memphis Northside. Alluvium, which is restricted to stream valleys, includes alluviated or reworked loess. The loess is typically 0 to 65 feet in the Memphis area; at NSA Memphis it ranges from 15 to 45 feet in thickness. Water-bearing zones are present in the loess primarily in the upper part of this unit; however, yields are low and water quality analyses performed during the water use survey portion of previous UST investigations indicate that loess groundwater does not meet many primary and secondary drinking water standards. Previous investigations at NSA Memphis have found depth to water in the loess varying between 5 and 15 feet bls and vertical hydraulic conductivities to range from 10^{-6} to 10^{-8} centimeter per second (cm/sec). Although the loess may be considered an aquitard on the basis of the relatively low hydraulic conductivities, this shallowest water-bearing zone is present within this interval and, therefore, the target depth of the shallow groundwater investigation at SWMU 15. Groundwater flow in the loess is primarily downward, although locally some groundwater in the loess may discharge to nearby streams, drainage ditches, and other surface-water bodies.

The fluvial deposits underlie the loess in upland areas and consist of sand, gravel, and some clay, with thin layers of ferruginous sandstone and conglomerate at the base. This unit ranges in thickness from 0 to 100 feet in the Memphis area; on the Northside of NSA Memphis it ranges from 10 to 35 feet in thickness and represents the most significant component of the surficial aquifer. Many shallow domestic wells in the Memphis rural areas are completed in the fluvial deposits. Relative groundwater elevations between wells completed in the loess/alluvium and fluvial deposits indicate semiconfined to confined conditions in the fluvial deposits. Typically a downward vertical gradient exists between water in the loess and the fluvial deposits. Sediments in the fluvial deposits generally coarsen with depth, and typically, the upper portion consists of a mixture of very fine sand with varying degrees of silt and clay and becomes increasingly less silty with depth, grading into a fine to medium sand near the middle of the unit. Grain sizes typically coarsen below this interval, grading into a gravelly sand near the fluvial deposits basal section.

The fluvial deposits are underlain by the Cockfield Formation, a part of the Jackson-upper Claiborne confining unit, which is a heterogeneous formation consisting of very fine silty sand interbedded with clay and silt lenses or clay with interbedded fine sand lenses. The more-permeable characteristics of the fluvial deposits, compared to the relatively impermeable properties of the overlying loess/alluvium and the underlying Jackson-upper Claiborne confining unit, result in the fluvial deposits being the preferential zone of groundwater flow and the route for contaminant transport in NSA Memphis's subsurface.

5.2 Site-Specific Geology and Hydrogeology

The following sections provide site-specific geologic and hydrogeologic information obtained from stratigraphic test borings, previous investigations, USGS monitoring wells, and the SWMU 15 DPT investigation.

5.2.1 Stratigraphic Test Borings

In 1994, the USGS drilled the 200-foot deep stratigraphic test hole 4 approximately 500 feet south of the main runway and about 750 feet west of SWMU 15. The test hole was originally to be advanced approximately 15 feet into the Cook Mountain Formation (the confining unit separating the Memphis aquifer from the overlying Cockfield Formation and shallower units). However, due to the unanticipated thinness of the Cockfield Formation, this borehole was advanced approximately 50 feet into the Memphis Sand. Cuttings from the test hole were visually logged by a field geologist during drilling, and geophysical logs were run following completion of the hole. Lithologies encountered in the test hole were as follows:

Loess:	Approximately 40 feet of wind-blown silt deposits (loess) consisting of silt and clay.
Fluvial Deposits:	Approximately 30 feet of fluvial deposits consisting of sand and gravel.
Cockfield Formation:	Approximately 35 feet of alternating sand, clay, and some lignite.
Cook Mountain Formation:	The Cook Mountain, characterized as a brownish-gray to olive-gray dense clay approximately 50 feet thick, is defined as the upper confining unit between the surficial aquifers and the Memphis Sand aquifer.

5.2.2 Previous Investigations

UST Investigations

Shallow subsurface soil information was reported in the environmental assessment reports (EARs) for three separate UST investigations at sites near SWMU 15. During these investigations, soil borings were advanced and sampled to a maximum depth of 28 feet in the loess, which is described as brown and gray mottled clayey silt and silty clay. Miscellaneous boring logs and boring locations are presented in Attachment 2 of Volume II.

An EAR (E/A&H, 1992) was submitted following the investigation of a UST (Tank 301) approximately 100 feet east of SWMU 15. Groundwater was typically encountered between 6 and 13 feet bls. Vertical permeabilities in soil samples collected from the loess ranged from 1.5×10^{-6} to 5.2×10^{-7} cm/sec.

A second EAR (E/A&H, 1994) was submitted following the assessment of two USTs (304 and 1239), approximately 400 feet east of SWMU 15. Groundwater levels ranged from 6.8 to 13.6 feet bls. Vertical permeabilities in two subsurface soil samples collected immediately above the water table in the loess were 1.8×10^{-7} cm/sec and 8.4×10^{-7} cm/sec. Slug test results indicate the average horizontal hydraulic conductivity in the USTs' vicinity to be 4.48×10^{-3} feet per day.

Vertical permeability data collected during a UST investigation at Building N-126 (USTs 7, 303, and 1241) (E/A&H, 1993) indicated an average hydraulic conductivity value of 4.5×10^{-7} cm/sec in a soil sample collected from 11 to 13 feet bls in the loess. Building N-126 is approximately 500 feet northeast of the site.

Assembly A RFI

Subsurface soil information was collected during the Assembly A RFI for SWMU 7, the Building N-126 Plating Shop Dry Well. Nine monitoring well clusters (designated 07MW01 through 07MW09) were installed at various locations around SWMU 7, which is approximately 900 feet northeast of SWMU 15. 07MW07, 07MW08, and 07MW09 are the SWMU 7 monitoring well clusters closest to SWMU 15 (approximately 600 feet east, 250 feet east, and 500 feet northeast, respectively). The general lithology encountered in the soil borings associated with these three well clusters is as follows:

- Clayey silt, silty clay, and sandy clay from ground surface to between 32.5 and 35 feet bls (loess).

- Sand with gravel, silt, and clay from between 32.5 and 35 feet bls to between 73 and 78.5 feet bls (fluvial deposits).

- Silty sand, clayey sand, sandy clay, and clay from between 73 and 78.5 feet to the termination depth of the borings (between 105 to 125 feet) (Cockfield Formation).

Laboratory-measured hydraulic conductivities for subsurface soil samples associated with the SWMU 7 monitoring wells are as follows:

Well Cluster	Associated Soil Sample ID	Sampling Depth (in feet)	Hydraulic Conductivity (in cm/sec)
07MW01	07S000177	75 - 77 (lower fluvial deposits)	6.8×10^{-5}
	07S0001112	110 to 112 (Cockfield Formation)	4.1×10^{-8}
07MW03	07S0003117	115 to 117 (Cockfield Formation)	1.6×10^{-8}
07MW08	07S0008127	125 to 127 (Cockfield Formation)	8.7×10^{-7}
07MW09	07S000922	10 - 22 (loess)	9.5×10^{-7}

The boring and monitoring well logs and hydraulic conductivity data sheets for SWMU 7 well clusters are provided in Attachment 2 of Volume II.

5.2.3 USGS Monitoring Wells

In April 1995, the USGS installed three monitoring wells just north of SWMU 40 and approximately 500 feet south of SWMU 15. One well is screened in the loess (WL-1L), one in the fluvial deposits (WL-1F), and the third in the Cockfield Formation (WL-1C). Based on

verbal and written communication the USGS, the following lithologic units were encountered while drilling the test hole for the Cockfield Formation monitoring well:

- Silty clay from 0 to 2 feet bls (fill)
- Silt and clayey silt from 2 to 36 feet bls (loess)
- Sand and gravel from 36 to 74 feet bls (fluvial deposits)
- Clayey sand, silty clay, and clay from 74 feet to the termination depth of the boring at 122 feet bls (Cockfield Formation)

The lithologies in the USGS monitoring wells are consistent with the lithology encountered while installing the SWMU 7 monitoring wells described in the previous section.

The USGS measured several rounds of water levels in the three wells. Table 5-1 lists selected water elevation measurements.

Table 5-1
Groundwater Level Data — USGS Monitoring Wells

USGS Well Designation	Screened Interval (ft. bls)[a]	Land Surface Altitude (msl)[b]	Date[a]	Depth to Water (feet bls)[a]	Groundwater Altitude (msl)[c]
WL-1L (SH:U-100)	8 - 18' bls, loess	274.97	05-08-95	4.98	269.99
			06-13-95	6.17	268.80
			06-21-95	6.50	268.47
			08-22-95	6.45	268.52
WL-1F (SH:U-101)	59 - 69' bls, fluvial deposits	275.19	05-08-95	17.98	257.21
			06-13-95	18.48	256.71
			06-21-95	18.57	256.62
			08-22-95	19.15	256.04
WL-1C (SH:U-102)	105 - 115', upper Cockfield Fm.	275.05	05-08-95	17.94	257.11
			06-13-95	18.09	256.96
			06-21-95	18.01	257.04
			08-22-95	18.65	2556.40

Notes:

[a] Screened interval, date, and depth to water were obtained through verbal and written communication with Mr. Jack Carmichael of the USGS.
[b] Ground surface altitudes were obtained using Global Positioning System (GPS) survey equipment; altitudes reported with respect to mean sea level (msl).
[c] Water-level altitudes were obtained by subtracting depth to water from land surface altitude (msl).

Based on 1995 water level measurements in monitoring wells on the Northside, there is very little vertical head difference in groundwater levels in the upper fluvial, lower fluvial, and Cockfield Formation monitoring wells on the Northside of NSA Memphis.

Based on the topography, the information contained in the conceptual model of the NSA Memphis hydrogeology (Section 2.12 of the *Comprehensive RFI Work Plan*), recent data collected during investigations at Assembly A SWMUs, and communication with USGS representatives, groundwater in the fluvial deposits flows locally toward the northwest. Groundwater flow in the loess is primarily downward, although locally, some groundwater in the loess may discharge to nearby streams, drainage ditches, and other surface water bodies.

5.2.4 DPT Piezocone Soundings

As outlined in Section 4.1.1 of this document, two piezocone soundings (designated PO-1 and PO-18, refer to Figure 4-1) were performed at SWMU 15 to obtain information regarding the lithology and potential water-bearing zones prior to sample collection. E/A&H used the information generated from the piezocone soundings to select soil and groundwater sampling intervals for the DPT investigation. Appendix B provides the piezocone logs and plots for SWMU 15. As shown on the piezocone logs and plots, the fluvial deposits can be readily identified from approximately 33 to 38 feet bls to the termination depth of each piezocone. The fluvial deposits are described as a clayey to silty fine sand and fine sand on the lithologic logs, and visually identified due to the higher point stress on the plots. The water-bearing zone in the loess was not as readily identifiable on the lithologic logs and plots.

5.2.5 DPT Hydrocone Plots

During the DPT investigations, the GS-1 groundwater sampler obtained groundwater samples from specific depths in the loess and upper fluvial deposits, with and without an applied vacuum. The sampling device, which included a transducer attached to an on-board computer system via an umbilical cable, recorded data regarding the fill rate, hydrostatic pressure, and gas pressure.

The computer estimated horizontal permeability by applying the time rate of filling data to the standard Bouwer and Rice rate-of-rise permeability models. Horizontal permeability measurements for the loess ranged from 1.09×10^{-5} to 2.27×10^{-4} cm/sec. Horizontal permeability measurements for the fluvial deposits ranged from 1.05×10^{-5} to 3.92×10^{-4} cm/sec. Appendix B provides the GS-1 sample plots and horizontal permeability measurements for the groundwater samples collected during the DPT investigation.

6.0 NATURE AND EXTENT OF CONTAMINATION

The following sections provide the analytical results for subsurface soil and groundwater samples collected during the DPT investigation. Hydrologic's onsite laboratory analyzed the DPT soil and groundwater samples for VOCs. Twenty-five percent of the soil and groundwater samples were split and submitted to NET for confirmation analysis. Appendix C provides the laboratory data.

As a reference for organic concentrations detected in subsurface soil samples, the contaminant concentrations are compared with the risk-based concentrations (RBCs) for residential and industrial soil (USEPA Region III Risk-Based Concentration Table, January to June 1995). Contaminant concentrations in groundwater are compared to the RBCs for tap water (USEPA Region III Risk-Based Concentration Table, January to June 1995) and the maximum contaminant level (MCL) for drinking water (USEPA Drinking Water Regulations and Health Advisories, May 1994). The following sections discuss the analytical results by media.

6.1 Subsurface Soil Sample Results — DPT Investigation

Thirty-five subsurface soil samples were collected from 20 locations during the DPT investigation. Twenty were from the 5- to 7-foot or 7- to 9-foot interval at each DPT sampling location. The remaining 15 samples were from the anticipated soil/water interface in the loess, where a groundwater sample could not be collected. Each sample was screened for organic vapors with a PID; field screening results and visual observations were recorded in the field logbook. Nine of the soil samples were split and submitted to the offsite laboratory for confirmation analysis. Laboratory analyses identified the following contaminants in subsurface soil at SWMU 15:

benzene	1,3,5-trimethylbenzene	p-isopropyltoluene
toluene	1,2,4-trimethylbenzene	tert-butylbenzene
ethylbenzene	n-butylbenzene	p-isopropyltoluene
total xylenes	styrene	naphthalene
n-propylbenzene	isopropylbenzene/bromobenzene	

All detected VOCs are typical constituents of petroleum products. Methylene chloride, acetone, and 2-butanone were also detected, but these compounds are likely laboratory artifacts. Table 6-1 summarizes the detected VOCs. As shown on this table and on Figure 6-1, the industrial and residential RBCs for VOCs were not exceeded in any soil sample.

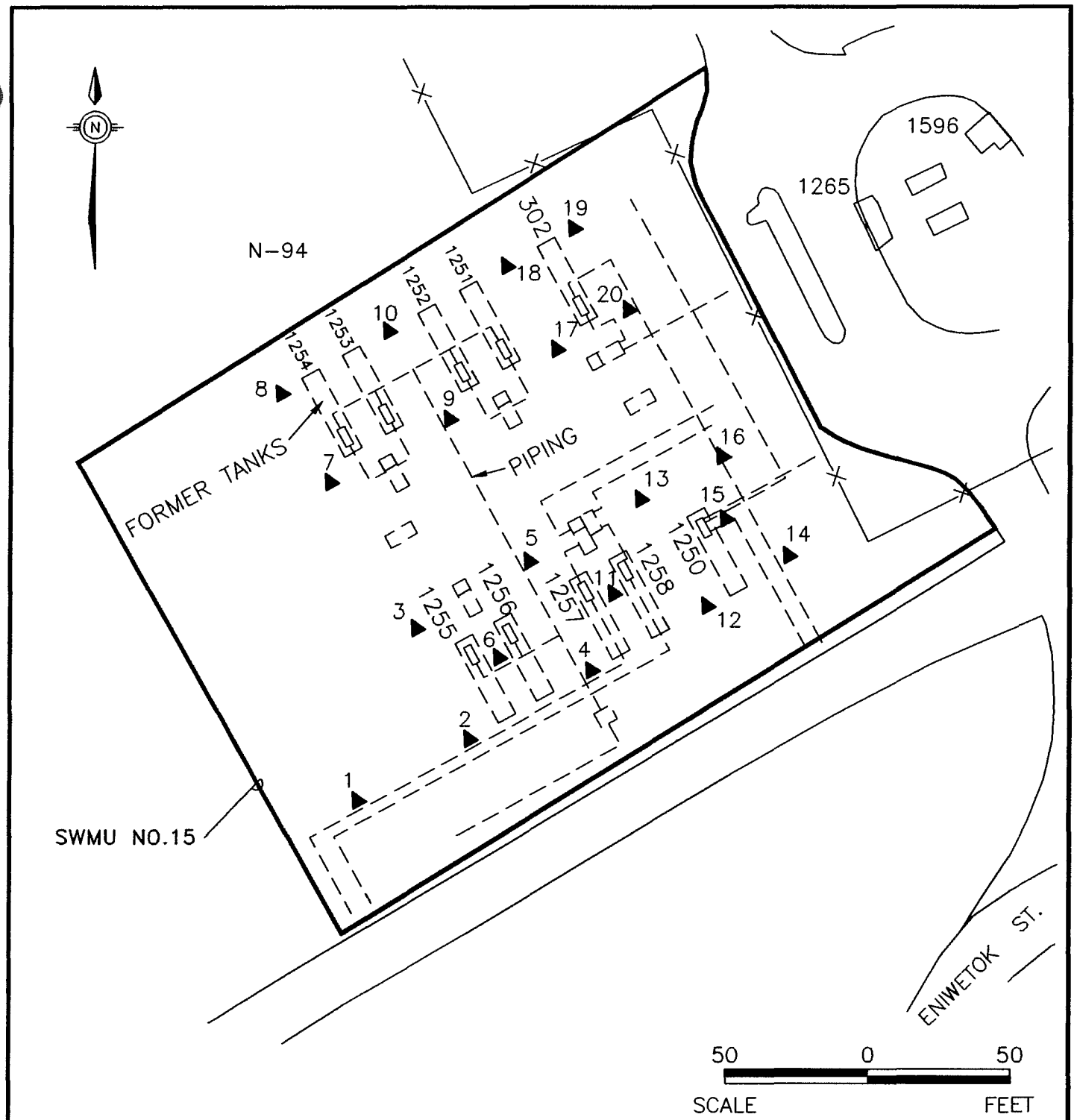
6.2 Groundwater Sample Results — DPT Investigation

Groundwater samples could be collected from the loess at only five locations (Locations 1, 2, 4, 5, and 8). The E/A&H geologist collected a soil sample from the anticipated soil/water interface in the loess at the 15 other DPT sampling locations where loess groundwater could not be collected. A fluvial deposits groundwater sample was obtained at all 20 DPT sampling locations. Twenty-five percent of the groundwater samples were split (two from the loess and five from the fluvial deposits) and submitted to the offsite laboratory for confirmation analyses.

The following VOCs were detected in loess and fluvial deposits groundwater:

benzene	1,3,5-trimethylbenzene
toluene	1,2,4-trimethylbenzene
ethylbenzene	s-butylbenzene
total xylenes	bromomethane
styrene	1,1-dichloroethane
n-propylbenzene	carbon disulfide
isopropylbenzene/bromobenzene	

These contaminants, except 1,1-dichloroethane (a common solvent), are constituents of petroleum products. Methylene chloride, acetone, and 2-butanone were also detected in groundwater, but these constituents are likely laboratory artifacts. Table 6-2 summarizes the detected VOC concentrations in loess and fluvial groundwater.



LEGEND

▲ CONTAMINANT CONCENTRATION NON-DETECT OR LESS THAN RESIDENTIAL RISK-BASED CONCENTRATION FOR SOIL.

FORMER UNDERGROUND UST PIPING

1254 FORMER FUEL UST

RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 6-1
VOCs IN SOIL SAMPLES
N-94 UNDERGROUND TANK FARM
SWMU 15

DWG DATE: 10/06/95 | DWG NAME: 94VSS15

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
Benzene	2 (7 - 9')	015S000201	36.8	ND[d]	200,000	22,000
	6 (15 - 17')	015S006017	210	N/A[e]		
	7 (15 - 17')	015S007017	6.2	N/A		
	9 (15 - 17')	015S000902	163	N/A		
	12 (5 - 7')	015S001201	48.8	N/A		
	12 (15 - 17')	015S001202	1,100	ND		
	13 (15 - 17')	015S013017	320	N/A		
	14 (5 - 7')	015S001401	1,700	N/A		
	14 (15 - 17')	015S001402	1,300	N/A		
	15 (7 - 9')	015S001501	1,100	N/A		
	15 (15 - 17')	015S001502	ND	6J[f]		
	16 (5 - 7')	015S016007	6,000	N/A		
	16 (15 - 17')	015S016017	673	N/A		
Toluene	9 (15 - 17')	015S000902	15.9	N/A	410,000,000	16,000,000
	12 (15 - 17')	015S001202	1,300	1,000D[g]J		
	14 (5 - 7')	015S001401	1,200	N/A		
	14 (15 - 17')	015S001402	2,000	N/A		
	15 (7 - 9')	015S001501	3,500	N/A		
	16 (5 - 7')	015S016007	411	N/A		
	19 (15 - 17')	015S019017	6.1	ND		
Ethylbenzene	2 (7 - 9')	015S000201	48.5	27	200,000,000	7,800,000
	3 (15 - 17')	015S003017	41.7	N/A		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
Ethylbenzene (continued)	4 (5 - 7')	015S000401	23.1	N/A		
	6 (15 - 17')	015S006017	190	N/A		
	7 (15 - 17')	015S007017	18.6	N/A		
	9 (15 - 17')	015S000902	83.5	N/A		
	10 (5 - 7')	015S010007	ND	6J		
	10 (15 - 17')	015S010017	ND	10J		
	11 (5 - 7')	015S001101	119	N/A		
	12 (5 - 7')	015S001201	644	N/A		
	12 (15 - 17')	015S001202	1,500	8,600DJ		
	13 (15 - 17')	015S013017	45.6	N/A		
	14 (15 - 17')	015S001401	2,700	N/A		
	15 (15 - 17')	015S001502	174	200		
	16 (5 - 7')	015S016007	1,000	N/A		
	18 (15 - 17')	015S018017	ND	2J		
	19 (15 - 17')	015S019017	10.2	ND		
Total Xylenes	2 (7 - 9')	015S000201	98.2	ND	1,000,000,000	160,000,000
	3 (15 - 17')	015S003017	49.8	N/A		
	4 (5 - 7')	015S000401	87	N/A		
	6 (15 - 17')	015S006017	464	N/A	1,000,000,000	160,000,000
	7 (15 - 17')	015S007017	5.7	N/A		
	9 (5 - 7')	015S000901	24.4	N/A		
	9 (15 - 17')	015S000902	227.8	N/A		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
Total Xylenes (continued)	10 (5 - 7')	015S010007	ND	25		
	10 (15 - 17')	015S010017	ND	4J		
	11 (5 - 7')	015S001101	397	N/A		
	12 (5 - 7')	015S001201	251.1	N/A		
	12 (15 - 17')	015S001202	9,600	39,000D		
	13 (5 - 7')	015S013007	7.8	N/A		
	13 (15 - 17')	015S013017	92.9	N/A		
	14 (5 - 7')	015S001401	13,900	N/A		
	14 (15 - 17')	015S001402	2,200	N/A		
	15 (7 - 9')	015S001501	3,000	N/A		
	15 (15 - 17')	015S001502	144	130		
	16 (5 - 7')	015S016007	9,120	N/A		
	16 (15 - 17')	015S016017	1,411	N/A		
	18 (5 - 7')	015S018007	ND	2J		
	19 (15 - 17')	015S019017	35.9	ND		
	20 (5 - 7')	015S020007	5.8	ND		
Isopropylbenzene, Bromobenzene	2 (7 - 9')	015S000201	44.5	ND	None	None
	3 (15 - 17')	015S003017	17.6	N/A		
	4 (5 - 7')	015S000401	28.5	N/A		
	6 (5 - 7')	015S000601	5.9	N/A		
	7 (15 - 17')	015S007017	7.5	N/A		
	9 (15 - 17')	015S000902	26.1	N/A		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
Isopropylbenzene, Bromobenzene (continued)	11 (5 - 7')	015S001101	18.5	N/A		
	12 (5 - 7')	015S001201	100	N/A		
	12 (15 - 17')	015S001202	3,300	ND		
	13 (15 - 17')	015S013017	21.6	N/A		
	14 (5 - 7')	015S001401	3,700	N/A		
	14 (15 - 17')	015S001402	631	N/A		
	15 (7 - 9')	015S001501	1,300	N/A		
	16 (5 - 7')	015S016007	5,500	N/A		
	16 (15 - 17')	015S016017	23.9	N/A		
	19 (15 - 17')	015S019017	78.5	ND		
n-Propylbenzene	2 (7 - 9')	015S000201	21.7	ND	None	None
	4 (5 - 7')	015S000401	41.3	N/A		
	6 (15 - 17')	015S006017	34.6	N/A		
	7 (15 - 17')	015S007017	22	N/A		
	9 (5 - 7')	015S000901	13.3	N/A		
	9 (15 - 17')	015S000902	79.1	N/A	None	None
	11 (5 - 7')	015S001101	12	N/A		
	12 (5 - 7')	015S001201	328	N/A		
	12 (15 - 17')	015S001202	928	ND		
	13 (15 - 17')	015S013017	77.3	N/A		
	14 (5 - 7')	015S001401	1,100	N/A		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
n-Propylbenzene (continued)	14 (15 - 17')	015S001402	708	N/A		
	15 (7 - 9')	015S001501	915	N/A		
	15 (15 - 17')	015S001502	16.2	ND		
	16 (5 - 7')	015S016007	810	N/A		
	16 (15 - 17')	015S016017	607	N/A		
	19 (15 - 17')	015S019017	7.4	ND		
1,3,5-Trimethylbenzene	3 (15 - 17')	015S003017	15.8	N/A	820,000	31,000
	6 (5 - 7')	015S000601	8.4	N/A		
	6 (15 - 17')	015S006017	48.8	N/A		
	9 (15 - 17')	015S000902	135	N/A		
	11 (5 - 7')	015S001101	23.6	N/A		
	12 (5 - 7')	015S001201	343	N/A		
	12 (15 - 17')	015S001202	1,700	ND		
	13 (15 - 17')	015S013017	63.3	N/A		
	14 (5 - 7')	015S001401	1,800	N/A		
	14 (15 - 17')	015S001402	1,100	N/A		
	15 (7 - 9')	015S001501	1,800	N/A	820,000	31,000
	15 (15 - 17')	015S001502	35.4	ND		
	16 (5 - 7')	015S016007	154	N/A		
	19 (15 - 17')	015S019017	33.4	ND		
1,2,4-Trimethylbenzene	4 (5 - 7')	015S000401	144	N/A	1,000,000	39,000
	6 (5 - 7')	015S000601	6.1	N/A		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
1,2,4-Trimethylbenzene (continued)	6 (15 - 17')	015S006017	160	N/A		
	9 (15 - 17')	015S000902	209	N/A		
	11 (5 - 7')	015S001101	13.6	N/A		
	12 (5 - 7')	015S001201	115	N/A		
	12 (15 - 17')	015S001202	548	ND		
	13 (15 - 17')	015S013017	20.1	N/A		
	14 (5 - 7')	015S001401	677	N/A		
	14 (15 - 17')	015S001402	1,500	N/A		
	15 (7 - 9')	015S001501	1,700	N/A		
	15 (15 - 17')	015S001502	63.5	ND		
	16 (5 - 7')	015S016007	1,300	N/A		
	16 (15 - 17')	015S016017	10.3	N/A		
Styrene	3 (15 - 17')	015S003017	10.6	N/A	410,000,000	16,000,000
	4 (5 - 7')	015S000401	15.2	N/A		
	9 (5 - 7')	015S000901	7.1	N/A		
	9 (15 - 17')	015S000902	14.1	N/A		
	12 (5 - 7')	015S001201	46.3	N/A		
	14 (5 - 7')	015S001401	1,200	N/A		
	16 (5 - 7')	015S016007	207	N/A		
	16 (15 - 17')	015S016017	8.3	N/A		
tert-Butylbenzene	2 (5 - 7')	015S000201	7.2	ND	20,000,000	780,000
	9 (15 - 17')	015S000902	57.5	N/A		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
tert-Butylbenzene (continued)	12 (15 - 17')	015S001202	2,800	ND		
	14 (5 - 7')	015S001401	2,900	N/A		
	16 (5 - 7')	015S016007	145	N/A		
	16 (15 - 17')	015S016017	7.2	N/A		
	19 (15 - 17')	015S019017	7.6	ND		
sec-Butylbenzene/1,3-Dichlorobenzene	2 (7 - 9')	015S000201	18	ND	20,000,000	780,000
	3 (15 - 17')	015S003017	10.5	N/A		
	4 (5 - 7')	015S000401	26.4	N/A		
	6 (5 - 7')	015S000601	5.9	N/A		
	6 (15 - 17')	015S016017	14.4	N/A		
	7 (15 - 17')	015S007017	10.2	N/A		
	9 (15 - 17')	015S009002	191	N/A	20,000,000	780,000
	11 (5 - 7')	015S001101	20.8	N/A		
	12 (5 - 7')	015S001201	115	N/A		
	12 (15 - 17')	015S001202	9,600	ND		
	14 (5 - 7')	015S001401	9,500	N/A		
	14 (15 - 17')	015S001402	505	N/A		
	15 (7 - 9')	015S001501	727	N/A		
	16 (5 - 7')	015S016007	1,240	N/A		
	16 (15 - 17')	015S016017	9.6	N/A		
	19 (15 - 17')	015S019017	13.0	ND		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
p-Isopropyltoluene	9 (15 - 17')	015S000902	6.9	N/A	None	None
	11 (5 - 7')	015S001101	9.2	N/A		
	12 (5 - 7')	015S001201	66.2	N/A		
	16 (5 - 7')	015S016007	134	N/A		
n-Butylbenzene	9 (15 - 17')	015S000902	10.2	N/A	None	None
	11 (5 - 7')	015S001101	22.2	N/A		
	12 (5 - 7')	015S001201	41.1	N/A		
	16 (5 - 7')	015S016007	1,150	N/A		
	16 (15 - 17')	015S016017	6.8	N/A		
Naphthalene	6 (15 - 17')	015S006017	40.3	N/A	82,000,000	3,100,000
	11 (5 - 7')	015S001101	12.3	N/A		
	15 (15 - 17')	015S001502	103	ND		
	16 (5 - 7')	015S016007	63.5	N/A		
2-Butanone	2 (7 - 9')	015S000201	ND	6J	1,000,000,000	47,000,000
	10 (5 - 7')	015S010007	ND	5J		

Table 6-1
Detected Concentrations of VOCs in Soil
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Depth (feet bgs)	Sample ID	Field Lab Result[a]	Offsite Lab Result[b]	RBC[c] Industrial Soil	RBC[c] Residential Soil
Methylene chloride	15 (15 - 17')	015S001502	ND	2J	760,000	85,000
Acetone	12 (15 - 17')	015S001202	ND	3J	200,000,000	7,800,000

Notes:

[a] Hydrologic Inc.'s onsite mobile laboratory analyzed the samples for VOCs using Method 8021.
[b] NET's Bedford, Massachusetts, laboratory analyzed the samples for VOCs by Method 8240. Approximately 25% of the DPT samples submitted to the onsite mobile laboratory were split and submitted to NET for offsite confirmation analysis.
[c] Risk-Based Concentrations obtained from the USEPA Region III Risk-Based Concentration Table, January to June, 1995.
[d] ND = No VOCs detected in this sample
[e] N/A = Laboratory did not analyze this sample for VOCs.
[f] J denotes estimated concentration.
[g] D denotes reported concentration was from a diluted sample.

Table 6-2
Detected Concentrations of VOCs in Groundwater
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Lithologic Unit	Sample ID	Field Lab[a] Result	Offsite Lab[b] Result	RBC[c] - Tap Water	MCL[d]
Benzene	1 (Loess)	015G000102	*79.6*	N/A[e]	0.36	5
	2 (Loess)	015G000202	*20*	N/A		
	4 (Loess)	015G000402	*3,200*	*1,800*		
	5 (Loess)	015G000502	*13.1*	N/A		
	5 (Fluvial)	015G000503	*741*	N/A		
	8 (Loess)	015G008015	*230*	*78*		
	8 (Fluvial)	015G008043	*176*	*68*		
	10 (Fluvial)	015G010045	*9.8*	2J		
	11 (Fluvial)	015G001103	*780*	N/A		
	12 (Fluvial)	015G001203	*370*	N/A		
	14 (Fluvial)	015G001403	*100*	N/A		
	15 (Fluvial)	015G001503	*60*	N/A		
	16 (Fluvial)	015G016049	*48.8*	N/A		
	18 (Fluvial)	015G018045	*13.9*	N/A		
	20 (Fluvial)	015G020045	*9.7*	N/A		
Toluene	1 (Fluvial)	015G000103	ND[f]	2J	750	1,000
	2 (Fluvial)	015G000203	Bad Run, No Data	3J		
	4 (Loess)	015G000402	186	180		
	8 (Fluvial)	015G008043	ND	1J		
	10 (Fluvial)	015G010045	12.9	ND		
	20 (Fluvial)	015G020045	20.4	N/A		

Table 6-2
Detected Concentrations of VOCs in Groundwater
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Lithologic Unit	Sample ID	Field Lab[a] Result	Offsite Lab[b] Result	RBC[c] - Tap Water	MCL[d]
Ethylbenzene	1 (Loess)	015G000102	61	N/A	1,300	700
	1 (Fluvial)	015G000103	8.1	ND		
	2 (Loess)	015G000202	34.8	N/A		
	4 (Loess)	015G000402	*1,300*	*720*		
	5 (Fluvial)	015G000503	27.2	N/A		
	8 (Loess)	015G008015	390	240		
	8 (Fluvial)	015G008043	17.7	12		
	10 (Fluvial)	015G010045	ND	2J		
	11 (Fluvial)	015G001103	490	N/A		
	12 (Fluvial)	015G001203	140	N/A		
	14 (Fluvial)	015G001403	330	N/A		
	15 (Fluvial)	015G001503	260	N/A		
	16 (Fluvial)	015G016049	124	N/A		
	18 (Fluvial)	015G018045	81.7	N/A		
	19 (Fluvial)	015G019046	62.6	N/A		
	20 (Fluvial)	015G020045	155	N/A		
Total Xylenes	1 (Loess)	015G000102	10.5	N/A	1,400	10,000
	1 (Fluvial)	015G000103	60.1	2J		
	2 (Loess)	015G000202	34.9	N/A		
	2 (Fluvial)	015G000203	Bad Run, No Data	3J		

Table 6-2
Detected Concentrations of VOCs in Groundwater
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Lithologic Unit	Sample ID	Field Lab[a] Result	Offsite Lab[b] Result	RBC[c] - Tap Water	MCL[d]
Total Xylenes (continued)	4 (Loess)	015G000402	4,700	1,600	1,400	10,000
	4 (Fluvial)	015G000403	9.4	N/A		
	8 (Loess)	015G008015	340	83		
	8 (Fluvial)	015G008043	ND	2J		
	10 (Fluvial)	015G010045	10.4	ND		
	11 (Fluvial)	015G001103	27.3	N/A		
	12 (Fluvial)	015G001203	21.5	N/A		
	14 (Fluvial)	015G001403	45	N/A		
	15 (Fluvial)	015G001503	19.5	N/A		
	16 (Fluvial)	015G016049	12.2	N/A		
	18 (Fluvial)	015G018045	14.6	N/A		
	19 (Fluvial)	015G019046	8.5	N/A		
	20 (Fluvial)	015G020045	41.9	N/A		
n-Propylbenzene	1 (Loess)	015G000102	9.7	N/A	None	None
	2 (Loess)	015G000202	71.4	N/A		
	4 (Loess)	015G000402	98	ND		
	8 (Loess)	015G008015	140	ND		
	11 (Fluvial)	015G001103	22.1	N/A		
	12 (Fluvial)	015G001203	10	N/A		
	14 (Fluvial)	015G001403	20.2	N/A		

Table 6-2
Detected Concentrations of VOCs in Groundwater
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Lithologic Unit	Sample ID	Field Lab[a] Result	Offsite Lab[b] Result	RBC[c] - Tap Water	MCL[d]
n-Propylbenzene (continued)	15 (Fluvial)	015G001503	18.2	N/A	None	None
	16 (Fluvial)	015G016049	20.3	N/A		
	18 (Fluvial)	015G018045	11.0	N/A		
	19 (Fluvial)	015G019046	14.9	N/A		
	20 (Fluvial)	015G020045	28.5	N/A		
Isopropylbenzene, Bromobenzene	1 (Loess)	015G000102	8.4	N/A	None	None
	1 (Fluvial)	015G000103	5.2	ND		
	2 (Loess)	015G000202	5.7	N/A		
	10 (Fluvial)	015G010045	5.1	ND		
	12 (Fluvial)	015G001203	20.6	N/A		
	16 (Fluvial)	015G016049	6.9	N/A		
	20 (Fluvial)	015G020045	6.2	N/A		
1,3,5-Trimethylbenzene	4 (Loess)	015G000402	222	ND	2.4	None
1,2,4-Trimethylbenzene	2 (Loess)	015G000202	9.5	N/A	3	None
	4 (Loess)	015G000402	550	ND		
	12 (Fluvial)	015G001203	11.9	N/A		

Table 6-2
Detected Concentrations of VOCs in Groundwater
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Lithologic Unit	Sample ID	Field Lab[a] Result	Offsite Lab[b] Result	RBC[c] - Tap Water	MCL[d]
Bromomethane	15 (Fluvial)	015G001503	80	N/A	8.7	None
s-Butylbenzene/ 1,3-Dichlorobenzene	2 (Loess)	015G000202	10.2	N/A	61	None
	16 (Fluvial)	015G016049	6.6	N/A		
	18 (Fluvial)	015G018045	5.0	N/A		
	20 (Fluvial)	015G020045	5.2	N/A		
Methylene Chloride	1 (Fluvial)	015G000103	ND	7J	4.1	None
	2 (Fluvial)	015G000203	Bad Run, No Data	3J		
Styrene	1 (Fluvial)	015G000103	14.4	ND	1,600	100
	4 (Fluvial)	015G000403	5.5	N/A		
1,1-Dichloroethane	15 (Fluvial)	015G001503	23	N/A	810	None
Carbon Disulfide	1 (Fluvial)	015G000103	ND	3J	21	None
	2 (Fluvial)	015G000203	Bad Run, No Data	3J		

Table 6-2
Detected Concentrations of VOCs in Groundwater
SWMU 15 — N-94 Underground Storage Tank Farm
(data in parts per billion)

Parameter	Sample Location and Lithologic Unit	Sample ID	Field Lab[a] Result	Offsite Lab[b] Result	RBC[c] - Tap Water	MCL[d]
Acetone	2 (Fluvial)	015G000203	Bad Run, No Data	330	3,700	None
	4 (Loess)	015G000402	ND	810		

Notes:

[a] Hydrologic's onsite mobile laboratory analyzed the samples for VOCs using Method 8021.
[b] NET's Bedford, Massachusetts, laboratory analyzed the samples for VOCs by Method 8240. Approximately 25% of the DPT samples submitted to the onsite mobile laboratory were split and submitted to NET for confirmation analysis.
[c] Risk-based concentration obtained from the USEPA Region III Risk-Based Concentration Table, January to June, 1995.
[d] Maximum contaminant level obtained from the USEPA Drinking Water Regulations and Health Advisories, May 1994.
[e] N/A denotes sample was not analyzed for VOCs by this laboratory.
[f] ND denotes VOCs were not detected in this sample.

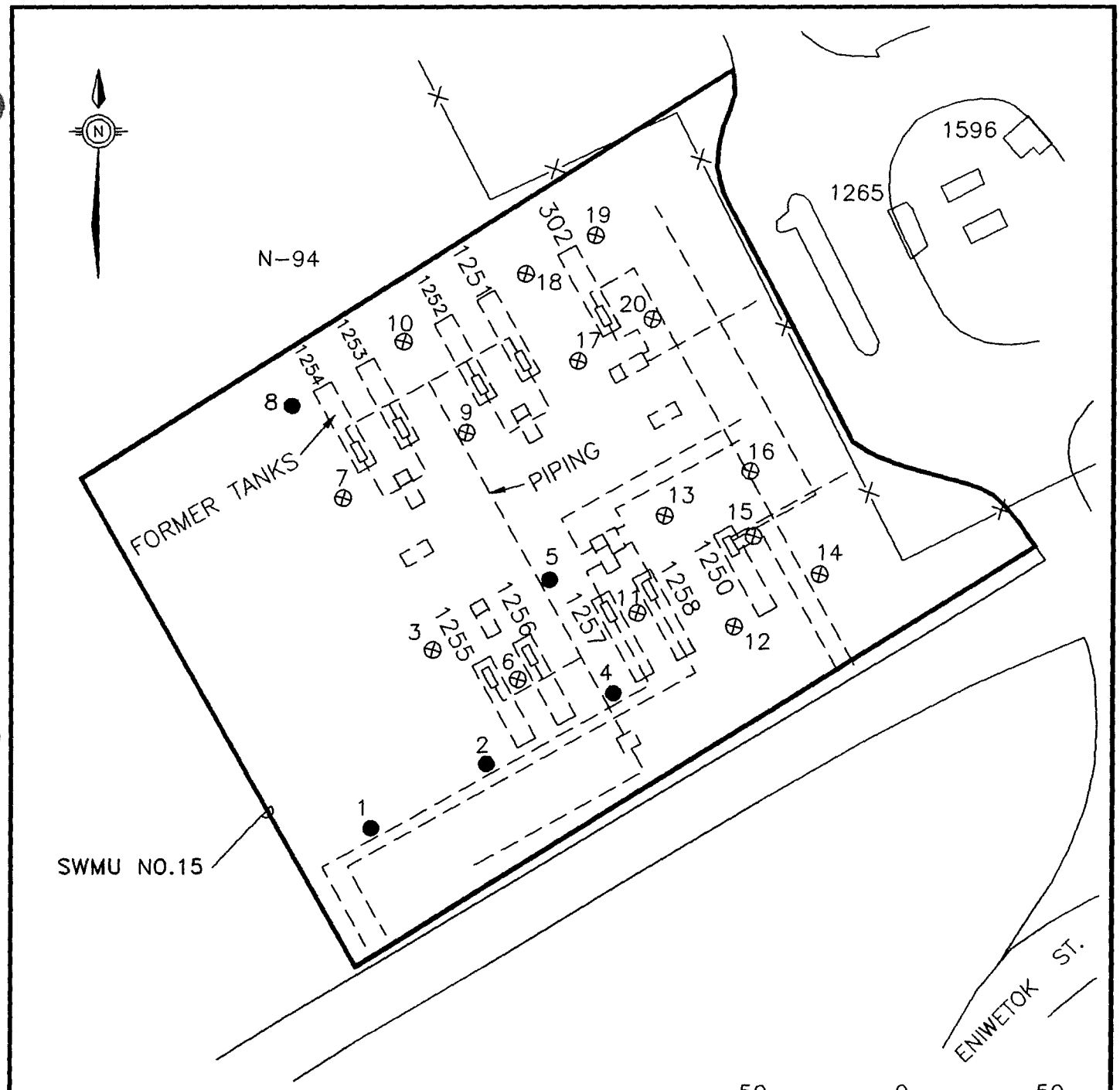
Bold indicates contaminant concentration exceeds the RBC for tap water, but not the MCL for drinking water.
Italics indicates the contaminant concentration exceeds the MCL for drinking water, but not the RBC for tap water.
Bold and italics indicates contaminant concentration exceeds both the RBC for tap water and the MCL for drinking water.

6.2.1 Loess Groundwater

VOCs were detected at each of the five loess groundwater sampling locations at concentrations exceeding the RBC for tap water and the MCL for drinking water. Figure 6-2 shows the five loess groundwater sampling locations. The benzene concentrations at all five sampling locations (13.1 parts per billion [ppb] to 3,200 ppb) exceed the RBC and MCL (0.36 ppb and 5 ppb, respectively). The ethylbenzene concentration at Location 4 (1,300 ppb) exceeds the RBC and MCL for ethylbenzene (1,300 ppb and 700 ppb, respectively). The total xylenes concentration at Location 4 (4,700 ppb) exceeds the RBC (1,400 ppb) but not the MCL (10,000 ppb). 1,2,4-trimethylbenzene concentrations at Locations 2 (9.5 ppb) and 4 (550 ppb) exceed the RBC (3 ppb). The 1,3,5-trimethylbenzene concentration at Location 4 (220 ppb) exceeds the RBC (2.4 ppb). No MCLs exist for 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene. The RBC for methylene chloride (4.1 ppb) was exceeded at Location 1, but this contaminant may be a laboratory artifact.

6.2.2 Fluvial Deposits Groundwater

VOC concentrations in fluvial deposits groundwater at 12 DPT sampling locations exceeded RBCs and in most cases, MCLs. Figure 6-3 shows the DPT locations where the RBC for tap water was exceeded by at least one detected VOC. Benzene concentrations at Locations 5, 8, 10, 11, 12, 14, 15, 16, and 18, ranging from 9.7 ppb to 780 ppb, exceeded both the RBC (0.36 ppb) and MCL (5 ppb). The 1,2,4-trimethylbenzene concentration at Locations 12 (11.9 ppb) and 19 (7.3 ppb) exceeded the RBC (3 ppb); however, no MCL exists for this compound. The bromomethane concentration at Location 15 (80 ppb) exceeded the RBC (8.7 ppb). No MCL exists for bromomethane. The methylene chloride concentration at Location 1 (7J ppb) exceeded the RBC (4.1 ppb); however, no MCL exists for this compound, which is likely a laboratory artifact.



LEGEND

⊗ NO LOESS GROUNDWATER SAMPLE OBTAINED AT THIS LOCATION

● CONTAMINANT CONCENTRATION GREATER THAN RISK-BASED CONCENTRATION FOR TAP WATER.

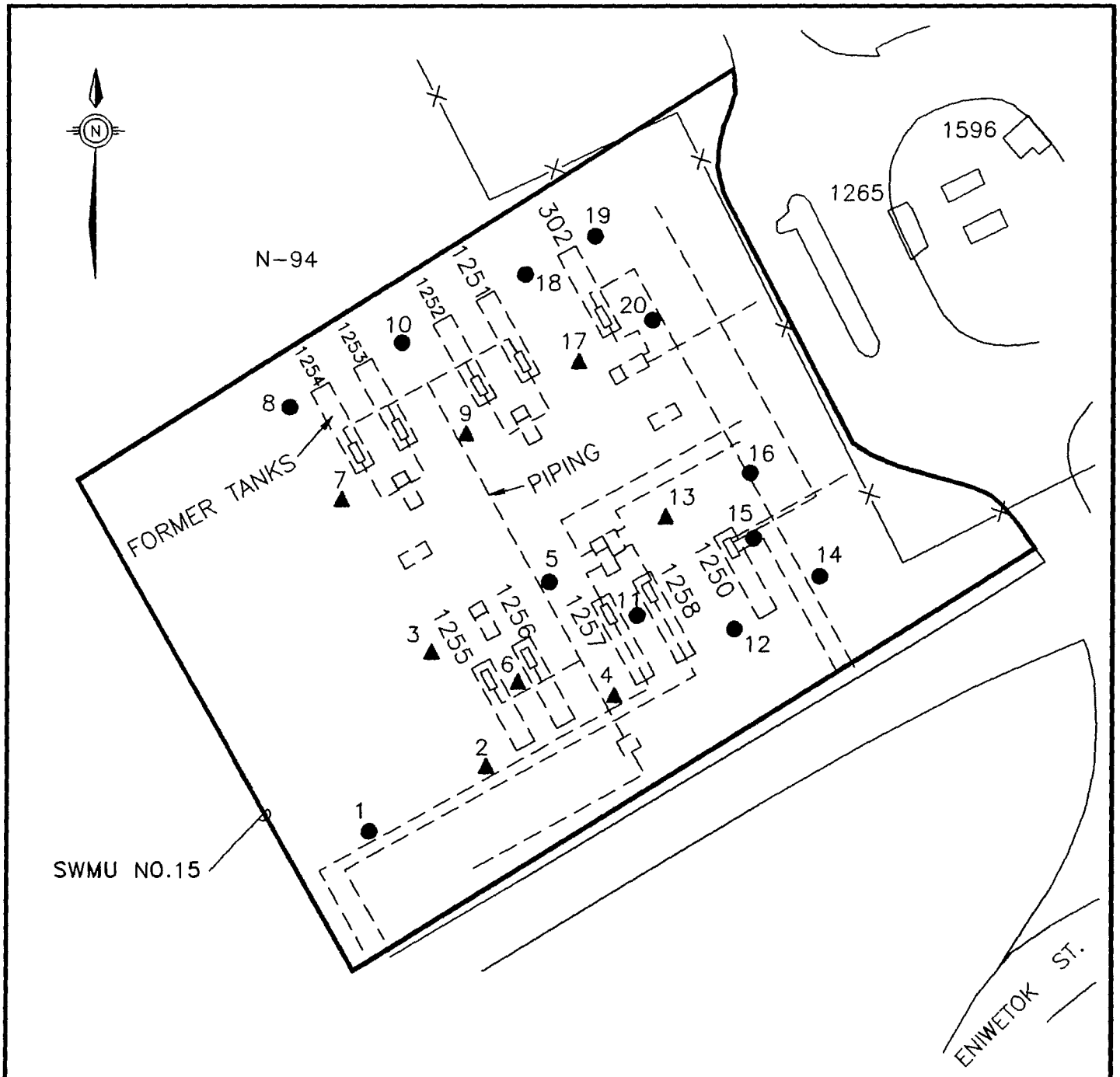
FORMER UNDERGROUND UST PIPING

1254 FORMER FUEL UST

RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 6-2
VOCs IN SHALLOW (LOESS) GROUNDWATER
N-94 UNDERGROUND TANK FARM
SWMU 15

DWG DATE: 10/06/95 | DWG NAME: 94VSG15



LEGEND

▲ CONTAMINANT CONCENTRATION NON-DETECT OR LESS THAN RISK-BASED CONCENTRATION FOR TAP WATER.

● CONTAMINANT CONCENTRATION GREATER THAN RISK-BASED CONCENTRATION FOR TAP WATER.

FORMER UNDERGROUND UST PIPING

1254 FORMER FUEL UST

RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 6-3
VOCs IN FLUVIAL DEPOSITS GROUNDWATER
N-94 UNDERGROUND TANK FARM
SWMU 15

DWG DATE: 10/06/95 | DWG NAME: 94VDG15

7.0 PROPOSED RCRA FACILITY INVESTIGATION

Based on the results of the DPT investigation at SWMU 15, RFI characterization is recommended. The proposed sampling rationale, sampling protocol, and reporting requirements are summarized in the following sections.

7.1 RFI Work Plan Rationale

Subsurface soil samples collected within the SWMU 15 boundaries during the DPT investigation were only analyzed for VOCs due to onsite laboratory capabilities. Although the VOC concentrations were below residential RBCs, no information exists for concentrations of other constituents associated with a petroleum release, including SVOCs, Appendix IX metals, and TPH. Therefore, additional subsurface soil samples should be collected from within the SWMU 15 boundaries and analyzed for RFI characterization. No surface-soil samples have been collected from SWMU 15 for risk characterization. To obtain the necessary information to prepare a risk assessment for the SWMU, surface soil samples must be collected and analyzed to determine if a risk exists to human health and the environment.

The DPT investigation identified VOC contamination above the RBCs and MCLs in both the loess and fluvial deposits groundwater throughout the SWMU. The nature and extent of contamination in both the upper and lower fluvial deposits will be required to complete the requirements of the RFI. Presently, it is unknown how far the VOC contamination has migrated outside the boundary of SWMU 15; therefore, a supplementary DPT or Geoprobe groundwater investigation is recommended prior to monitoring well installation so that optimum placement of the wells will be achieved.

7.2 Additional Soil Sampling

As discussed in the June 6, 1995, BCT meeting, approximately five soil borings will be drilled and sampled at SWMU 15 to further define the nature of the soil contamination within its boundaries. The borings will be terminated at the soil/water interface (anticipated to be between

13 and 17 feet bls). Figure 7-1 shows the proposed soil boring locations. The following intervals will be sampled at each soil boring location:

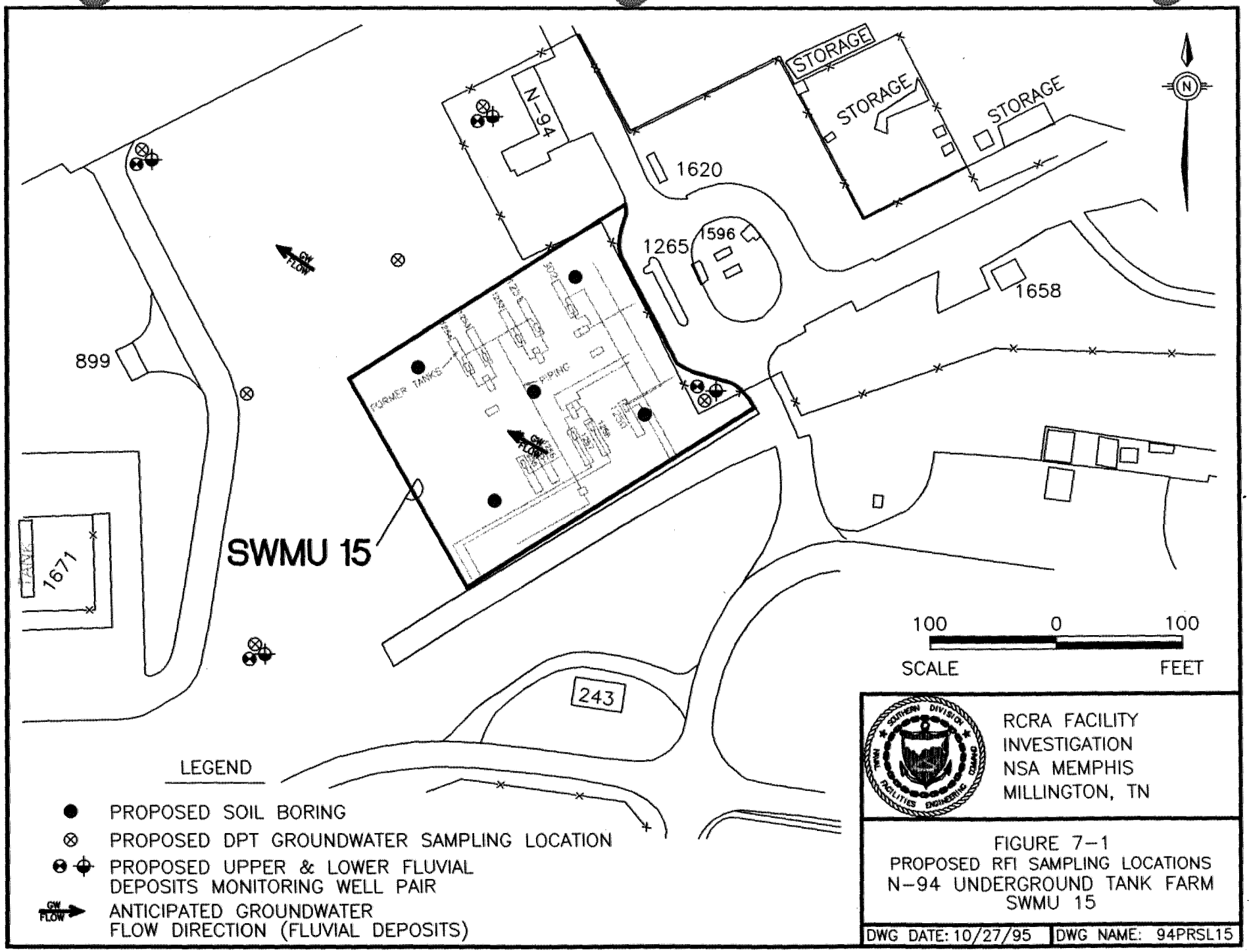
- Surface soil (0 to 1 foot bls)
- From just above the soil-water interface (anticipated to be between 13 and 17 feet bls)
- From an intermediate interval between the surface and the first water encountered (suggested sampling interval 5 to 7 feet bls to be consistent with the previous DPT investigation sampling interval)

Surface-soil samples will be analyzed for VOCs, SVOCs, Appendix IX metals, TPH, and pesticides/polychlorinated biphenyls (PCBs) for RFI characterization and use in preparing a risk assessment. Subsurface soil samples will be analyzed for VOCs, SVOCs, Appendix IX metals, and TPH. Section 7.4 outlines the proposed sampling and analytical requirements for the USGS soil borings.

7.3 Soil Boring and Monitoring Well Installations

The DPT investigation identified the presence of VOCs in loess and fluvial deposits groundwater at concentrations above RBCs and MCLs throughout the SWMU. As discussed in the June 6, 1995 BCT meeting, soil borings and monitoring wells will be installed outside SWMU 15's boundary to define the nature and extent of groundwater contamination. Four monitoring well pairs are proposed, each consisting of one well screened in the upper fluvial deposits and one screened in the lower fluvial deposits. Proposed soil boring and monitoring well locations are shown on Figure 7-1. Two of the proposed locations are positioned to intercept the anticipated groundwater flow direction from SWMU 15 (northwest, refer to Section 5.0).

Prior to soil boring and monitoring well installation, an additional DPT investigation is proposed o wells are optimally placed. The following paragraphs describe the supplemental DPT investigation and the soil boring and monitoring well installation and sampling procedures.


STORAGE
STORAGE
STORAGE
N-94
1620
1265
1596
1658
899
1671
TANK
FORMER TANKS
PIPING
GW FLOW
SWMU 15
243
N
100 0 100
SCALE FEET
LEGEND
PROPOSED SOIL BORING
PROPOSED DPT GROUNDWATER SAMPLING LOCATION
PROPOSED UPPER & LOWER FLUVIAL DEPOSITS MONITORING WELL PAIR
ANTICIPATED GROUNDWATER FLOW DIRECTION (FLUVIAL DEPOSITS)
SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN
FIGURE 7-1
PROPOSED RFI SAMPLING LOCATIONS
N-94 UNDERGROUND TANK FARM
SWMU 15
DWG DATE: 10/27/95
DWG NAME: 94PRSL15

7.3.1 Supplemental DPT/Geoprobe Investigation

Before installing monitoring wells, a supplemental DPT/Geoprobe groundwater investigation is recommended, consisting of collecting fluvial deposits groundwater samples at up to six locations (as shown on Figure 7-1), and analyzing them for VOCs. Based on the DPT or Geoprobe results, the proposed monitoring well locations, also shown on Figure 7-1, may be revised. Currently, Geoprobe and DPT investigations are scheduled for October and November 1995, during the Assembly E RFI on the Southside of NSA Memphis. The additional DPT/Geoprobe groundwater investigation at SWMU 15 may be concurrent with the Assembly E investigation.

7.3.2 Soil Borings

Soil borings will be advanced and sampled prior to monitoring-well installation. Each soil boring will be continuously sampled for lithologic description and organic vapor field screening, with information recorded in the field logbook. Samples for laboratory analysis will be collected at three intervals from one boring at each monitoring well pair location. Surface and subsurface soil samples will be collected from the following intervals:

- Surface (0 to 1 foot bls)
- From just above the soil-water interface (anticipated to be between 13 and 17 feet bls)
- From an intermediate interval between the surface and first water encountered

The intermediate subsurface soil sample interval will be selected based on organic vapor readings or by field judgment as described in Section 4.44 of the *Comprehensive RFI Work Plan*. All soil samples collected during this phase will be submitted for full-scan analysis (FSA). Sampling and analytical requirements are summarized in Section 7.4.

7.3.3 Monitoring Wells

Four monitoring well pairs will be installed during the RFI, each consisting of one monitoring well installed in the upper fluvial deposits at a depth of between 35 and 45 feet, and one in the lower fluvial deposits between 65 and 75 feet deep. The monitoring wells will be constructed of 2-inch polyvinyl chloride with 10-foot screens. The wells will be installed in accordance with Section 4.5 of the *Comprehensive RFI Work Plan* using Rotasonic drilling techniques. Groundwater samples will be collected as described in Section 4.6 of the *Comprehensive RFI Work Plan*. All groundwater samples collected from the monitoring wells will be submitted for FSA. Section 7.4 discusses the RFI sampling and analytical requirements.

Field personnel may deviate from the proposed sampling strategy should data from the DPT/Geoprobe investigation, field conditions, or organic vapor field screening readings suggest that additional or different intervals may be successfully sampled or yield more useful information. Deviations will be documented in the field logbook and the RFI report. The area of investigation then may be expanded or concentrated, based on the results of the initial data.

7.3.4 Expansion of Investigation

If laboratory data indicate the presence of soil or groundwater contamination in the proposed sample locations, additional sampling locations may be required to fully define the nature and extent of contamination, particularly in the determined downgradient groundwater flow direction. Measured contaminant concentrations in soil and groundwater, coupled with groundwater-flow directions and characteristics, will be used to determine the locations of additional soil borings and/or monitoring wells, if the investigation is expanded. The soil and groundwater investigation will proceed until the nature and extent of contamination have been adequately defined and/or risk assessment or groundwater modeling results indicate that downgradient concentrations are below action levels at potential receptor sites.

7.4 Analytical Requirements

Soil and groundwater samples will be collected at and surrounding SWMU 15 for laboratory analysis. Sampling and analytical requirements are summarized in Table 7-1. Samples collected during the supplemental DPT/Geoprobe investigation will be analyzed in the field with a portable gas chromatograph at Level II-equivalent DQO. For those samples submitted for offsite laboratory analysis, Level III-equivalent DQO will be used for 95% of the samples and Level IV-equivalent DQO for the remaining 5%.

A detailed list of the analytical parameters shown on Table 7-1 is provided in Appendix F of the *Comprehensive RFI Work Plan*. Field sampling personnel will determine which samples will be analyzed for Level IV-equivalent DQO. Field measurements at SWMU 15 will be collected in accordance with Section 4.10.1 of the *Comprehensive RFI Work Plan*. Measurements will include organic vapor for soil samples and boreholes and pH, temperature, specific conductivity, and groundwater level for monitoring wells.

7.5 Sample and Data Management

Sample and data management procedures will adhere to Sections 4.12 and 5 of the *Comprehensive RFI Work Plan*.

7.6 Sample Custody

Sample custody will adhere to Section 4.12.5 of the *Comprehensive RFI Work Plan*.

7.7 Quality Assurance/Quality Control

QA/QC procedures to be followed during the investigation will adhere to the Quality Assurance Plan presented in Section 4.14 of the *Comprehensive RFI Work Plan*.

7.8 Decontamination Procedures

Decontamination procedures will adhere to Section 4.11 of the *Comprehensive RFI Work Plan*.

Table 7-1
Proposed Sampling and Analytical Requirements
RCRA Facility Investigation — SWMU 15, N-94 Underground Tank Farm

Method	Sample Matrix/Type	Number of Samples	Analysis
Soil Borings	Surface soil - within SWMU 15	5	VOCs, SVOCs, Appendix IX metals, TPH, Pest./PCBs
	Subsurface soil - within SWMU 15	10	VOCs, SVOCs, Appendix IX metals, TPH
		1	DPS
		1	ST
		12	FSA
	Surface and subsurface soil associated with well installation	1	DPS
		1	ST
DPT	Groundwater	6 Upper Fluvial	VOCs
Monitoring Well	Groundwater	4 Upper Fluvial	FSA
		4 Lower Fluvial	FSA
		2	DPW

Notes:

FSA (Full-Scan Analysis) = VOCs, SVOCs, chlorinated pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, Appendix IX metals, total cyanide, and TPH - gasoline and diesel-range organics.

DPS (Design Parameters Soil) = total phosphorus, nitrate-N, total Kjeldahl nitrogen (TKN), heterotrophic plate count, total organic carbon (TOC), cation-exchange capacity.

ST (Shelby Tube) = hydraulic conductivity, porosity, bulk density, particle size, percent moisture, and specific gravity.

DPW (Design Parameters Water) = five-day biochemical oxygen demand (BOD_5), chemical oxygen demand (COD), hardness, total suspended solids (TSS), total dissolved solids (TDS), alkalinity, total phosphorus, nitrate-N, TKN, heterotrophic plate count, turbidity, iron, and manganese.

7.9 Investigation-Derived Waste

Investigation-derived waste will be handled as specified in Section 4.13 of the Comprehensive RFI Work Plan. A detailed *Investigation-Derived Waste Management Plan for Naval Support Activity Memphis* (E/A&H, 1995) provides additional guidance for handling IDW generated during the SWMU 15 RFI.

7.10 Health and Safety Plan

The site-specific Health and Safety Plan for SWMU 15 is included in the *Assembly C Site Investigation Plans*. The *Comprehensive Health and Safety Plan* is included in Section 7 of the *Comprehensive RFI Work Plan*.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information gathered during this investigation, the following conclusions and recommendations have been reached.

- VOCs associated with a petroleum release were detected in shallow soil samples throughout the SWMU. However, none of the detected VOCs exceeds RBCs for residential or industrial soil.

- VOC contamination was identified in loess and fluvial deposits groundwater throughout SWMU 15. VOCs in groundwater have likely migrated beyond the SWMU boundary. The detected VOCs are typical petroleum constituents. The main constituent of concern is benzene, detected most frequently at the highest concentrations. Benzene concentrations, along with several other VOCs, exceed the RBCs for tap water and MCLs for drinking water.

- VOC concentrations in all five loess groundwater sampling locations exceeded RBCs and MCLs. Benzene was detected in every loess groundwater sample at concentrations ranging from 13.1 ppb to 3,200 ppb. The RBC and MCL for benzene are 0.31 ppb and 5 ppb, respectively. The ethylbenzene concentration at one loess groundwater sampling location (1,300 ppb) equalled the RBC (1,300 ppb) and exceeded the MCL (700 ppb). The total xylenes concentration at one location (4,700 ppb) exceeded the RBC (1,400 ppb) but not the MCL (10,000 ppb). 1,2,4-trimethylbenzene concentrations at two sampling locations (9.5 ppb to 550 ppb) exceeded the RBC (3 ppb). The 1,3,5-trimethylbenzene concentration at one sampling location (220 ppb) exceeded the RBC (2.4 ppb). No MCLs exist for 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

- VOC concentrations in fluvial deposits groundwater at 12 of the 20 DPT sampling locations exceeded RBCs and, in most cases, MCLs. Benzene concentrations at

10 locations, ranging from 9.7 ppb to 780 ppb, exceeded the both the RBC (0.36 ppb) and MCL (5 ppb). The 1,2,4-trimethylbenzene concentration at two locations (7.3 ppb to 11.9 ppb) exceeded the RBC (3 ppb); however, no MCL exists for this compound. The bromomethane concentration at one location (80 ppb) exceeded the RBC (8.7 ppb). No MCL exists for bromomethane.

- Based on the DPT investigation, RFI characterization will be required for SWMU 15. The proposed RFI consists of the following field activities:

  — Five soil borings will be advanced and sampled within the SWMU 15 boundaries. Surface soil samples will be collected and analyzed for the preparation of a preliminary risk assessment; subsurface soil samples will be collected and analyzed for additional characterization of soil above the shallow water table.

  — E/A&H will conduct a supplemental DPT groundwater investigation outside the SWMU boundary to determine the optimal placement of RFI soil borings and monitoring wells.

  — E/A&H will install and sample four monitoring well pairs outside of the SWMU boundary. Each well pair will consist of one upper fluvial deposits monitoring well (screened approximately 35 to 45 feet bls) and one lower fluvial deposits monitoring well (65 to 75 feet bls). The soil borings associated with the wells will be continuously sampled for lithologic description and field screening, and soil samples will be collected and analyzed from one soil boring at each well pair.

- The results of the RFI will be compiled in an RFI report for submittal to the Navy, TDEC, and USEPA.

9.0 REFERENCES

EnSafe/Allen & Hoshall (1995). *Investigation-Derived Waste Management Plan for Naval Support Activity Memphis*. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall (1995). *Assembly C Site Investigation Plans, Naval Air Station Memphis*. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall (1994). *Comprehensive RFI Work Plan for Naval Air Station Memphis*. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall (September 1993). *Environmental Assessment Report, USTs 304 and 1239, Naval Air Station Memphis, Memphis, Tennessee*. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall (March 1992). *Environmental Assessment Report for Building N-94 UST, Naval Air Station, Memphis, Tennessee*. E/A&H: Memphis, Tennessee.

ERC/EDGe (April 1990). *Visual Site Inspection Report, NAS Memphis, Millington, Tennessee*. ERC Environmental and Energy Services Company/EDGe: Nashville, Tennessee.

ERC/EDGe (September 1990). *RCRA Facility Assessment (RFA), NAS Memphis*. ERC/EDGe: Nashville, Tennessee.

Kingsbury, James A. and John K. Carmichael (1995). *Hydrogeology of Post-Wilcox Group Stratigraphic Units in the Area of the Naval Air Station Memphis, Near Millington, Tennessee*. U.S. Geological Survey Water-Resources Investigations Report 95-4011.

Southern Division Naval Facilities Engineering Command (August 1988). *Sampling Report (SWMUs 3, 4, and 40), NAS Memphis*. SOUTHNAVFACENGCOM: Charleston, South Carolina.

United States Geological Survey (1995). Oral and written communication with Mr. Jack Carmichael. USGS: Nashville, Tennessee.

United States Environmental Protection Agency (November 22, 1994). *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)*. USEPA Region IV: Atlanta, Georgia.

Appendix A

UST Closure Reports and Correspondence

DEPARTMENT OF THE NAVY
NAVAL AIR STATION MEMPHIS
MILLINGTON, TENNESSEE 38054-5000

IN REPLY REFER TO

5090
Ser 01032/ 000035
11 FEB 1992

Tennessee Department of Environment and Conservation
Division of Solid Waste Management
Director Hazardous Waste Management Section
Customs House, Fourth Floor
701 Broadway
Nashville, Tennessee 37219-5403

Subj: EPA ID #TN2170022600

Gentlemen:

We would like to thank Mr. Ronnie Bowers of your staff for meeting with Mr. Mark Taylor of Southern Division, Naval Facilities Engineering Command on 21 January 1992 to help resolve our underground storage tank removal problem at N-94. Ms. Allison Drew of EPA IV has also been briefed on the situation and has offered helpful suggestions to rectify the situation.

For your information, the following is a recount of events pertaining to the underground storage tank (UST) farm at N-94. An engineering firm was retained by Southern Division to develop design plans and specifications to remove 37 USTs at NAS Memphis as part of the Navy's UST program. The underground tank farm at N-94, which contains 10 tanks, was identified as an UST system, i.e., containing petroleum hydrocarbons only. A construction contract was awarded and during subsequent tank excavation, analytical results of tank contents indicated a low concentration of halogenated solvent (approximately 7 ppm of methylene chloride). The UST contractor was advised by us to discontinue activities at N-94 until environmental personnel could thoroughly investigate the situation. Ensuing discussions revealed that N-94 was also identified as Solid Waste Management Unit (SWMU) #15 to be investigated under our RCRA Corrective Action Program which was previously not known by Southern Division's engineering design contractor.

Therefore, it is our understanding that the following approach would be acceptable and, we believe, offers the best environmental solution:

- Our UST contractor will continue to excavate the tanks at N-94 in accordance with 40 CFR 280 in lieu of 40 CFR 264/265. Any tank contents/residual soils will be containerized and analyzed in accordance with hazardous waste determination criteria (TCLP and F001 - F005 solvent scan) and disposed of properly.

- If any product is encountered during excavation, absorbents will be used to clean all visible contamination. The absorbents will be containerized and analyzed in accordance

with hazardous waste determination criteria and disposed of properly as stated above.

- One grab sample of water will be obtained from the water standing in each excavation. Each water sample will be analyzed for the hazardous waste criteria stated above. No groundwater will be removed from the excavation prior to backfilling.

- Four soil samples will be retrieved from the bottom of each tank excavation at N-94. Each sample will also be analyzed for hazardous waste criteria as stated above.

- The excavated soil associated with tank removal will be backfilled once the tanks are removed.

- Any soil or groundwater contamination pertaining to N-94 will be investigated and remediated through our RCRA Corrective Action Program in lieu of 40 CFR 264/265. Also, all collected data and any observations associated with tank removal at N-94 will be incorporated into and complement our RFI Workplan for NAS Memphis.

Thank you for your cooperation in resolving this situation. If you have any further questions or need any additional information, please contact Mr. Mark Taylor of Southern Division at (803) 743-0573, or Ms. Tonya Barker or NAS Memphis at (901) 873-5461.

Sincerely,

P. M. MOTOLENICH

Copy to:
Commanding Officer
Southern Division, Naval Facilities Engineering Command
Code 18221, Mr. Mark Taylor and Mr. James Worthy
2155 Eagle Drive
Charleston, SC 29411-0068

Subj: EPA ID #TN2170022600

EnSafe/Allen & Hoshall
Attn: Mr. Lawson Anderson
5724 Summer Trees Drive
P. O. Box 341315
Memphis, TN 38184

Environmental Protection Agency IV
Waste Management Division
RCRA and Federal Facilities Branch
Attn: Mr. John Johnston
345 Courtland Street
Atlanta, GA 30365

Tennessee Department of Environment and Conservation
Attn: Ms. Coleen Powers and Mr. Hussein Ghelichkhani
2500 Mt. Moriah Road
Suite E 645
Perimeter Park
Memphis, TN 38115

Contract N62467-90-C-0683
Underground Storage Tank Closure Report
Tank no. 302
(SD-84)

Naval Air Station Memphis
Millington, TN

April 9, 1992

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1.0 Introduction

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C. Chain of Custody Form and Analytical Results for Final Soil Samples.

D. Certifications and Manifests for Disposal of Tank 302.

E. Certifications and Manifests for the Disposal of Water from the Tank Vault and the Contents of Tank 302.

1.0 Introduction

The purpose of this report is to provide documentation that the underground storage tank listed below at the Naval Air Station was properly removed and closed as required by the applicable Tennessee state regulations and the Navy's contract specifications. Permanent closure report forms are located in Appendix A.

Navy Tank No.: Tank 302

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: February 21, 1992

2.0 Description of Work Performed

Before work began on the tanks, the fluid levels were measured and tank volumes were calculated. Tank 302 was specified to contain 420 gallons. After measurement, tank contents were determined to be 6198 gallons (Appendix B).

Prior to excavation, rainwater that had collected in the tank vault was pumped into trucks and disposed of as a hazardous waste liquid.

After pumping the liquids, excavation began to expose Tank 302. Because of the nature of the N-94 site the State of Tennessee gave permission for the Navy to backfill all excavations in the N-94 area with contaminated soil until further investigations could be made. The excavated soil was therefore stockpiled at the excavation site and was not field checked with the HNU photoionization detector (PID).

A 60 ton crane was hired to remove the tanks from the pit. Tank 302 was removed and placed on plastic sheeting on the ground. The tank gasses were checked with a combustible gas indicator (CGI) and no combustible gasses were detected. A hole was cut in the tank with non-explosive pneumatic nibblers and the tank was cleaned.

The outside of the tank was cleaned and labeled and hauled to the laydown area. The tank remained there over night and was then taken to Hutcherson Metals.

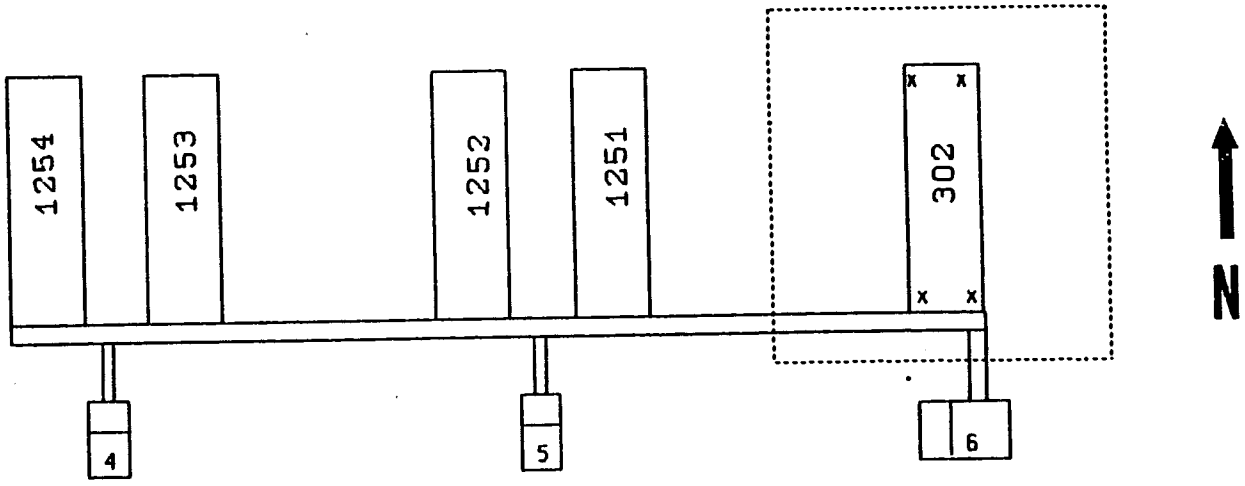
Soil samples were taken from the excavation and, as directed by the Navy, backfill began using contaminated soil from the excavation. The backfill materials from the original excavation became very muddy so it became necessary to finish the excavation with no. 86 clay gravel.

3.0 Sampling

Because permission was given by the State to backfill the excavations with contaminated soil, the soil from the excavation was not sampled or field checked with the HNU photoionization detector (PID).

Soil samples from the excavation pit were collected from each corner of the tank (4 samples). Samples were collected as grab samples from the excavator bucket and packed in clear glass jars with Teflon lined lids. The sample locations are identified on the following map.

Building N-94



x = Final Sample Locations

*** Not to Scale**

4.0 Analytical Results

All samples were shipped to Specialized Assays Environmental in Nashville Tennessee, a Navy approved and certified laboratory. Samples were analyzed using approved EPA methods for soil. Final in-situ materials were analyzed for flashpoint, BTEX, TPH, and TCLP analysis for BTEX, TPH, lead. The results of the analysis are summarized in the following tables. Laboratory reports are included in Appendix C.

Final In-situ Soils Samples

	Tank 302 Excavation			
Analysis (PPM)	NW	NE	SE	SW
TCLP Storage Tank				
Lead	<0.50	<0.50	<0.50	<0.50
Benzene	<0.100	<0.100	<0.100	<0.100
Lo Boil HC	<0.100	<0.100	<0.100	<0.100
Hi Boil HC	<0.100	<0.100	<0.100	<0.100
BTEX Soil				
Benzene	ND	ND	ND	ND
Toluene	ND	3.91	ND	ND
Ethylbenzene	ND	1.66	ND	ND
Xylene	ND	11.8	ND	ND
TPH				
Lo Boil HC	<5.0	41.2	<5.0	<5.0
Hi Boil HC	283	14.7	73.2	154
Flashpoint *	>160	>160	>160	>160

* Sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <1.00 PPM

5.0 Disposal of Materials

All soil removed from tank excavations at the N-94 site were placed back in the excavation as directed by the Navy. Certifications and disposal manifests for tank 302 is included in Appendix D. Certifications and disposal manifests for the tank contents and tank vaults are included in Appendix E.

6.0 Warranties and Limitations

This report certifies that the storage tanks were closed in accordance with federal and state regulations and Millington Naval Air Station's contract specifications. No certification is given that all environmental contaminants have been removed from the site because of the limitations of the type of representative sampling that was required and performed for this kind of work.

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank #302 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ____ NO X i.K.

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ____

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: No sludge was found. Liquids were pumped into trucks and disposed of by Laidlaw Environmental

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ____

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ____

12. If yes, was water sampled? Yes XX No ____ If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 600 C.K.

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes XX No ____

20. Were all samples stored in proper sampling containers? Yes XX No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes XX No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) ____

Signature: ____

close/disk2

week Ending 11-17-91

UNDERGROUND STORAGE TANKS REMOVAL, NAS MEMPHIS, SUBMITTALS LOGS ( )

	TANK #	GALLONS SPEC'D	ON-SITE CALCULATED	ACTUAL PUMPED	
1	TANK 302	420 GAL	6198 GAL		1
2	TANK 1250	160 GAL	929 GAL		2
3	TANK 1251	12,400 GAL	24,881 GAL		3
4	TANK 1252	2,000 GAL	24,804 GAL		4
5	TANK 1253	120 GAL	14,907 GAL		5
6	TANK 1254	100 GAL	929 GAL		6
7	TANK 1255	930 GAL	24,881 GAL		7
8	TANK 1256	1070 GAL	22,293 GAL		8
9	TANK 1257	2,250 GAL	5275 GAL		9
10	TANK 1258	2,300 GAL	5,275 GAL		10
11	TANK 1	870 GAL	502 GAL		11
12	TANK 2	580 GAL	513 GAL		12
13	TANK 3	570 GAL	561 GAL		13
14	TANK 4	560 GAL	529 GAL		14
15	TANK 5	560 GAL	• PLUGGED •		15
16	TANK 6	560 GAL	502 GAL		16
17	TANK 303				17
18	TANK 1241				18
19	TANK 7				19
20	TANK S-75N				20
21	TANK S-75W				21
22	TANK 1244				22
23	TANK 1245				23
24	TANK 1246				24
25	TANK 1565				25
26	TANK 1566				26
27	TANK 1618				27
28	TANK S-8				28
29	TANK 553				29
30	TANK S-50				30
31	TANK S-54				31
32	TANK S-56				32.
33	TANK 1594				33
34	TANK 1205N	700 GL	632		34
35	TANK 1205S	1000 GL	52		35
36	TANK N-10	80	2.53		36
37	TANK N-100				37
38					38
39					39
40					40
41					41
42					42
43					43
44					44
45					45
46					46
47					47
48					48
49					49
50					50
51					51
52					52

Contract N62467-90-C-0683
Underground Storage Tank Closure Report
Tank no. 1250
(SD-84)

Naval Air Station Memphis
Millington, TN

National Salvage & Service Corp.
243 E. Winslow Road
Bloomington, IN 47401

April 27, 1992

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3.0 Sampling

4.0 Analytical Results

5.0 Disposal of Materials

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A. Permanent Closure Report Forms

B. Field Data for Measured Tank Contents.

C. Chain of Custody Form and Initial Analytical Results for the Contents of Tank 1250.

D. Chain of Custody Form and Analytical Results for Additional Analyses of the Contents of Tank 1250.

E. Chain of Custody Form and Analytical Results for Final Soil Samples.

F. Certifications and Manifests for Disposal of Tank 1250.

G. Certifications and Manifests for the Contents of Tank 1250.

1.0 Introduction

The purpose of this report is to provide documentation that the underground storage tank listed below at the Naval Air Station was properly removed and closed as required by the applicable Tennessee state regulations and the Navy's contract specifications. Permanent closure report forms are located in Appendix A.

Navy Tank No.: Tank 1250

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: March 13, 1992

2.0 Description of Work Performed

Before work began on the tank, the fluid level was measured and tank volume was calculated. Tank 1250 was specified to contain 160 gallons of fluid. After measurement, the volume of tank contents were determined to be 929 gallons (Appendix B).

Prior to excavation, rainwater that had collected in the tank vaults and the tanks contents were pumped into trucks and disposed of as a hazardous waste liquid.

Excavation began to expose Tank 1250. After the tank was completely exposed a crane was used to lift the tank from the excavation.

Tank gasses were purged using 1.5 lbs. of dry ice (carbon dioxide) for every 100 gallons of tank volume. Tank gasses were checked with a combustible gas indicator (CGI). When no combustible gasses were detected a hole was cut in the tank with non-explosive pneumatic nibbler and the tank was cleaned. Sludge was removed from the tank using a Tornado drum vacuum and an aluminum squeegee and stored in drums. The tank was then labeled and taken to Hutcherson Recycling for disposal.

Because of the nature of the N-94 site, the State of Tennessee gave permission for the Navy to backfill all excavations in the N-94 area with contaminated soil until further investigations could be made. The excavated soil was therefore stockpiled at the excavation site and was not field checked with the HNU photoionization detector (PID).

Soil samples were taken from the excavation immediately after tank removal. The excavation was then backfilled using contaminated soil from the excavation, as directed by the Navy.

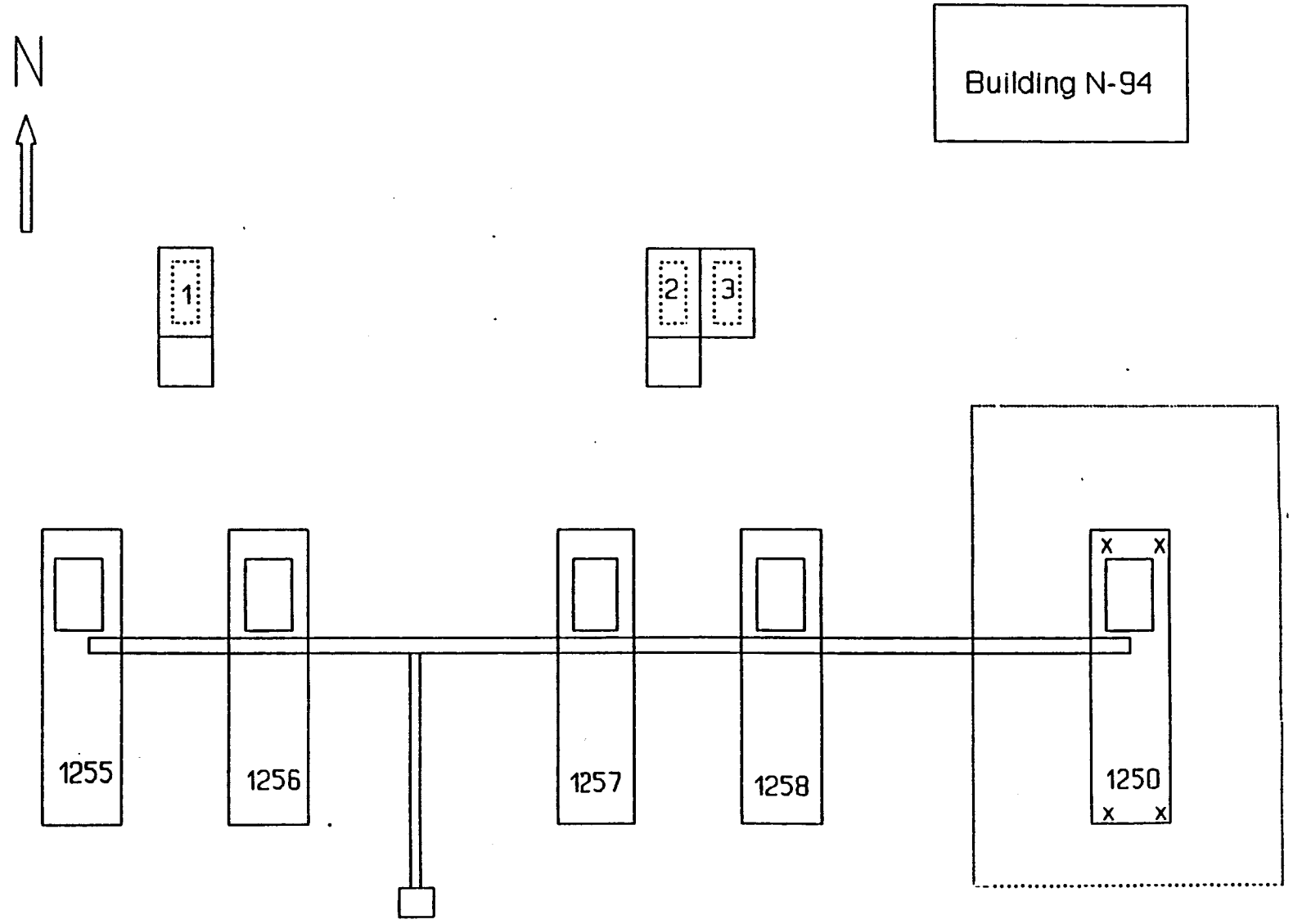
3.0 Sampling

Contaminated water from Tank 1250 was sampled using a stainless steel bomb sampler. Permission was granted for additional analysis so another sample of contaminated water was taken from Tank 1250.

Each sample consisted of one liter of liquid collected in an amber glass bottle with a teflon lined lid, plus one liter collected in the same way but with a nitric acid preservative supplied with the bottle from the laboratory, plus two clear glass vials for volatile organic analysis. Samples were collected using sterile gloves which were disposed of between samples. Bottles were labeled in the field and a chain of custody form was submitted with each shipment. Samples were shipped in coolers and iced to 4 degrees Celsius.

Because permission was given by the State to backfill the excavations with contaminated soil, the soil from the excavation was not sampled or field checked with the HNU photoionization detector (PID).

Soil samples from the excavation pit were collected the corners of the tank (4 samples). Samples were collected as grab samples from the excavator bucket and packed in clear glass jars with Teflon lined lids. The sample locations are identified on the following map.



X = Sample locations

* Not To Scale

4.0 Analytical Results

All samples were shipped to Specialized Assays Environmental in Nashville Tennessee, a Navy approved and certified laboratory. Samples were analyzed using approved EPA methods for soil and water. The initial sample from the tank was analyzed for total lead, TPH, and flashpoint. Additional analyses on the tank contents included TCLP analysis for metals, volatiles, semi-volatiles.

Final in-situ materials were analyzed for flashpoint, BTEX, TPH, volatile organic compounds, and TCLP analysis for metals, volatiles, and semi-volatiles. The results of the analysis are summarized in the following tables. Laboratory reports are included in Appendices C, D, and E respectively.

Tank Contents

Contaminated Water Tank 1250

Lo Boil Hydrocarbons	0.314
Hi Boil Hydrocarbons	<0.05
Flash Point	Sample heated to 160°F without flash or ignition
Lead	0.13

Analysis (PPM)	Tank 1250
Volatiles	
Acetone	<0.10
Acrylonitrile	<0.10
Bromoform	<0.10
Carbon Disulfide	<0.10
Carbon Tetrachloride	<0.10
Di-cl-di-f-methane	<0.10
Chlorobenzene	<0.10
Cl-di-br-methane	<0.10
Chloroethane	<0.10
2-Clethyvinyl Ether	<0.10
Chloroform	<0.10
Cyclohexanone	<0.10
Dichlorobenzenes	<0.10
Di-cl-br-methane	<0.10
1,1-Dichloroethane	<0.10
1,2-Dichloroethane	<0.10
1,1-Dichloroethylene	<0.10
1,2-Dichloroethylene	<0.10
1,2-Dichloropropane	<0.10
1,3-Dichloropropane	<0.10
Ethyl Acetate	<0.10
Ethylbenzene	<0.10
Ethyl Ether	<0.10
2-Ethoxyethanol	<1.0
Hexane	<0.10
Isobutanol	<5.0
Methyl Bromide	<0.10
Methyl Chloride	<0.10
2-Butanone (MEK)	<1.0
4-Methyl-2-Pentanone	<0.10
Methylene Chloride	<0.10
N-Butylalcohol	<5.0
Tri-cl-tri-f-ethane	<0.10
1,1,2,2-Tet-cl-ethane	<0.10
Tetrachloroethylene	<0.10
Toluene	0.12
1,1,1-Tri-cl-ethane	<0.10

Analysis (PPM)	Tank 1250
Volatiles	
1,1,2-Tri-cl-ethane	<0.10
Trichloroethylene	<0.10
Tri-cl-f-methane	<0.10
Xylene	0.27
Vinyl Chloride	<0.10
TCLP Metals	
Arsenic	<0.10
Barium	<1.0
Cadmium	<0.10
Chromium	<0.50

Analysis (PPM)	Tank 1250
Lead	<0.50
Mercury	<0.010
Selenium	<0.10
Silver	<0.10
TCLP Volatiles	
Benzene	<0.10
Carbon Tetrachloride	<0.10
Chlorobenzene	<0.10
Chloroform	<0.10
1,2-Dichloroethane	<0.10
1,1-Di-cl-ethylene	<0.10
2-Butanone (MEK)	<1.0
Tetrachloroethylene	<0.10
Trichloroethylene	<0.10
Vinyl Chloride	<0.10
TCLP semi-volatiles	
Pyridine	<0.10
O-Cresol	<0.10
M-Cresol	<0.10
P-Cresol	<0.10
1,4-Dichlorobenzene	<0.10
2,4-Dinitrotoluene	<0.10
Hexachlorobutadiene	<0.10
Hexachloroethane	<0.10
Nitrobenzene	<0.10
Pentachlorophenol	<0.10
2,4,5-Trichlorophenol	<0.10
2,4,6-Trichlorophenol	<0.10
Hexachlorobenzene	<0.10

Final In-situ Soils Samples

Analysis (PPM)	Tank 1250 Excavation NW	NE	SE	SW
BTEX Soil				
Benzene	<1	<1	<1	<1
Toluene	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1
Xylene	<1	<1	<1	<1
TPH				
Lo Boil HC	<5	<5	<5	<5
Hi Boil HC	<5	22.9	<5	<5
Volatiles				
Acetone	<0.05	<0.05	<0.05	<0.05
Acrylonitrile	ND*	ND	ND	ND
Bromoform	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Di-cl-di-f-methane	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Cl-di-br-methane	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Clethyvinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Cyclohexanone	ND	ND	ND	ND
Dichlorobenzenes	ND	ND	ND	ND
Di-cl-br-methane	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND
2-Ethoxyethanol	<1.0	<1.0	<1.0	<1.0
Hexane	ND	ND	ND	ND
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND
2-Butanone (MEK)	<0.05	<0.05	<0.05	<0.05
4-Methyl-2-Pentanone	<0.05	0.25	<0.05	<0.05
Methylene Chloride	ND	ND	ND	ND
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0
Tri-cl-tri-f-ethane	ND	ND	ND	ND
1,1,2,2-Tet-cl-ethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
1,1,1-Tri-cl-ethane	ND	ND	ND	ND

Analysis (PPM)	Tank 1250 Excavation NW	NE	SE	SW
1,1,2-Tri-cl-ethane	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Tri-cl-f-methane	ND	ND	ND	ND
Xylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP Metals				
Arsenic	<0.10	<0.10	<0.10	<0.10
Barium	1.87	1.90	<1.0	2.75
Cadmium	<0.10	<0.10	<0.10	<0.10
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.010	<0.010	<0.010	<0.010
Selenium	<0.10	<0.10	<0.10	<0.10
Silver	<0.10	<0.10	<0.10	<0.10
TCLP Volatiles				
Benzene	<0.10	<0.10	<0.10	<0.10
Carbon Tetrachloride	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	<0.10	<0.10	<0.10	<0.10
Chloroform	<0.10	<0.10	<0.10	<0.10
1,2-Dichloroethane	<0.10	<0.10	<0.10	<0.10
1,1-Di-cl-ethylene	<0.10	<0.10	<0.10	<0.10
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	<0.10	<0.10	<0.10	<0.10
Trichloroethylene	<0.10	<0.10	<0.10	<0.10
Vinyl Chloride	<0.10	<0.10	<0.10	<0.10
TCLP semi-volatiles				
Pyridine	<0.10	<0.10	<0.10	<0.10
O-Cresol	<0.10	<0.10	<0.10	<0.10
M-Cresol	<0.10	<0.10	<0.10	<0.10
P-Cresol	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	<0.10	<0.10	<0.10	<0.10
2,4-Dinitrotoluene	<0.10	<0.10	<0.10	<0.10
Hexachlorobutadiene	<0.10	<0.10	<0.10	<0.10
Hexachloroethane	<0.10	<0.10	<0.10	<0.10
Nitrobenzene	<0.10	<0.10	<0.10	<0.10
Pentachlorophenol	<0.10	<0.10	<0.10	<0.10
2,4,5-Trichlorophenol	<0.10	<0.10	<0.10	<0.10
2,4,6-Trichlorophenol	<0.10	<0.10	<0.10	<0.10
Hexachlorobenzene	<0.10	<0.10	<0.10	<0.10

* ND = not detected or <0.01 PPM

5.0 Disposal of Materials

All soil removed from tank excavations at the N-94 site were placed back in the excavation pit as directed by the Navy. Certification and the disposal manifest for the Tank 1250 are included in Appendix F. Certifications and disposal manifests for the tank contents are included in Appendix G.

6.0 Warranties and Limitations

This report certifies that the storage tank was closed in accordance with federal and state regulations and Millington Naval Air Station's contract specifications. No certification is given that all environmental contaminants have been removed from the site because of the limitations of the type of representative sampling that was required and performed for this kind of work.

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank # 1250 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ____ NO XX

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ____

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Liquid was taken by Laidlaw Environmental for disposal. Sludge stored in 17H DOT drums and will be disposed of with sludge from all N-94 tanks.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ____

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ____

12. If yes, was water sampled? Yes ____ No XX If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 600 CY

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes XX No ____

20. Were all samples stored in proper sampling containers? Yes XX No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes XX No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) _____

Signature: _____

close/disk2

week Ending 11-17-91

UNDERGROUND STORAGE TANKS REMOVAL, NAS MEMPHIS, SUBMITTALS LOGS ( )

	TANK #	GALLONS SPEC'D	ON-SITE CALCULATED	ACTUAL PUMPED	
1	TANK 302	420 GAL	6198 GAL		1
2	TANK 1250	160 GAL	929 GAL		2
3	TANK 1251	12,400 GAL	24,881 GAL		3
4	TANK 1252	2,000 GAL	24,804 GAL		4
5	TANK 1253	120 GAL	14,907 GAL		5
6	TANK 1254	100 GAL	929 GAL		6
7	TANK 1255	930 GAL	24,881 GAL		7
8	TANK 1256	1070 GAL	22,293 GAL		8
9	TANK 1257	2,250 GAL	5275 GAL		9
10	TANK 1258	2,300 GAL	5,275 GAL		10
11	TANK 1	570 GAL	502 GAL		11
12	TANK 2	580 GAL	513 GAL		12
13	TANK 3	570 GAL	561 GAL		13
14	TANK 4	560 GAL	525 GAL		14
15	TANK 5	560 GAL	-PLUGGED-		15
16	TANK 6	560 GAL	502 GAL		16
17	TANK 303				17
18	TANK 1241				18
19	TANK 7				19
20	TANK S-75N				20
21	TANK S-75W				21
22	TANK 1244				22
23	TANK 1245				23
24	TANK 1246				24
25	TANK 1565				25
26	TANK 1566				26
27	TANK 1618				27
28	TANK S-8				28
29	TANK 553				29
30	TANK S-50				30
31	TANK S-54				31
32	TANK S-56				32
33	TANK 1594				33
34	TANK 1205N	726 GL	632		34
35	TANK 1205S	1000 GL	52		35
36	TANK N-10	80	2.53		36
37	TANK N-100				37
38					38
39					39
40					40
41					41
42					42
43					43
44					44
45					45
46					46
47					47
48					48
49					49
50					50
51					51
52					52

Contract N62467-90-C-0683
Underground Storage Tank Closure Report
Tank nos. 1251 and 1252
(SD-84)

Naval Air Station Memphis
Millington, TN

April 20, 1992

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G. Certifications and Manifests for the Contents of Tanks 1251 and 1252.

H. Certifications and Manifests for the Disposal of Contaminated Rainwater from Tank Vaults 1251 and 1252.

1.0 Introduction

The purpose of this report is to provide documentation that the underground storage tank listed below at the Naval Air Station was properly removed and closed as required by the applicable Tennessee state regulations and the Navy's contract specifications. Permanent closure report forms are located in Appendix A.

Navy Tank No.: Tank System 1251 and 1252

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: February 6, 1992

2.0 Description of Work Performed

Before work began on the tanks, the fluid levels were measured and tank volumes were calculated. Tanks 1251 and 1252 were specified to contain 12,400 and 2,000 gallons respectively. After measurement, tank contents were determined to be 24,881 and 24,804 gallons respectively (Appendix B).

Prior to excavation, rainwater that had collected in the tank vaults was pumped into trucks and disposed of as a hazardous waste liquid.

Excavation began to expose tank 1252 first. Water from the excavation for tanks 1253 and 1254 or from an unlocated water pipe partially filled the excavation. Tank 1252 then floated to the top of the water in the excavation. Workers pulled the tank to the side of the excavation and chained it down to prevent it from tipping over and filling with water. Excavation then began on tank 1251. The workers exposed one side of the tank and the banks caved in. The banks were cut back and excavation continued until the tank was exposed.

Because of the nature of the N-94 site the State of Tennessee gave permission for the Navy to backfill all excavations in the N-94 area with contaminated soil until further investigations could be made. The excavated soil was therefore stockpiled at the excavation site and was not field checked with the HNU photoionization detector (PID).

A 60 ton crane was hired to remove the tanks from the pit. Tank 1252 was removed and placed on plastic sheeting on the ground but the crane failed to extract tank 1251 from the pit. A 100 ton crane was then used to extract tank 1251. It was also placed on plastic sheeting on the ground.

The tank gasses were checked with a combustible gas indicator (CGI) and no combustible gasses were detected. A hole was cut in the tank with non-explosive pneumatic nibblers and the tank was cleaned. A small amount of scale was removed. There was no sludge found inside the tanks.

The tanks were then labeled and hauled to the laydown area. They remained there over a weekend and were then taken to Hutchinson Recycling.

Soil samples were taken from the excavation and, as directed by the Navy, backfill began using contaminated soil from the excavation. The backfill materials became to muddy so it became necessary to finish the excavation with no. 86 clay gravel.

3.0 Sampling

Contaminated water in Tank 1252 was sampled first. The sample was a composite collected from the bottom, middle, and top of the liquid using a stainless steel bomb sampler.

Permission was granted for additional analysis so samples were collected from all tanks including tanks 1251 and 1252.

Each sample consisted of one liter of liquid collected in an amber glass bottle with a teflon lined lid, plus one liter collected in the same way but with a nitric acid preservative supplied with the bottle from the laboratory, plus two clear glass vials for volatile organic analysis. Samples were collected using sterile gloves which were disposed of between samples. Bottles were labeled in the field and a chain of custody form was submitted with each shipment. Samples were shipped in coolers and iced to 4 degrees Celsius.

Because permission was given by the State to backfill the excavations with contaminated soil, the soil from the excavation was not sampled or field checked with the HNU photoionization detector (PID).

Soil samples from the excavation pit were collected from each corner of each tank (8 samples). Samples were collected collected as grab samples from the excavator bucket and packed in clear glass jars with Teflon lined lids. The sample locations are identified on the following map.

4.0 Analytical Results

All samples were shipped to Specialized Assays Environmental in Nashville Tennessee, a Navy approved and certified laboratory. Samples were analyzed using approved EPA methods for soil and water. Water and tank contents were analyzed for flashpoint, BTEX, total lead, TPH, volatile organic compounds, TCLP metals, TCLP volatiles, and TCLP semi-volatiles. Stockpiled soils were analyzed for BTEX, TPH, as well as TCLP analysis for lead, benzene, and TPH. Final in-situ materials were analyzed for flashpoint, BTEX, TPH, volatile organic compounds, and TCLP analysis for TPH, metals, volatiles, and semi-volatiles. The results of the analysis are summarized in the following tables. Laboratory reports are included in Appendicies D, E, and F respectively.

Tank Contents

Analysis (PPM)	Tank 1252
Flashpoint *	>160
BTEX Water	
Benzene	0.237
Toluene	0.332
Ethylbenzene	3.44
Xylene	21.6
Total Lead	0.19
TPH	
Lo Boil HC	80.4
Hi Boil HC	<0.05

Analysis (PPM)	Tank 1251	Tank 1252
Volatiles		
Acetone	ND**	ND
Acrylonitrile	ND	ND
Bromoform	ND	ND
Carbon Disulfide	ND	ND
Carbon Tetrachloride	ND	ND
Di-cl-di-f-methane	ND	ND
Chlorobenzene	ND	ND
Cl-di-br-methane	ND	ND
Chloroethane	ND	ND
2-Clethyvinyl Ether	ND	ND
Chloroform	ND	ND
Cyclohexanone	ND	ND
Dichlorobenzenes	ND	ND
Di-cl-br-methane	ND	ND
1,1-Dichloroethane	ND	ND
1,2-Dichloroethane	ND	ND
1,1-Dichloroethylene	ND	ND
1,2-Dichloroethylene	ND	ND
1,2-Dichloropropane	ND	ND
1,3-Dichloropropane	ND	ND
Ethyl Acetate	ND	ND
Ethylbenzene	ND	ND
Ethyl Ether	ND	ND
2-Ethoxyethanol	<1.0	<1.0
Hexane	ND	ND
Isobutanol	<5.0	<5.0
Methyl Bromide	ND	ND
Methyl Chloride	ND	ND
2-Butanone (MEK)	<1.0	<1.0
4-Methyl-2-Pentanone	ND	ND
Methylene Chloride	ND	ND
N-Butylalcohol	<5.0	<5.0

Analysis (PPM)	Tank 1251	Tank 1252
Tri-cl-tri-f-ethane	ND**	ND
1,1,2,2-Tet-cl-ethane	ND	ND
Tetrachloroethylene	ND	ND
Toluene	ND	ND
1,1,1-Tri-cl-ethane	ND	ND
1,1,2-Tri-cl-ethane	ND	ND
Trichloroethylene	ND	ND
Tri-cl-f-methane	ND	ND
Xylene	ND	ND
Vinyl Chloride	ND	ND
TCLP Metals		
Arsenic	<0.10	<0.10
Barium	<1.0	<1.0
Cadmium	<0.10	<0.10
Chromium	<0.50	<0.50
Lead	<0.50	<0.50
Mercury	<0.010	<0.010
Selenium	<0.10	<0.10
Silver	<0.10	<0.10
TCLP Volatiles		
Benzene	ND	ND
Carbon Tetrachloride	ND	ND
Chlorobenzene	ND	ND
Chloroform	ND	ND
1,2-Dichloroethane	ND	ND
1,1-Di-cl-ethylene	ND	ND
2-Butanone (MEK)	<1.0	<1.0
Tetrachloroethylene	ND	ND
Trichloroethylene	ND	ND
Vinyl Chloride	ND	ND
TCLP semi-volatiles		
Pyridine	ND	ND
O-Cresol	ND	ND
M-Cresol	ND	ND
P-Cresol	ND	ND
1,4-Dichlorobenzene	ND	ND
2,4-Dinitrotoluene	ND	ND
Hexachlorobutadiene	ND	ND
Hexachloroethane	ND	ND
Nitrobenzene	ND	ND
Pentachlorophenol	ND	ND
2,4,5-Trichlorophenol	ND	ND
2,4,6-Trichlorophenol	ND	ND
Hexachlorobenzene	ND	ND

* sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <0.10 PPM

Final In-situ Soils Samples

Analysis (PPM)	Tank 1251 Excavation NW	NE	SE	SW
Flashpoint *	>160	>160	>160	>160
BTEX Soil				
Benzene	ND	ND	ND	ND
Toluene	33.4	5.82	26.6	ND
Ethylbenzene	ND	ND	ND	ND
Xylene	ND	ND	ND	ND
TPH				
Lo Boil HC	257	42.4	14.2	<5.0
Hi Boil HC	2134	1654	4760	383
Volatiles				
Acetone	<1.0	<1.0	<1.0	<1.0
Acrylonitrile	ND**	ND	ND	ND
Bromoform	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Di-cl-di-f-methane	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Cl-di-br-methane	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Clethyvinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Cyclohexanone	ND	ND	ND	ND
Dichlorobenzenes	ND	ND	ND	ND
Di-cl-br-methane	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND
2-Ethoxyethanol	<1.0	<1.0	<1.0	<1.0
Hexane	ND	ND	ND	ND
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-Pentanone	0.46	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0
Tri-cl-tri-f-ethane	ND	ND	ND	ND
1,1,2,2-Tet-cl-ethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	ND	ND	ND	ND

Analysis (PPM)	Tank 1251 Excavation NW	NE	SE	SW
1,1,1-Tri-cl-ethane	ND**	ND	ND	ND
1,1,2-Tri-cl-ethane	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Tri-cl-f-methane	ND	ND	ND	ND
Xylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP TPH				
Lo Boil HC	0.330	<0.100	<0.100	<0.100
Hi Boil HC	296	118	393	91
TCLP Metals				
Arsenic	<0.10	<0.10	<0.10	<0.10
Barium	1.48	1.58	1.35	1.69
Cadmium	<0.10	<0.10	<0.10	<0.10
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.010	<0.010	<0.010	<0.010
Selenium	<0.10	<0.10	<0.10	<0.10
Silver	<0.10	<0.10	<0.10	<0.10
TCLP Volatiles				
Benzene	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Di-cl-ethylene	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP semi-volatiles				
Pyridine	ND	ND	ND	ND
O-Cresol	ND	ND	ND	ND
M-Cresol	ND	ND	ND	ND
P-Cresol	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND

* Sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <0.10 PPM

Analysis (PPM)	Tank 1252 Excavation NW	NE	SE	SW
Flashpoint *	>160	>160	>160	>160
BTEX Soil				
Benzene	ND	ND	ND	ND
Toluene	19.1	13.2	2.91	ND
Ethylbenzene	ND	ND	ND	ND
Xylene	ND	ND	ND	ND
TPH				
Lo Boil HC	37.6	<5.0	<5.0	<5.0
Hi Boil HC	3240	2233	419	195
Volatiles				
Acetone	<1.0	<1.0	<1.0	<1.0
Acrylonitrile	ND**	ND	ND	ND
Bromoform	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Di-cl-di-f-methane	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Cl-di-br-methane	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Clethyvinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Cyclohexanone	ND	ND	ND	ND
Dichlorobenzenes	ND	ND	ND	ND
Di-cl-br-methane	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND
2-Ethoxyethanol	<1.0	<1.0	<1.0	<1.0
Hexane	ND	ND	ND	ND
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-Pentanone	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0
Tri-cl-tri-f-ethane	ND	ND	ND	ND
1,1,2,2-Tet-cl-ethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
1,1,1-Tri-cl-ethane	ND	ND	ND	ND
1,1,2-Tri-cl-ethane	ND	ND	ND	ND

Analysis (PPM)	Tank 1252 Excavation NW	NE	SE	SW
Trichloroethylene	ND**	ND	ND	ND
Tri-cl-f-methane	ND	ND	ND	ND
Xylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP TPH				
Lo Boil HC	<0.100	<0.100	<0.100	<0.100
Hi Boil HC	363	348	184	77
TCLP Metals				
Arsenic	<0.10	<0.10	<0.10	<0.10
Barium	1.29	1.15	1.38	1.17
Cadmium	<0.10	<0.10	<0.10	<0.10
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.010	<0.010	<0.010	<0.010
Selenium	<0.10	<0.10	<0.10	<0.10
Silver	<0.10	<0.10	<0.10	<0.10
TCLP Volatiles				
Benzene	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Di-cl-ethylene	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP semi-volatiles				
Pyridine	ND	ND	ND	ND
O-Cresol	ND	ND	ND	ND
M-Cresol	ND	ND	ND	ND
P-Cresol	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND

* Sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <0.10 PPM

5.0 Disposal of Materials

All soil removed from tank excavations at the N-94 site were placed back in the excavation as directed by the Navy. Certifications and disposal manifests for the tanks 1251, and 1252 are included in Appendix F. Certifications and disposal manifests for the tank contents are included in Appendix G. Certifications and disposal manifests for rainwater from the tank vaults are included in Appendix H.

6.0 Warranties and Limitations

This report certifies that the storage tanks were closed in accordance with federal and state regulations and Millington Naval Air Station's contract specifications. No certification is given that all environmental contaminants have been removed from the site because of the limitations of the type of representative sampling that was required and performed for this kind of work.

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank #1251 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ____ NO X C.K.

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ____

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Tank contents were pumped into a truck for disposal by Laidlaw Environmental. No sludge was found in the tank.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ____

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ____

12. If yes, was water sampled? Yes XX No ____ If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 600 C.Y.

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes XX No ____

20. Were all samples stored in proper sampling containers? Yes XX No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes XX No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) ____

Signature: ____

close/disk2

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank #1252 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ___ NO X

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ___

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Tank contents were pumped into a truck for disposal by Laidlaw Environmental. No sludge was found in the tank.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ___

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ___ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ___

12. If yes, was water sampled? Yes XX No ____ If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 100 CY

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes XX No ____

20. Were all samples stored in proper sampling containers? Yes XX No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes XX No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) ____

Signature: ____

close/disk2

11-11-91

UNDERGROUND STORAGE TANKS REMOVAL, NAS MEMPHIS, SUBMITTALS LOGS ( )

	TANK #	GALLONS SPEC'D	ON-SITE CALCULATED	ACTUAL PUMPED	
1	TANK 302	420 GAL	6198 GAL		1
2	TANK 1250	160 GAL	929 GAL		2
3	TANK 1251	12,400 GAL	24,881 GAL		3
4	TANK 1252	2,000 GAL	84,804 GAL		4
5	TANK 1253	120 GAL	14,907 GAL		5
6	TANK 1254	100 GAL	929 GAL		6
7	TANK 1255	930 GAL	24,881 GAL		7
8	TANK 1256	1070 GAL	22,293 GAL		8
9	TANK 1257	2,250 GAL	5275 GAL		9
10	TANK 1258	2,300 GAL	5275 GAL		10
11	TANK 1	570 GAL	502 GAL		11
12	TANK 2	580 GAL	513 GAL		12
13	TANK 3	570 GAL	561 GAL		13
14	TANK 4	560 GAL	525 GAL		14
15	TANK 5	560 GAL	-PLUGGED-		15
16	TANK 6	560 GAL	502 GAL		16
17	TANK 303				17
18	TANK 1241				18
19	TANK 7				19
20	TANK S-75N				20
21	TANK S-75W				21
22	TANK 1244				22
23	TANK 1245				23
24	TANK 1246				24
25	TANK 1565				25
26	TANK 1566				26
27	TANK 1618				27
28	TANK S-8				28
29	TANK 553				29
30	TANK S-50				30
31	TANK S-54				31
32	TANK S-56				32
33	TANK 1594				33
34	TANK 1205N	2.6 GL	632		34
35	TANK 1205S	1000 GL	52		35
36	TANK N-10	80	2.53		36
37	TANK N-100				37
38					38
39					39
40					40
41					41
42					42
43					43
44					44
45					45
46					46
47					47
48					48
49					49
50					50
51					51
52					52

Contract N62467-90-C-0683
Underground Storage Tank Closure Report
(SD-84)

Naval Air Station Memphis
Millington, Tn

March 10, 1992

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F. Disposal Manifests for Tanks 1253, 1254, and N-10.

G. Disposal Manifests for Contents of Frac Tanks 60, 65, R1, and Tanks 1253 and 1254.

1.0 Introduction

The purpose of this report is to provide documentation that the underground storage tanks (UST) listed below at the Naval Air Station were properly removed and closed as required by the applicable Tennessee state regulations and the Navy's contract specifications.

Navy Tank No.: Tank System 1253 and 1254

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: December 18, 1991

2.0 Description of Work Performed

Before work began at the N-94 site, tank fluids were measured and volumes calculated. As the tanks were opened, workers noticed a solvent-like odor. Samples were taken and additional testing was ordered.

Tanks 1253 and 1254 were specified to contain 120 and 100 gallons of water with a petroleum sheen. After measurement, the contents of tank 1253 were estimated to be 14,907 gallons, and tank 1254 was estimated at 929 gallons (Appendix A).

Prior to excavation, equipment was moved to the site and a construction fence was erected around the area. Rainwater that had collected in the tank vaults was pumped into frac tank R1. The water was sampled and analyzed prior to disposal. A diversion trench was dug around the N-94 site to prevent surface runoff from entering the excavation.

Excavation began to expose tank 1254 first but both tanks 1253 and 1254 were exposed during the initial excavation. Contaminated soil was found 8 to 12 inches below the surface. Excavated soil was checked with an HNU photoionization detector (PID). The soil was hauled to the laydown area and stockpiled on 10 mil polyethylene sheeting. All soil was segregated into potentially clean and contaminated stockpiles.

The tank liquids were pumped into frac tanks using a pneumatic diaphragm pump. The tank gasses were checked with a combustible gas indicator (CGI) and no combustible gasses were detected. Holes was cut in the tank with non-explosive pneumatic nibblers and the tanks were cleaned.

The tanks were lifted out of the excavation using a 60 ton crane. The tanks were labeled and placed on a flatbed to be removed for disposal.

Due to the extent of the contamination and the presence of

other contaminants at the tank farm, the State gave permission for the Navy to have the source of the contamination (UST) removed and backfill all excavations in the N-94 area with contaminated soil until further investigations could be made.

Soil samples were taken from the excavation and backfill began using contaminated soil from the excavation, as directed by the Navy.

Sampling

Contaminated tank water from the tanks was sampled first. The samples were composite samples collected from the bottom, middle, and top of the liquid using a stainless steel bomb sampler.

Soil was continually screened with an HNU photoionization detector (PID) with a 10.2 eV lamp. Every 20 to 40 yards of soil were checked during excavation. Samples were collected and submitted for analysis to confirm the PID results prior to screening the stockpiles. Finally, every bucket of stockpiled soils was checked with the PID to confirm the results.

A total of 8 samples of contaminated soil from the stockpile were sent for analysis during and after the screening process. A total of 6 samples of clean stockpiled soil were submitted for analysis plus one sample for Browning-Ferris landfills leachate analysis (lab report included in Appendix D).

Water samples were then taken for analysis prior to disposal for the excavation pit water, frac tanks 60 and 65 which contained the contents of tanks 1253 and 1254, as well as the rainwater in frac tank R1.

Each water sample consisted of one liter of liquid collected in an amber glass bottle with a teflon lined lid, plus one liter collected in the same way but with a nitric acid preservative supplied with the bottle from the laboratory, plus two clear glass vials for volatile organic analysis. Samples were collected using sterile gloves which were disposed of between samples. Samples were shipped in coolers and iced to 4 degrees Celsius.

Finally, soil samples from the excavation pit were collected from each corner of the tank. Sample locations are identified on the following map. Soils samples were packed in clear glass jars with Teflon lined lids supplied by the laboratory. All samples were labeled in the field and a chain of custody form submitted with each shipment.

Analytical Results

Field screened soils checked with the PID indicated initial concentrations of ionizable gasses at 1180, 1600, 197, and 270 PPM respectively. Results of further excavation and stockpile testing yielded the results shown in Appendix A.

Results of analysis of samples submitted to confirm field PID reading are presented in the following table and are included in Appendix B. The threshold value for contaminated soil was determined to be 200 PPM on the field instrument.

Sample no.	PID (PPM)	BTEX (PPM)				TPH (PPM)	
		Benz.	Tol.	E.benz.	Xyl.	Lo B.	Hi B.
1	388	ND*	3.0	ND	ND	505.0	<5.0
2	152	ND	ND	ND	ND	72.0	10.8
3	212	ND	1.3	ND	ND	89.0	7.1
4	98	ND	ND	ND	ND	<5.0	<5.0
5	94	ND	ND	ND	ND	16.8	<5.0
6	45.4	ND	ND	ND	ND	13.5	<5.0

* ND = not detected or <0.10 PPM

All samples were shipped to Specialized Assays Environmental in Nashville Tennessee, a Navy approved and certified laboratory. Samples were analyzed using approved EPA methods for soil and water. Water and tank contents were analyzed for flashpoint, BTEX, total lead, TPH, volatile organic compounds, TCLP metals, TCLP volatiles, and TCLP semi-volatiles. Stockpiled soils were analyzed for BTEX, TPH, as well as TCLP analysis for lead, benzene, and TPH. Final in-situ materials were analyzed for flashpoint, BTEX, TPH, volatile organic compounds, and TCLP analysis for TPH, metals, volatiles, and semi-volatiles. The results of the analysis are summarized in the following tables. Laboratory reports are included in Appendicies C, D, and E respectively.

Tank Contents

Analysis (PPM)	Tank 1253	Tank 1254
Flashpoint *	>160	>160
BTEX Water		
Benzene	0.735	0.634
Toluene	0.787	0.555
Ethylbenzene	4.20	2.07
Xylene	22.6	21.4
Total Lead	0.065	0.19
TPH		
Lo Boil HC	94.1	72.8
Hi Boil HC	<0.05	<0.05

Analysis (PPM)	Frac tank no. 60	65	R1	Excavation Pit Water
Volatiles				
Acetone	ND**	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Di-cl-di-f-methane	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Cl-di-br-methane	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Clethyvinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Cyclohexanone	ND	ND	ND	ND
Dichlorobenzenes	ND	ND	ND	ND
Di-cl-br-methane	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND
2-Ethoxyethanol	<1.0	<1.0	<1.0	<1.0
Hexane	ND	ND	ND	ND
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-Pentanone	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0

Analysis (PPM)	Frac tank no. 60	65	R1	Excavation Pit Water
Tri-cl-tri-f-ethane	ND**	ND	ND	ND
1,1,2,2-Tet-cl-ethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
1,1,1-Tri-cl-ethane	ND	ND	ND	ND
1,1,2-Tri-cl-ethane	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Tri-cl-f-methane	ND	ND	ND	ND
Xylene	ND	ND	ND	1.9
Vinyl Chloride	ND	ND	ND	ND
TCLP Metals				
Arsenic	<0.10	<0.10	<0.10	<0.10
Barium	<1.0	<1.0	<1.0	<1.0
Cadmium	<0.10	<0.10	<0.10	<0.10
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.010	<0.010	<0.010	<0.010
Selenium	<0.10	<0.10	<0.10	<0.10
Silver	<0.10	<0.10	<0.10	<0.10
TCLP Volatiles				
Benzene	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Di-cl-ethylene	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP semi-volatiles				
Pyridine	ND	ND	ND	ND
O-Cresol	ND	ND	ND	ND
M-Cresol	ND	ND	ND	ND
P-Cresol	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND

* sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <0.10 PPM

Contaminated Stockpile Samples

Analysis	1	2	3	4	5	6	7	8
BTEX Soil								
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	15.0	<1.0	21	<1.0	26.0	6.9	10.8	<1.0
Ethylbenz.	<1.0	<1.0	6.3	<1.0	<1.0	<1.0	<1.0	<1.0
Xylene	7.0	3.6	14	<1.0	2.1	<1.0	<1.0	<1.0
TPH								
Lo Boil HC	668.0	610	3056	146	3103	4403	557	<5.0
Hi Boil HC	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TCLP								
Lead	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lo Boil HC	0.691	1.17	2.87	0.262	0.352	0.497	0.330	<0.10
Hi Boil HC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Clean Stockpile Samples

Analysis	1	2	3	4	5	6
BTEX Soil						
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenz.	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TPH						
Lo Boil HC	<5.0	<5.0	<5.0	54.7	242	51.5
Hi Boil HC	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TCLP						
Lead	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Lo Boil HC	<0.10	<0.10	<0.10	0.145	0.246	0.270
Hi Boil HC	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

Final In-situ Soils Samples

Analysis (PPM)	Tank 1253 Excavation NW	NE	SE	SW
Flashpoint *	>160	>160	>160	>160
BTEX Soil				
Benzene	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	18.6	<1.0	51.4
Ethylbenzene	<1.0	4.3	<1.0	13.8
Xylene	<1.0	23.8	<1.0	17.0
TPH				
Lo Boil HC	<5.0	889	<5.0	2656
Hi Boil HC	22.6	12991	169	1500
Volatiles				
Acetone	<1.0	<1.0	<1.0	<1.0
Acrylonitrile	<1.0	<1.0	<1.0	<1.0
Bromoform	ND**	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Di-cl-di-f-methane	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Cl-di-br-methane	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Clethyvinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Cyclohexanone	ND	ND	ND	ND
Dichlorobenzenes	ND	ND	ND	ND
Di-cl-br-methane	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND
2-Ethoxyethanol	<1.0	<1.0	<1.0	<1.0
Hexane	ND	ND	ND	ND
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-Pentanone	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0
Tri-cl-tri-f-ethane	ND	ND	ND	ND
1,1,2,2-Tet-cl-ethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	ND	0.12	ND	ND

Analysis (PPM)	Tank 1253 Excavation NW	NE	SE	SW
1,1,1-Tri-cl-ethane	ND**	ND	ND	ND
1,1,2-Tri-cl-ethane	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Tri-cl-f-methane	ND	ND	ND	ND
Xylene	ND	0.44	ND	1.9
Vinyl Chloride	ND	ND	ND	ND
TCLP TPH				
Lo Boil HC	<0.100	0.184	<0.100	0.472
Hi Boil HC	1.13	5.12	<0.100	2.10
TCLP Metals				
Arsenic	<0.10	<0.10	<0.10	<0.10
Barium	<1.0	<1.0	<1.0	1.14
Cadmium	<0.10	<0.10	<0.10	<0.10
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.010	<0.010	<0.010	<0.010
Selenium	<0.10	<0.10	<0.10	<0.10
Silver	<0.10	<0.10	<0.10	<0.10
TCLP Volatiles				
Benzene	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Di-cl-ethylene	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP semi-volatiles				
Pyridine	ND	ND	ND	ND
O-Cresol	ND	ND	ND	ND
M-Cresol	ND	ND	ND	ND
P-Cresol	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND

* Sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <0.10 PPM

Analysis (PPM)	Tank 1254 Excavation NW	NE	SE	SW
Flashpoint *	>160	>160	>160	>160
BTEX Soil				
Benzene	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	5.9	<1.0	22.6
Ethylbenzene	<1.0	<1.0	<1.0	3.5
Xylene	<1.0	5.5	<1.0	7.5
TPH				
Lo Boil HC	<5.0	682	<5.0	2607
Hi Boil HC	17.0	490	47.1	128
Volatiles				
Acetone	<1.0	<1.0	<1.0	<1.0
Acrylonitrile	<1.0	<1.0	<1.0	<1.0
Bromoform	ND**	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Di-cl-di-f-methane	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Cl-di-br-methane	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Clethyvinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Cyclohexanone	ND	ND	ND	ND
Dichlorobenzenes	ND	ND	ND	ND
Di-cl-br-methane	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloroethylene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND
2-Ethoxyethanol	<1.0	<1.0	<1.0	<1.0
Hexane	ND	ND	ND	ND
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-Pentanone	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0
Tri-cl-tri-f-ethane	ND	ND	ND	ND
1,1,2,2-Tet-cl-ethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	ND	0.15	ND	ND
1,1,1-Tri-cl-ethane	ND	ND	ND	ND
1,1,2-Tri-cl-ethane	ND	ND	ND	ND

Analysis (PPM)	Tank 1254 Excavation NW	NE	SE	SW
Trichloroethylene	ND**	ND	ND	ND
Tri-cl-f-methane	ND	ND	ND	ND
Xylene	ND	0.68	ND	0.21
Vinyl Chloride	ND	ND	ND	ND
TCLP TPH				
Lo Boil HC	<0.100	0.112	<0.100	0.713
Hi Boil HC	<0.100	0.840	<0.100	<0.100
TCLP Metals				
Arsenic	<0.10	<0.10	<0.10	<0.10
Barium	<1.0	1.11	1.00	<1.0
Cadmium	<0.10	<0.10	<0.10	<0.10
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.010	<0.010	<0.010	<0.010
Selenium	<0.10	<0.10	<0.10	<0.10
Silver	<0.10	<0.10	<0.10	<0.10
TCLP Volatiles				
Benzene	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Di-cl-ethylene	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP semi-volatiles				
Pyridine	ND	ND	ND	ND
O-Cresol	ND	ND	ND	ND
M-Cresol	ND	ND	ND	ND
P-Cresol	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND

* Sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <0.10 PPM

0 Disposal of Materials

All soil removed from tank excavations at the N-94 site were placed back in the excavation as directed by the Navy. Disposal manifests for the tanks 1253, 1254, and N-10 are included in Appendix F. Disposal manifests for the contents of frac tanks 60, 65, and R1 plus tanks 1253 and 1254 are included in Appendix G.

6.0 Warranties and Limitations

This report certifies that the storage tank was closed in accordance with federal and state regulations and Millington Naval Air Station's contract specifications. No certification is given that all environmental contaminants have been removed from the site because of the limitations of the type of representative sampling that was required and performed for this kind of work.

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tanks 1253 & 1254 (unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes X NO ____

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes X No ____

5. Describe how the tank(s) was purged: Purged with 15 lbs. of dry ice (carbon dioxide) for every 1,000 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): Liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Liquid stored in a frac tank then taken by Laidlaw Environmental for disposal. Sludge stored in 17H DOT drums and will be disposed of with sludge from all N-94 tanks.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes X No ____

9. How and where was the tank(s) disposed of? Taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No X

11. Was water encountered in the tank pit during the tank abandonment activities? Yes X No ____

12. If yes, was water sampled? Yes X No ____ If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes X No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No X

15. If yes, who did you notify with this Division? NA

16. When did you make the notification? NA

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 840 (360 clean, 480 contaminated)

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stock piled in the laydown area, after analysis all soil was returned to the excavation (see closure report).

19. Were all samples cooled to a proper temperature when received by the lab? Yes X No ____

20. Were all samples stored in proper sampling containers? Yes X No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes X No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of Owner or Owner's Authorized Representative (Print) P. M. MOTOLENICH, CDR, CEC, USN, PWO

Signature: PM Motolenich

close/disk2

Contract N62467-90-C-0683
Underground Storage Tank Closure Report
Tank nos. 1255 and 1256
(SD-84)

Naval Air Station Memphis
Millington, TN

National Salvage & Service Corp.
243 E. Winslow Road
Bloomington, IN 47401

April 22, 1992

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B. Field Data for Measured Tank Contents.

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G. Certifications and Manifests for the Contents of Tanks 1255 and 1256.

1.0 Introduction

The purpose of this report is to provide documentation that the underground storage tank listed below at the Naval Air Station was properly removed and closed as required by the applicable Tennessee state regulations and the Navy's contract specifications. Permanent closure report forms are located in Appendix A.

Navy Tank No.: Tank 1255

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: February 27, 1992

Navy Tank No.: Tank 1256

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: March 3, 1992

2.0 Description of Work Performed

Before work began on the tanks, the fluid levels were measured and tank volumes were calculated. Tanks 1255 and 1256 were specified to contain 930 and 1,070 gallons respectively. After measurement, the volume of tank contents were determined to be 24,881 and 22,293 gallons respectively (Appendix B). Prior to excavation the tank contents were pumped into trucks and disposed of as a hazardous waste liquid.

Excavation began to expose Tank 1255 first, then Tank 1256. After the tanks were completely exposed a 60 ton crane was hired but failed to extract the tanks. A larger crane was used to lift the tanks from the excavation.

Tank gasses were purged using 1.5 lbs. of dry ice (carbon dioxide) for every 100 gallons of tank volume. The tank gasses were checked with a combustible gas indicator (CGI). When no combustible gasses were detected a hole was cut in the tank with non-explosive pneumatic nibblers and the tank was cleaned. Sludge was removed from the tank and stored in drums using a Tornado drum vacuum and an aluminum squeegee. The tanks were then labeled and taken to Hutcherson Recycling for disposal.

Because of the nature of the N-94 site, the State of Tennessee gave permission for the Navy to backfill all excavations in the N-94 area with contaminated soil until further investigations could be made. The excavated soil was therefore stockpiled at the excavation site and was not field checked with the HNU photoionization detector (PID).

Soil samples were taken from the excavations immediately after tank removal. The excavations were then backfilled using contaminated soil from the excavation, as directed by the Navy.

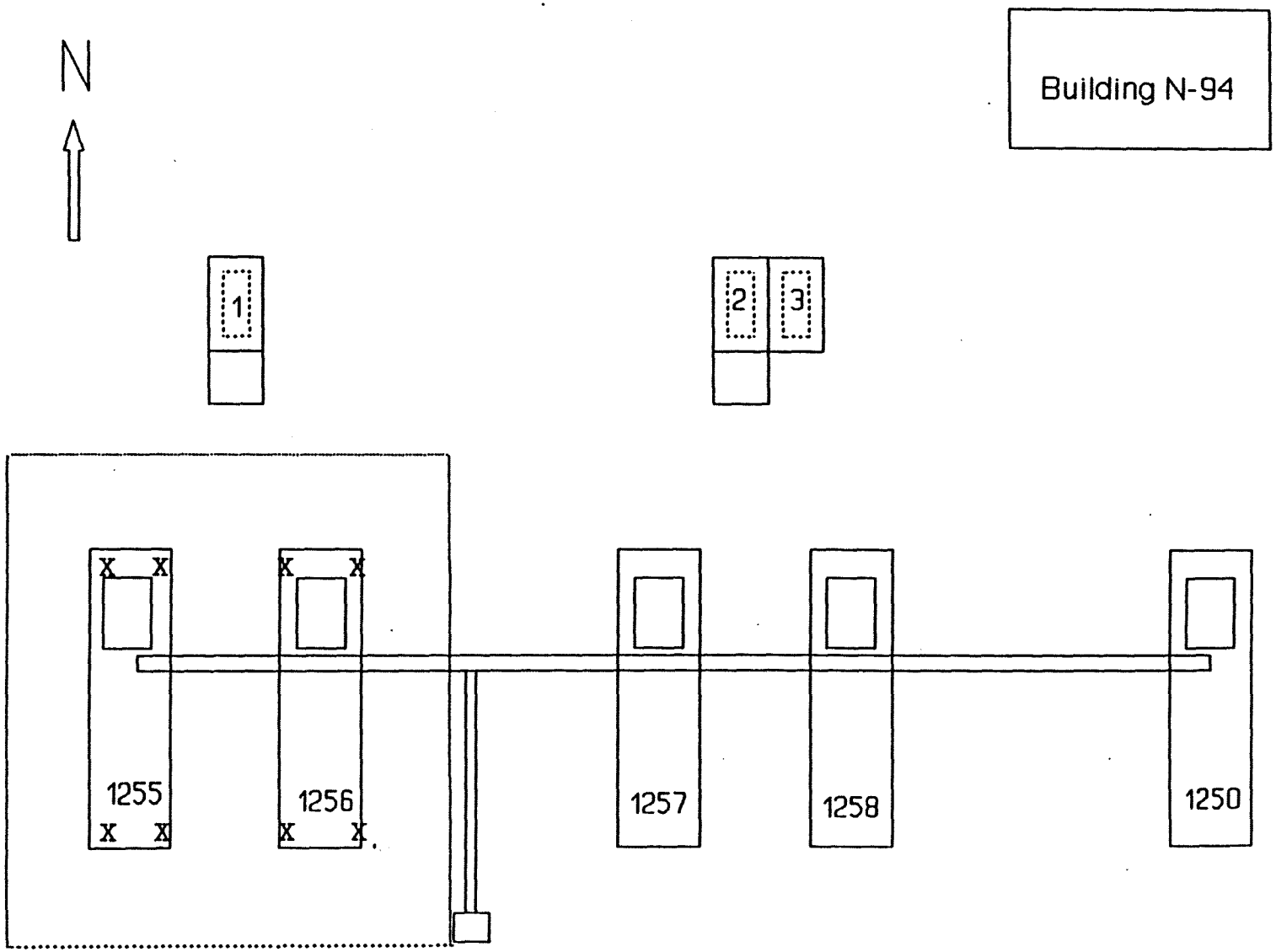
3.0 Sampling

Contaminated water from Tanks 1255, 1256, and 1257 were sampled first. The sample was a composite collected from the tanks using a stainless steel bomb sampler. Permission was granted for additional analysis so samples were collected from the oil and water phases from tanks 1255 and 1256.

Each sample consisted of one liter of liquid collected in an amber glass bottle with a teflon lined lid, plus one liter collected in the same way but with a nitric acid preservative supplied with the bottle from the laboratory, plus two clear glass vials for volatile organic analysis. Samples were collected using sterile gloves which were disposed of between samples. Bottles were labeled in the field and a chain of custody form was submitted with each shipment. Samples were shipped in coolers and iced to 4 degrees Celsius.

Because permission was given by the State to backfill the excavations with contaminated soil, the soil from the excavation was not sampled or field checked with the HNU photoionization detector (PID).

Soil samples from the excavation pit were collected from the corners of each tank (8 samples). Samples were collected as grab samples from the excavator bucket and packed in clear glass jars with Teflon lined lids. The sample locations are identified on the following map.



X = Sample locations

* Not To Scale

4.0 Analytical Results

All samples were shipped to Specialized Assays Environmental in Nashville Tennessee, a Navy approved and certified laboratory. Samples were analyzed using approved EPA methods for soil and water. The initial solvent scan on the tank contents analyzed for total lead, PCBs, BTU, flashpoint, volatile and semi-volatile organic compounds, and reactive compounds.

Additional analyses on the oil and water phases in the tanks included flashpoint, volatile organic compounds, total lead, and BTU for the oil phase. TCLP analysis run on the samples included metals, volatiles, semi-volatiles.

Final in-situ materials were analyzed for flashpoint, BTEX, TPH, volatile organic compounds, and TCLP analysis for metals, volatiles, and semi-volatiles. . The results of the analysis are summarized in the following tables. Laboratory reports are included in Appendices C, D, and E respectively.

Tank Contents - Oil Layer/Composite 1255-1256-1257

Analysis (PPM)	
Lead	342
PCB's	<2.0
BTU's	19000
Flash Point	<70° F

Reactivity Test	
Reactive Cyanide	<2.0
Reactive Sulfide	<2.0

Volatiles	
Acetone	<1.0
Acylonitrile	<1.0
Bromoform	<1.0
Carbon Disulfide	<1.0
Carbon Tetrachloride	<1.0
Di-cl-di-f-methane	<1.0
Chlorobenzene	<1.0
Cl-di-br-methane	<1.0
Chloroethane	<1.0
2-Clethyvinyl Ether	<1.0
Chloroform	<1.0
Cyclohexanone	<1.0
Dichlorobenzene	<1.0
Di-cl-br-methane	<1.0
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<1.0
1,1-Dichloroethylene	<1.0
1,2-Dichloroethylene	<1.0
1,2-Dichloropropane	<1.0
1,3-Dichloropropane	<1.0
Ethyl Acetate	<1.0
Ethylbenzene	1100
Ethyl Ether	<1.0
2-Ethoxyethanol	<1.0
Hexane	<1.0
Isobutanol	<50.0
Methyl Bromide	<1.0
Methyl Chloride	<1.0
2-Butanone (MEK)	<1.0
4-Methyl-2-Pentanone	3400
Methylene Chloride	<1.0
N-Butylalcohol	<100
Tri-cl-tri-f-ethane	<1.0
1,1,2,2-Tet-cl-ethane	<1.0
Tetrachloroethylene	<1.0
Toluene	5500
1,1,1-Tri-cl-ethane	<1.0
1,1,2-Tri-cl-ethane	<1.0
Trichloroethylene	<1.0

Analysis (PPM)

Tri-cl-f-methane	<1.0
Xylene	11000
Vinyl Chloride	<1.0

Acid Organics

2-Chlorophenol	<500
2,4 Dichlorophenol	<500
2,4 Dimethylphenol	<500
2,4 Dinitrophenol	<500
2-Nitrophenol	<500
4-Nitrophenol	<500
P-chloro-m-cresol	<500
Pentachlorophenol	<500
Phenol	<500
2,4,6-Tri cl phenol	<500

Base Neutrals

Acenapthene	<500
Acenapthtylene	<500
Anthracene	<500
Benzidine	<500
Benzo(a)anthracene	<500
Benzo(a)pyrene	<500
Benzo(b)fluoranthene	<500
Benzo(ghi)perylene	<500
Benzo(k)fluoranthene	<500
Bis-2-cl-ethox-metha	<500
Bis(2-cl-ethyl)ether	<500
Bis(2-cl-isopro)ether	<500
Bis(2-eth-hex)phthal	<500
4-Br-phen-phen-ether	<500
Butyl-benz-pthalate	<500
2-Chloronapthalene	<500
4-Cl-phen-phen-ether	<500
Chrysene	<500
Dibenz(a,h)anthracen	<500
1,2-Dichlorobenzene	<500
1,3-Dichlorobenzene	<500
1,4-Dichlorobenzene	<500
3,3-Dichlorobenzidine	<500
Diethyl Phthalate	<500
Dimethyl Phthalate	<500
Benzo(e)pyrene	<500
Di-n-butyl Phthalate	<500
2,4-Dinitrotoluene	<500
2,6-Dinitrotoluene	<500
Di-n-octyl phthalate	<500
1,2-Diphen-hydrazine	<500
Fluoranthene	<500
Fluorene	<500

Analysis (PPM)

Hexachlorobenzene	<500
Hexachlorobutadiene	<500
Hexclcyclopentadiene	<500
Hexachloroethane	<500
Indeno (1,2,3-cd)pyr	<500
Isophorone	<500
Naphthalene	760
Nitrobenzene	<500
N-nit-deimethylamine	<500
N-nit-dinpropylamine	<500
N-nit-diphenylamine	<500
Phenanthrene	<500
1,2,4-Trichlorobenz	<500

Tank Contents - Oil Phase

Analysis (PPM)	Tank 1255	Tank 1256
Flash Point	Room Temp	Room Temp
Volatiles		
Acetone	<1.0	<100
Acylonitrile	<1.0	<100
Bromoform	<1.0	<100
Carbon Disulfide	<1.0	<100
Carbon Tetrachloride	<1.0	<100
Di-cl-di-f-methane	<1.0	<100
Chlorobenzene	<1.0	<100
Cl-di-br-methane	<1.0	<100
Chloroethane	<1.0	<100
2-Clethyvinyl Ether	<1.0	<100
Chloroform	<1.0	<100
Cyclohexanone	<1.0	<100
Dichlorobenzene	<1.0	<100
Di-cl-br-methane	<1.0	<100
1,1-Dichloroethane	<1.0	<100
1,2-Dichloroethane	<1.0	<100
1,1-Dichloroethylene	<1.0	<100
1,2-Dichloroethylene	<1.0	<100
1,2-Dichloropropane	<1.0	<100
1,3-Dichloropropane	<1.0	<100
Ethyl Acetate	<1.0	<100
Ethylbenzene	<1.0	<100
Ethyl Ether	<1.0	<100
2-Ethoxyethanol	<1.0	<100
Hexane	<1.0	<100
Isobutanol	<5.0	<10
Methyl Bromide	<1.0	<100
Methyl Chloride	<1.0	<100
2-Butanone (MEK)	<1.0	<100
4-Methyl-2-Pentanone	<1.0	<100
Methylene Chloride	<1.0	<100
N-Butylalcohol	8.8	<10
Tri-cl-tri-f-ethane	<1.0	<100
1,1,2,2-Tet-cl-ethane	<1.0	<100
Tetrachloroethylene	<1.0	<100
Toluene	<1.0	<100
1,1,1-Tri-cl-ethane	<1.0	<100
1,1,2-Tri-cl-ethane	<1.0	<100
Trichloroethylene	<1.0	<100
Tri-cl-f-methane	<1.0	<100
Xylene	13	11000
Vinyl Chloride	<1.0	<100
BTU's /lb	19,830	19,340
Lead	43	44

* ND = not detected or <0.10 PPM

Tank Contents - Water Phase

Analysis (PPM)	Tank 1255	Tank 1256
Flash Point	Room Temperature	100^0 F
Volatiles		
Acetone	<1.0	<1.0
Acylonitrile	<1.0	<1.0
Bromoform	<1.0	<1.0
Carbon Disulfide	<1.0	<1.0
Carbon Tetrachloride	<1.0	<1.0
Di-cl-di-f-methane	<1.0	<1.0
Chlorobenzene	<1.0	<1.0
Cl-di-br-methane	<1.0	<1.0
Chloroethane	<1.0	<1.0
2-Clethyvinyl Ether	<1.0	<1.0
Chloroform	<1.0	<1.0
Cyclohexanone	<1.0	<1.0
Dichlorobenzene	<1.0	<1.0
Di-cl-br-methane	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0
1,2-Dichloroethane	<1.0	<1.0
1,1-Dichloroethylene	<1.0	<1.0
1,2-Dichloroethylene	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0
1,3-Dichloropropane	<1.0	<1.0
Ethyl Acetate	<1.0	<1.0
Ethylbenzene	1.6	2.1
Ethyl Ether	<1.0	<1.0
2-Ethoxyethanol	<1.0	<1.0
Hexane	<1.0	<1.0
Isobutanol	<5.0	<5.0
Methyl Bromide	<1.0	<1.0
Methyl Chloride	<1.0	<1.0
2-Butanone (MEK)	<1.0	<1.0
4-Methyl-2-Pentanone	<1.0	<1.0
Methylene Chloride	<1.0	<1.0
N-Butylalcohol	<5.0	<5.0
Tri-cl-tri-f-ethane	<1.0	<1.0
1,1,2,2-Tet-cl-ethane	<1.0	<1.0
Tetrachloroethylene	<1.0	<1.0
Toluene	11	9.9
1,1,1-Tri-cl-ethane	<1.0	<1.0
1,1,2-Tri-cl-ethane	<1.0	<1.0
Trichloroethylene	<1.0	<1.0
Tri-cl-f-methane	<1.0	<1.0
Xylene	23	27
Vinyl Chloride	<1.0	<1.0
Lead	0.28	0.09

* ND = not detected or <0.10 PPM

Tank Contents

Analysis (PPM)	Tank 1255	Tank 1256
Volatiles		
Acetone	ND*	ND
Acrylonitrile	ND	ND
Bromoform	ND	ND
Carbon Disulfide	ND	ND
Carbon Tetrachloride	ND	ND
Di-cl-di-f-methane	ND	ND
Chlorobenzene	ND	ND
Chlorodibrmethane	ND	ND
Chloroethane	ND	ND
2-Clethyvinyl Ether	ND	ND
Chloroform	ND	ND
Cyclohexanone	ND	ND
Dichlorobenzene	ND	ND
Di-cl-br-methane	ND	ND
1,1-Dichloroethane	ND	ND
1,2-Dichloroethane	ND	ND
1,1-Dichloroethylene	ND	ND
1,2-Dichloroethylene	ND	ND
1,2-Dichloropropane	ND	ND
1,3-Dichloropropane	ND	ND
Ethyl Acetate	ND	ND
Ethylbenzene	5.0	ND
Ethyl Ether	ND	ND
2-Ethoxyethanol	<1.0	<1.0
Hexane	ND	ND
Isobutanol	<5.0	<5.0
Methyl Bromide	ND	ND
Methyl Chloride	ND	ND
2-Butanone (MEK)	<1.0	<1.0
4-Methyl-2-Pentanone	ND	ND
Methylene Chloride	ND	ND
N-Butylalcohol	<5.0	<5.0
Tri-cl-tri-f-ethane	ND	ND
1,1,2,2-Tet-cl-ethane	ND	ND
Tetrachloroethylene	ND	ND
Toluene	12	ND
1,1,1-Tri-cl-ethane	ND	ND
1,1,2-Tri-cl-ethane	ND	ND
Trichloroethylene	ND	ND
Tri-cl-f-methane	ND	ND
Xylene	63	ND
Vinyl Chloride	ND	ND

TCLP Metals	Tank 1255	Tank 1256
Arsenic	ND	ND
Barium	<1.0	<1.0
Cadmium	ND	ND
Chromium	<0.5	<0.50
Lead	0.92	<0.50
Mercury	<0.01	<0.01
Selenium	ND	ND
Silver	ND	ND
TCLP Volatiles		
Benzene	ND	0.44
Carbon Tetrachloride	ND	ND
Chlorobenzene	ND	ND
Chloroform	ND	ND
1,2-Dichloroethane	ND	ND
1,1-Di-cl-ethylene	ND	ND
2-Butanone (MEK)	<1.0	<1.0
Tetrachloroethylene	ND	ND
Trichloroethylene	ND	ND
Vinyl Chloride	ND	ND
TCLP semi-volatiles		
Pyridine	<2.0	ND
O-Cresol	<2.0	ND
M-Cresol	<2.0	ND
P-Cresol	<2.0	ND
1,4-Dichlorobenzene	<2.0	ND
2,4-Dinitrotoluene	<2.0	ND
Hexachlorobutadiene	<2.0	ND
Hexachloroethane	<2.0	ND
Nitrobenzene	<2.0	ND
Pentachlorophenol	<2.0	ND
2,4,5-Trichlorophenol	<2.0	ND
2,4,6-Trichlorophenol	<2.0	ND
Hexachlorobenzene	<2.0	ND

* ND = not detected or <0.10 PPM

Final In-situ Soils Samples

Analysis (PPM)	Tank 1255 Excavation NW	NE	SE	SW
BTEX Soil				
Benzene	<1	<1	<1	<1
Toluene	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1
Xylene	<1	<1	<1	<1
TPH				
Lo Boil HC	<5.0	<5.0	<5.0	<5.0
Hi Boil HC	19.7	230	<5.0	<5.0
Volatiles				
Acetone	<0.10	<0.10	<0.11	<0.10
Acrylonitrile	<0.01	<0.01	<0.01	<0.01
Bromoform	<0.01	<0.01	<0.01	<0.01
Carbon Disulfide	<0.01	<0.01	<0.01	<0.01
Carbon Tetrachloride	<0.01	<0.01	<0.01	<0.01
Di-cl-di-f-methane	<0.01	<0.01	<0.01	<0.01
Chlorobenzene	<0.01	<0.01	<0.01	<0.01
Cl-di-br-methane	<0.01	<0.01	<0.01	<0.01
Chloroethane	<0.01	<0.01	<0.01	<0.01
2-Clethyvinyl Ether	<0.01	<0.01	<0.01	<0.01
Chloroform	<0.01	<0.01	<0.01	<0.01
Cyclohexanone	<0.01	<0.01	<0.01	<0.01
Dichlorobenzene	<0.01	<0.01	<0.01	<0.01
Di-cl-br-methane	<0.01	<0.01	<0.01	<0.01
1,1-Dichloroethane	<0.01	<0.01	<0.01	<0.01
1,2-Dichloroethane	<0.01	<0.01	<0.01	<0.01
1,1-Dichloroethylene	<0.01	<0.01	<0.01	<0.01
1,2-Dichloroethylene	<0.01	<0.01	<0.01	<0.01
1,2-Dichloropropane	<0.01	<0.01	<0.01	<0.01
1,3-Dichloropropane	<0.01	<0.01	<0.01	<0.01
Ethyl Acetate	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	<0.01	<0.01	<0.01	<0.01
Ethyl Ether	<0.01	<0.01	<0.01	<0.01
2-Ethoxyethanol	ND	ND	ND	ND
Hexane	<0.01	<0.01	<0.01	<0.01
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	<0.01	<0.01	<0.01	<0.01
Methyl Chloride	<0.01	<0.01	<0.01	<0.01
2-Butanone (MEK)	ND	0.20	0.22	0.22
4-Methyl-2-Pentanone	<0.01	0.12	<0.01	<0.01
Methylene Chloride	<0.01	<0.01	<0.01	<0.01
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0
Tri-cl-tri-f-ethane	<0.01	<0.01	<0.01	<0.01
1,1,2,2-Tet-cl-ethane	<0.01	<0.01	<0.01	<0.01
Tetrachloroethylene	<0.01	<0.01	<0.01	<0.01
Toluene	<0.01	<0.01	<0.01	<0.01

Analysis (PPM)	Tank 1255 Excavation NW	NE	SE	SW
1,1,1-Tri-cl-ethane	<0.01	<0.01	<0.01	<0.01
1,1,2-Tri-cl-ethane	<0.01	<0.01	<0.01	<0.01
Trichloroethylene	<0.01	<0.01	<0.01	<0.01
Tri-cl-f-methane	<0.01	<0.01	<0.01	<0.01
Xylene	<0.01	<0.01	<0.01	<0.01
Vinyl Chloride	<0.01	<0.01	<0.01	<0.01
TCLP Metals				
Arsenic	ND	ND	ND	ND
Barium	1.36	1.14	1.07	<1.0
Cadmium	ND	ND	ND	ND
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.01	<0.01	<0.01	<0.01
Selenium	ND	ND	ND	ND
Silver	ND	ND	ND	ND
TCLP Volatiles				
Benzene	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Di-cl-ethylene	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP semi-volatiles				
Pyridine	ND	ND	ND	ND
O-Cresol	ND	ND	ND	ND
M-Cresol	ND	ND	ND	ND
P-Cresol	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND

* ND = not detected or <0.10 PPM

Analysis (PPM)	Tank 1256 Excavation NW	NE	SE	SW
BTEX Soil				
Benzene	<1	<1	<1	<1
Toluene	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1
Xylene	<1	<1	<1	<1
TPH				
Lo Boil HC	2500	<5.0	<5.0	285
Hi Boil HC	<5.0	<5.0	<5.0	<5.0
Volatiles				
Acetone	<1.3	<1.3	<1.3	<1.3
Acrylonitrile	<0.63	<0.63	<0.63	<0.63
Bromoform	<0.63	<0.63	<0.63	<0.63
Carbon Disulfide	<0.63	<0.63	<0.63	<0.63
Carbon Tetrachloride	<0.63	<0.63	<0.63	<0.63
Di-cl-di-f-methane	<0.63	<0.63	<0.63	<0.63
Chlorobenzene	<0.63	<0.63	<0.63	<0.63
Cl-di-br-methane	<0.63	<0.63	<0.63	<0.63
Chloroethane	<0.63	<0.63	<0.63	<0.63
2-Clethyvinyl Ether	<0.63	<0.63	<0.63	<0.63
Chloroform	<0.63	<0.63	<0.63	<0.63
Cyclohexanone	<0.63	<0.63	<0.63	<0.63
Dichlorobenzene	<0.63	<0.63	<0.63	<0.63
Di-cl-br-methane	<0.63	<0.63	<0.63	<0.63
1,1-Dichloroethane	<0.63	<0.63	<0.63	<0.63
1,2-Dichloroethane	<0.63	<0.63	<0.63	<0.63
1,1-Dichloroethylene	<0.63	<0.63	<0.63	<0.63
1,2-Dichloroethylene	<0.63	<0.63	<0.63	<0.63
1,2-Dichloropropane	<0.63	<0.63	<0.63	<0.63
1,3-Dichloropropane	<0.63	<0.63	<0.63	<0.63
Ethyl Acetate	<0.63	<0.63	<0.63	<0.63
Ethylbenzene	<0.63	<0.63	<0.63	<0.63
Ethyl Ether	<0.63	<0.63	<0.63	<0.63
2-Ethoxyethanol	<1.3	<1.3	<1.3	<1.3
Hexane	<0.63	<0.63	<0.63	<0.63
Isobutanol	<5.0	<5.0	<5.0	<5.0
Methyl Bromide	<0.63	<0.63	<0.63	<0.63
Methyl Chloride	<0.63	<0.63	<0.63	<0.63
2-Butanone (MEK)	<1.3	<1.3	<1.3	<3.6
4-Methyl-2-Pentanone	3.1	8.8	<0.63	<0.63
Methylene Chloride	<0.63	<0.63	<0.63	<0.63
N-Butylalcohol	<5.0	<5.0	<5.0	<5.0
Tri-cl-tri-f-ethane	<0.63	<0.63	<0.63	<0.63
1,1,2,2-Tet-cl-ethane	<0.63	<0.63	<0.63	<0.63
Tetrachloroethylene	<0.63	<0.63	<0.63	<0.63
Toluene	<0.63	<0.63	<0.63	<0.63
1,1,1-Tri-cl-ethane	<0.63	<0.63	<0.63	<0.63
1,1,2-Tri-cl-ethane	<0.63	<0.63	<0.63	<0.63

Analysis (PPM)	Tank 1256 Excavation NW	NE	SE	SW
Trichloroethylene	<0.63	<0.63	<0.63	<0.63
Tri-cl-f-methane	<0.63	<0.63	<0.63	<0.63
Xylene	<0.63	<0.63	<0.63	<0.63
Vinyl Chloride	<0.63	<0.63	<0.63	<0.63
TCLP Metals				
Arsenic	ND*	ND	ND	ND
Barium	1.46	1.57	1.47	1.45
Cadmium	ND	ND	ND	ND
Chromium	<0.50	<0.50	<0.50	<0.50
Lead	<0.50	<0.50	<0.50	<0.50
Mercury	<0.01	<0.01	<0.01	<0.01
Selenium	ND	ND	ND	ND
Silver	ND	ND	ND	ND
TCLP Volatiles				
Benzene	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Di-cl-ethylene	ND	ND	ND	ND
2-Butanone (MEK)	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
TCLP semi-volatiles				
Pyridine	ND	ND	ND	ND
O-Cresol	ND	ND	ND	ND
M-Cresol	ND	ND	ND	ND
P-Cresol	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND

* ND = not detected or <0.10 PPM

5.0 Disposal of Materials

All soil removed from tank excavations at the N-94 site were placed back in the excavation as directed by the Navy. Certifications and disposal manifests for the Tanks 1255, and 1256 are included in Appendix F. Certifications and disposal manifests for the tank contents are included in Appendix G.

6.0 Warranties and Limitations

This report certifies that the storage tanks were closed in accordance with federal and state regulations and Millington Naval Air Station's contract specifications. No certification is given that all environmental contaminants have been removed from the site because of the limitations of the type of representative sampling that was required and performed for this kind of work.

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank #1255 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ____ NO XX

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ____

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Liquid was taken by Laidlaw Environmental for disposal. Sludge stored in 17H DOT drums and will be disposed of with sludge from all N-94 tanks.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ____

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ____

12. If yes, was water sampled? Yes ____ No XX If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 600 CY

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes XX No ____

20. Were all samples stored in proper sampling containers? Yes XX No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes XX No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) ____

Signature: ____

close/disk2

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank #1256 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ____ NO XX

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ____

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Liquid was taken by Laidlaw Environmental for disposal. Sludge stored in 17H DOT drums and will be disposed of with sludge from all N-94 tanks.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ____

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ____

12. If yes, was water sampled? Yes ____ No XX If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 600 CY

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes YY No ____

20. Were all samples stored in proper sampling containers? Yes YY No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes YY No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) _____

Signature: _____

close/disk2

A WEEK ENDING 11-11-91

UNDERGROUND STORAGE TANKS REMOVAL, NAS MEMPHIS, SUBMITTALS LOGS ( )

	TANK #	GALLONS SPEC'D	ON-SITE CALCULATED	ACTUAL PUMPED	
1	TANK 302	420 GAL	6198 GAL		1
2	TANK 1250	160 GAL	929 GAL		2
3	TANK 1251	12,400 GAL	24,881 GAL		3
4	TANK 1252	2,000 GAL	24,804 GAL		4
5	TANK 1253	120 GAL	14,907 GAL		5
6	TANK 1254	100 GAL	929 GAL		6
7	TANK 1255	930 GAL	24,881 GAL		7
8	TANK 1256	1070 GAL	22,293 GAL		8
9	TANK 1257	2,250 GAL	5275 GAL		9
10	TANK 1258	2,300 GAL	5275 GAL		10
11	TANK 1	570 GAL	502 GAL		11
12	TANK 2	580 GAL	513 GAL		12
13	TANK 3	570 GAL	561 GAL		13
14	TANK 4	560 GAL	525 GAL		14
15	TANK 5	560 GAL	-PLUGGED.		15
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Contract N62467-90-C-0683
Underground Storage Tank Closure Report
Tank nos. 1257 and 1258
(SD-84)

Naval Air Station Memphis
Millington, TN

National Salvage & Service Corp.
243 E. Winslow Road
Bloomington, IN 47401

April 22, 1992

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Certifications and Manifests for the Contents of Tanks 1257 and 1258.

1.0 Introduction

The purpose of this report is to provide documentation that the underground storage tank listed below at the Naval Air Station was properly removed and closed as required by the applicable Tennessee state regulations and the Navy's contract specifications. Permanent closure report forms are located in Appendix A.

Navy Tank No.: Tank 1257

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: March 6, 1992

Navy Tank No.: Tank 1258

Location: Adjacent to Building N-94
Description: 25,000 gal. steel tank
Contents: Water with petroleum sheen
Removal date: March 6, 1992

2.0 Description of Work Performed

Before work began on the tanks, the fluid levels were measured and tank volumes were calculated. Tanks 1257 and 1258 were specified to contain 2,250 and 2,306 gallons respectively. After measurement, the volume of tank contents were determined to be 5,275 gallons for each tank (Appendix B).

Prior to excavation, rainwater that had collected in the tank vaults and the tanks contents were pumped into trucks and disposed of as a hazardous waste liquid.

Excavation began to expose Tank 1257 first, then Tank 1258. After the tanks were completely exposed a crane was used to lift the tanks from the excavation.

Tank gasses were purged using 1.5 lbs. of dry ice (carbon dioxide) for every 100 gallons of tank volume. The tank gasses were checked with a combustible gas indicator (CGI). When no combustible gasses were detected a hole was cut in the tank with non-explosive pneumatic nibblers and the tank was cleaned. Sludge was removed from the tank and stored in drums using a Tornado drum vacuum and an aluminum squeegee. The tanks were then labeled and taken to Hutcherson Recycling for disposal.

cause of the nature of the N-94 site, the State of Tennessee ve permission for the Navy to backfill all excavations in e N-94 area with contaminated soil until further vestigations could be made. The excavated soil was erefore stockpiled at the excavation site and was not field ecked with the HNU photoionization detector (PID).

oil samples were taken from the excavations immediately after ank removal. The excavations were then backfilled using ontaminated soil from the excavation, as directed by the avy.

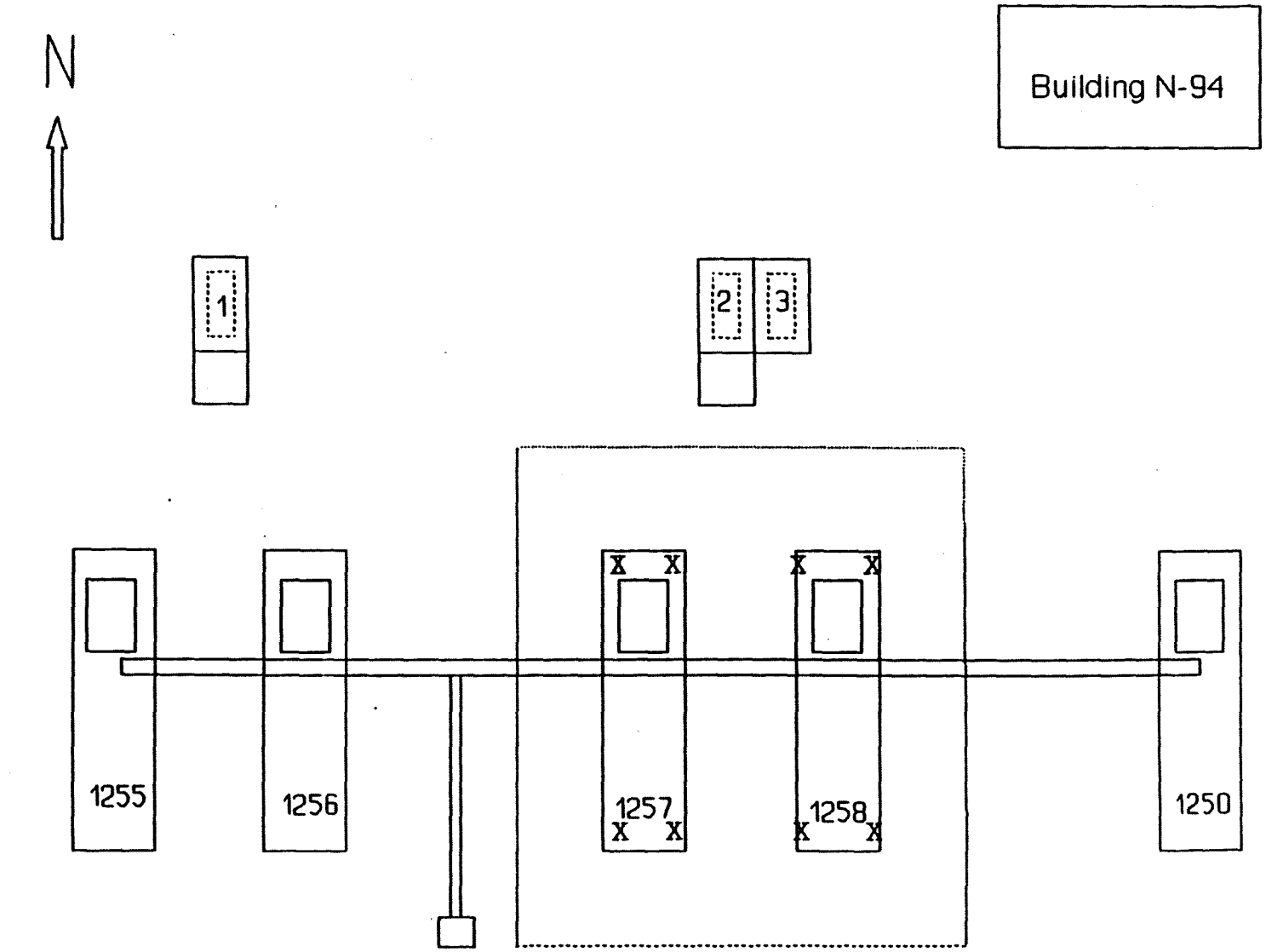
ampling

Contaminated water from Tank 1257 was sampled first. The sample was a composite combined with samples from Tanks 1255 and 1256. The sample was collected using a stainless steel bomb sampler. Permission was granted for additional analysis so a sample of contaminated water was taken from Tank 1257. A composite and the oil and water phases of the contents of Tank 1258 were also sampled for additional analysis.

Each sample consisted of one liter of liquid collected in an amber glass bottle with a teflon lined lid, plus one liter collected in the same way but with a nitric acid preservative supplied with the bottle from the laboratory, plus two clear glass vials for volatile organic analysis. Samples were collected using sterile gloves which were disposed of between samples. Bottles were labeled in the field and a chain of custody form was submitted with each shipment. Samples were shipped in coolers and iced to 4 degrees Celsius.

Because permission was given by the State to backfill the excavations with contaminated soil, the soil from the excavation was not sampled or field checked with the HNU photoionization detector (PID).

Soil samples from the excavation pit were collected the corners of each tank (8 samples). Samples were collected as grab samples from the excavator bucket and packed in clear glass jars with Teflon lined lids. The sample locations are identified on the following map.


N
Building N-94
1
2
3
1255
1256
1257
1258
1250
X = Sample locations
* Not To Scale

lytical Results

ll samples were shipped to Specialized Assays Environmental n Nashville Tennessee, a Navy approved and certified aboratory. Samples were analyzed using approved EPA methods or soil and water. The initial solvent scan on the tank ontents analyzed for total lead, PCBs, BTU, flashpoint, olatile and semi-volatile organic compounds, and reactive ompounds.

dditional analyses on the oil and water phases in the tanks ncluded flashpoint, volatile organic compounds, total lead, and BTU for the oil phase. TCLP analysis run on the samples ncluded metals, volatiles, semi-volatiles.

Final in-situ materials were analyzed for flashpoint, BTEX, TPH, volatile organic compounds, and TCLP analysis for metals, volatiles, and semi-volatiles. The results of the analysis are summarized in the following tables. Laboratory reports are included in Appendices C, D, and E respectively.

Tank Contents 1257-1258

Analysis (PPM)	1257	1258
TCLP Metals		
Arsenic	<0.10	<0.10
Barium	<1.0	<1.0
Cadmium	<0.10	<0.10
Chromium	<0.50	<0.50
Lead	<0.50	<0.50
Mercury	<0.010	<0.010
Selenium	<0.10	<0.10
Silver	<0.10	<0.10
TCLP Volatiles		
Benzene	<0.10	0.90
Carbon Tetrachloride	<0.10	<0.10
Chlorobenzene	<0.10	<0.10
Chloroform	<0.10	<0.10
1,2-Dichloroethane	<0.10	<0.10
1,1-Di-cl-ethylene	<0.10	<0.10
2-Butanone (MEK)	<1.0	<1.0
Tetrachloroethylene	<0.10	<0.10
Trichloroethylene	<0.10	<0.10
Vinyl Chloride	<0.10	<0.10
TCLP semi-volatiles		
Pyridine	<0.10	<0.10
O-Cresol	<0.10	<0.10
M-Cresol	<0.10	<0.10
P-Cresol	<0.10	<0.10
1,4-Dichlorobenzene	<0.10	<0.10
2,4-Dinitrotoluene	<0.10	<0.10
Hexachlorobutadiene	<0.10	<0.10
Hexachloroethane	<0.10	<0.10
Nitrobenzene	<0.10	<0.10
Pentachlorophenol	<0.10	<0.10
2,4,5-Trichlorophenol	<0.10	<0.10
2,4,6-Trichlorophenol	<0.10	<0.10
Hexachlorobenzene	<0.10	<0.10
Volatiles		
Acetone	<0.10	<0.10
Acrylonitrile	<0.10	<0.10
Bromoform	<0.10	<0.10
Carbon Disulfide	<0.10	<0.10
Carbon Tetrachloride	<0.10	<0.10
Di-cl-di-f-methane	<0.10	<0.10
Chlorobenzene	<0.10	<0.10
Cl-di-br-methane	<0.10	<0.10
Chloroethane	<0.10	<0.10
2-Clethyvinyl Ether	<0.10	<0.10
Chloroform	<0.10	<0.10

Analysis (PPM)	1257	1258
Cyclohexanone	<0.10	<0.10
Dichlorobenzenes	<0.10	<0.10
Di-cl-br-methane	<0.10	<0.10
1,1-Dichloroethane	<0.10	<0.10
1,2-Dichloroethane	<0.10	<0.10
1,1-Dichloroethylene	<0.10	<0.10
1,2-Dichloroethylene	<0.10	<0.10
1,2-Dichloropropane	<0.10	<0.10
1,3-Dichloropropane	<0.10	<0.10
Ethyl Acetate	<0.10	<0.10
Ethylbenzene	<0.10	0.67
Ethyl Ether	<0.10	<0.10
2-Ethoxyethanol	<1.0	<1.0
Hexane	<0.10	<0.10
Isobutanol	<5.0	<5.0
Methyl Bromide	<0.10	<0.10
Methyl Chloride	<0.10	<0.10
2-Butanone (MEK)	<1.0	<1.0
4-Methyl-2-Pentanone	<0.10	<0.10
Methylene Chloride	<0.10	<0.10
N-Butylalcohol	<5.0	<5.0
Tri-cl-tri-f-ethane	<0.10	<0.10
1,1,2,2-Tet-cl-ethane	<0.10	<0.10
Tetrachloroethylene	<0.10	<0.10
Toluene	0.87	9.5
1,1,1-Tri-cl-ethane	<0.10	<0.10
1,1,2-Tri-cl-ethane	<0.10	<0.10
Trichloroethylene	<0.10	<0.10
Tri-cl-f-methane	<0.10	<0.10
Xylene	2.4	3.6
Vinyl Chloride	<0.10	<0.10

Tank Contents - Oil Layer/Composite 1255-1256-1257

Analysis (PPM)	
Lead	342
PCB's	<2.0
BTU's	19000
Flash Point	<70° F
Reactivity Test	
Reactive Cyanide	<2.0
Reactive Sulfide	<2.0
Volatiles	
Acetone	<1.0
Acylonitrile	<1.0
Bromoform	<1.0
Carbon Disulfide	<1.0
Carbon Tetrachloride	<1.0
Di-cl-di-f-methane	<1.0
Chlorobenzene	<1.0
Cl-di-br-methane	<1.0
Chloroethane	<1.0
2-Clethyvinyl Ether	<1.0
Chloroform	<1.0
Cyclohexanone	<1.0
Dichlorobenzene	<1.0
Di-cl-br-methane	<1.0
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<1.0
1,1-Dichloroethylene	<1.0
1,2-Dichloroethylene	<1.0
1,2-Dichloropropane	<1.0
1,3-Dichloropropane	<1.0
Ethyl Acetate	<1.0
Ethylbenzene	1100
Ethyl Ether	<1.0
2-Ethoxyethanol	<1.0
Hexane	<1.0
Isobutanol	<50.0
Methyl Bromide	<1.0
Methyl Chloride	<1.0
2-Butanone (MEK)	<1.0
4-Methyl-2-Pentanone	3400
Methylene Chloride	<1.0
N-Butylalcohol	<100
Tri-cl-tri-f-ethane	<1.0
1,1,2,2-Tet-cl-ethane	<1.0
Tetrachloroethylene	<1.0
Toluene	5500
1,1,1-Tri-cl-ethane	<1.0
1,1,2-Tri-cl-ethane	<1.0

Analysis (PPM)	
Trichloroethylene	<1.0
Tri-cl-f-methane	<1.0
Xylene	11000
Vinyl Chloride	<1.0
Acid Organics	
2-Chlorophenol	<500
2,4 Dichlorophenol	<500
2,4 Dimethylphenol	<500
2,4 Dinitrophenol	<500
2-Nitrophenol	<500
4-Nitrophenol	<500
P-chloro-m-cresol	<500
Pentachlorophenol	<500
Phenol	<500
2,4,6-Tri cl phenol	<500
Base Neutrals	
Acenapthene	<500
Acenapthtylene	<500
Anthracene	<500
Benzidine	<500
Benzo(a)anthracene	<500
Benzo(a)pyrene	<500
Benzo(b)fluoranthene	<500
Benzo(ghi)perylene	<500
Benzo(k)fluoranthene	<500
Bis-2-cl-ethox-metha	<500
Bis(2-cl-ethyl)ether	<500
Bis(2-cl-isopro)ether	<500
Bis(2-eth-hex)phthal	<500
4-Br-phen-phen-ether	<500
Butyl-benz-pthalate	<500
2-Chloronapthalene	<500
4-Cl-phen-phen-ether	<500
Chrysene	<500
Dibenz(a,h)anthracen	<500
1,2-Dichlorobenzene	<500
1,3-Dichlorobenzene	<500
1,4-Dichlorobenzene	<500
3,3-Dichlorobenzidine	<500
Diethyl Phthalate	<500
Dimethyl Phthalate	<500
Benzo(e)pyrene	<500
Di-n-butyl Phthalate	<500
2,4-Dinitrotoluene	<500
2,6-Dinitrotoluene	<500
Di-n-octyl phthalate	<500
1,2-Diphen-hydrazine	<500
Fluoranthene	<500
Fluorene	<500

ysis (PPM)	
chlorobenzene	<500
chlorobutadiene	<500
clcyclopentadiene	<500
chloroethane	<500
eno (1,2,3-cd)pyr	<500
phorone	<500
hthalene	760
robenzene	<500
it-deimethylamine	<500
it-dinpropylamine	<500
it-diphenylamine	<500
enanthrene	<500
2,4-Trichlorobenz	<500

Tank Contents - Water Phase

Analysis (PPM)	Tank 1257	Tank 1258
Flashpoint	*	Room Temp
Total Lead	0.27	0.72
Volatiles		
Acetone	ND**	<1.0
Acrylonitrile	ND	<1.0
Bromoform	ND	<1.0
Carbon Disulfide	ND	<1.0
Carbon Tetrachloride	ND	<1.0
Di-cl-di-f-methane	ND	<1.0
Chlorobenzene	ND	<1.0
Cl-di-br-methane	ND	<1.0
Chloroethane	ND	<1.0
2-Clethyvinyl Ether	ND	<1.0
Chloroform	ND	<1.0
Cyclohexanone	ND	<1.0
Dichlorobenzenes	ND	<1.0
Di-cl-br-methane	ND	<1.0
1,1-Dichloroethane	ND	<1.0
1,2-Dichloroethane	ND	<1.0
1,1-Dichloroethylene	ND	<1.0
1,2-Dichloroethylene	ND	<1.0
1,2-Dichloropropane	ND	<1.0
1,3-Dichloropropane	ND	<1.0
Ethyl Acetate	ND	<1.0
Ethylbenzene	ND	2.8
Ethyl Ether	ND	<1.0
2-Ethoxyethanol	ND	<1.0
Hexane	ND	<1.0
Isobutanol	<5.0	<5.0
Methyl Bromide	ND	<1.0
Methyl Chloride	ND	<1.0
2-Butanone (MEK)	ND	<1.0
4-Methyl-2-Pentanone	ND	8.9
Methylene Chloride	ND	<1.0
N-Butylalcohol	<5.0	<5.0
Tri-cl-tri-f-ethane	ND	<1.0
1,1,2,2-Tet-cl-ethane	ND	<1.0
Tetrachloroethylene	ND	<1.0
Toluene	ND	23
1,1,1-Tri-cl-ethane	ND	<1.0
1,1,2-Tri-cl-ethane	ND	<1.0
Trichloroethylene	ND	<1.0
Tri-cl-f-methane	ND	<1.0
Xylene	.13	19
Vinyl Chloride	ND	<1.0

* sample heated to 160 degrees Fahrenheit without ignition
** ND = not detected or <0.010 PPM

Final In-situ Soils Samples

Analysis (PPM)	Tank 1257 Excavation NW	NE	SE	SW
BTEX Soil				
Benzene	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	<1.0	<1.0	<1.0	<1.0
Xylene	10.1	7.26	26.6	20.9
TPH				
Lo Boil HC	5960	3580	5330	2670
Hi Boil HC	<5.0	<5.0	<5.0	<5.0
Volatiles				
Acetone	9.8	12	<1.3	19
Acrylonitrile	<0.63	<0.63	<0.63	<0.63
Bromoform	<0.63	<0.63	<0.63	<0.63
Carbon Disulfide	<0.63	<0.63	<0.63	<0.63
Carbon Tetrachloride	<0.63	<0.63	<0.63	<0.63
Di-cl-di-f-methane	<0.63	<0.63	<0.63	<0.63
Chlorobenzene	<0.63	<0.63	<0.63	<0.63
Cl-di-br-methane	<0.63	<0.63	<0.63	<0.63
Chloroethane	<0.63	<0.63	<0.63	<0.63
2-Clethyvinyl Ether	<0.63	<0.63	<0.63	<0.63
Chloroform	<0.63	<0.63	<0.63	<0.63
Cyclohexanone	<0.63	<0.63	<0.63	<0.63
Dichlorobenzenes	<0.63	<0.63	<0.63	<0.63
Di-cl-br-methane	<0.63	<0.63	<0.63	<0.63
1,1-Dichloroethane	<0.63	<0.63	<0.63	<0.63
1,2-Dichloroethane	<0.63	<0.63	<0.63	<0.63
1,1-Dichloroethylene	<0.63	<0.63	<0.63	<0.63
1,2-Dichloroethylene	<0.63	<0.63	<0.63	<0.63
1,2-Dichloropropane	<0.63	<0.63	<0.63	<0.63
1,3-Dichloropropane	<0.63	<0.63	<0.63	<0.63
Ethyl Acetate	<0.63	<0.63	<0.63	<0.63
Ethylbenzene	<0.63	<0.63	<0.63	<0.63
Ethyl Ether	<0.63	<0.63	<0.63	<0.63
2-Ethoxyethanol	<1.3	<1.3	<1.3	<1.3
Hexane	<0.63	<0.63	<0.63	<0.63
Isobutanol	<10	<10	<10	<10
Methyl Bromide	<0.63	<0.63	<0.63	<0.63
Methyl Chloride	<0.63	<0.63	<0.63	<0.63
2-Butanone (MEK)	<1.3	<1.3	<1.3	<1.3
4-Methyl-2-Pentanone	<0.63	<0.63	<0.63	<0.63
Methylene Chloride	<0.63	<0.63	<0.63	<0.63
N-Butylalcohol	<10	<10	<10	<10
Tri-cl-tri-f-ethane	<0.63	<0.63	<0.63	<0.63
1,1,2,2-Tet-cl-ethane	<0.63	<0.63	<0.63	<0.63
Tetrachloroethylene	<0.63	<0.63	<0.63	<0.63
Toluene	<0.63	<0.63	<0.63	<0.63

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank #1257 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ____ No XX

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ____

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Liquid was taken by Laidlaw Environmental for disposal. Sludge stored in 17H DOT drums and will be disposed of with sludge from all N-94 tanks.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ____

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ____

12. If yes, was water sampled? Yes ____ No XX If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 600 CY

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes XX No ____

20. Were all samples stored in proper sampling containers? Yes XX No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes XX No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) ____

Signature: ____

close/disk2

DIVISION OF UNDERGROUND STORAGE TANKS
PERMANENT CLOSURE REPORT FORM

Directions: Please address the following questions in detail. Attach extra sheets if necessary. This form must be completed and submitted with the laboratory report forms.

1. Facility ID#: Tank # 1258 (Unregistered)

2. Facility Name: Millington Naval Air Station, Building N-94

3. Did you notify this Divison one working day prior to taking the soil samples for the closure? Yes ____ NO XX

4. Was the tank atmosphere and the work zone regularly tested with a combustible gas indicator in accordance with Appendix 5 Part (3) of the UST regulations? Yes XX No ____

5. Describe how the tank(s) was purged: Purged with 1.5 lbs of dry ice (carbon dioxide) for every 100 gallons of tank volume.

6. Describe how all liquids and sludges were removed from the tank(s): liquids pumped with a pneumatic diaphram pump, sludge removed with a Tornado drum vac and aluminum squeegee.

7. Describe how all liquids and sludges were stored and disposed of: Liquid was taken by Laidlaw Environmental for disposal. Sludge stored in 17H DOT drums and will be disposed of with sludge from all N-94 tanks.

8. If the tank(s) was removed, was it labeled in accordance with Appendix 5 Part (4)(f) of the UST regulations?
Yes XX No ____

9. How and where was the tank(s) disposed of? taken by Industrial Crane to Hutcherson Metals, Inc. for recycling.

10. Was bedrock encountered during tank abandonment/closure?
Yes ____ No XX

11. Was water encountered in the tank pit during the tank abandonment activities? Yes XX No ____

12. If yes, was water sampled? Yes ____ No XX If yes, please attach the results.

13. Was obviously contaminated soil encountered during the tank abandonment (i.e. discolored soil, soil with a hydrocarbon odor, etc.)? Yes XX No ____

14. Did you excavate more than 10 feet from any edge of the tank(s)? Yes ____ No XX

15. If yes, who did you notify with this Division? N/A

16. When did you make the notification? N/A

17. How much soil was removed during the tank abandonment procedure (cubic yards)? 600 CY

18. What was done with this soil after it was removed from the tank excavation? (Any soil removed from a tank pit excavation will be considered contaminated until proven otherwise through laboratory analyses.) All soil was stockpiled at the site and returned to the excavation (see closure report)

19. Were all samples cooled to a proper temperature when received by the lab? Yes YY No ____

20. Were all samples stored in proper sampling containers? Yes YY No ____

21. Were the sampling containers properly prepared prior to the samples being taken? Yes YY No ____

All results from the analyses of all samples must be submitted with this report. Attach the original or carbon copies of the laboratory report forms, photostatic copies will not be accepted. The facility's name and ID# must be provided to the laboratory and printed on each sheet.

I certify that I have examined and am familiar with the information in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and Official Title of
Owner or Owner's Authorized
Representative (Print) ____

Signature: ____

close/disk2

week Ending 11-17-91

UNDERGROUND STORAGE TANKS REMOVAL, NAS MEMPHIS, SUBMITTALS LOGS ( )

	TANK #	GALLONS SPEC'D	ON-SITE CALCULATED	ACTUAL PUMPED	
1	TANK 302	420 GAL	6198 GAL		1
2	TANK 1250	160 GAL	929 GAL		2
3	TANK 1251	12,400 GAL	24,881 GAL		3
4	TANK 1252	2,000 GAL	84,804 GAL		4
5	TANK 1253	120 GAL	14,907 GAL		5
6	TANK 1254	100 GAL	929 GAL		6
7	TANK 1255	930 GAL	24,881 GAL		7
8	TANK 1256	1070 GAL	22,293 GAL		8
9	TANK 1257	2,250 GAL	5275 GAL		9
10	TANK 1258	2,300 GAL	5275 GAL		10
11	TANK 1	570 GAL	502 GAL		11
12	TANK 2	580 GAL	513 GAL		12
13	TANK 3	570 GAL	561 GAL		13
14	TANK 4	560 GAL	529 GAL		14
15	TANK 5	560 GAL	-PLUGGED-		15
16	TANK 6	560 GAL	502 GAL		16
17	TANK 303				17
18	TANK 1241				18
19	TANK 7				19
20	TANK S-75N				20
21	TANK S-75W				21
22	TANK 1244				22
23	TANK 1245				23
24	TANK 1246				24
25	TANK 1565				25
26	TANK 1566				26
27	TANK 1618				27
28	TANK S-8				28
29	TANK 553				29
30	TANK S-50				30
31	TANK S-54				31
32	TANK S-56				32
33	TANK 1594				33
34	TANK 1205N	700 GL	632		34
35	TANK 1205S	1000 GL	52		35
36	TANK N-10	80	2.53		36
37	TANK N-100				37
38					38
39					39
40					40
41					41
42					42
43					43
44					44
45					45
46					46
47					47
48					48
49					49
50					50
51					51
52					52

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 10

To MARK TAYLOR	From T. BARKER
Co SODIV	Co. NAS MEMPHIS
Dept.	Phone # AV 966-5207
Fax # AV 563-0563	Fax #

OF THE NAVY
HANGE OF CONSTRUCTION
AIR STATION MEMPHIS
NNESSEE 38054-0007
AUTOVON 966-5478
A/V 966-5788

Code R-10/MJ
900683K
25 Feb 1992

MEMORANDUM

From: RDICC
To: Public Works Engineering, attn: Tanya Barker

Subj: UNDERGROUND STORAGE TANK REMOVAL AT N-94

Encl: (1) TCLP/GCMS analysis for Frac Tank R-1
(2) TCLP/GCMS analysis for Frac Tank 33
(3) TCLP/GCMS analysis for Frac Tank 46

1. Enclosed are the lab analysis for the three (3) 22,000 gallon portable storage tanks used to store rainwater collected in the excavation pits at N-94.

2. We are request permission to pump the contents of the above listed tanks into the drainage ditch located just west of the N-94 site.

3. Please respond as soon as possible.

G. R. STEVENSON

SPECIALIZED ASSAYS
ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

Specimen	Specimen ID	Acces
FRAC TANK #46 (RAINWATER)	92823259	92 823

Collection Date	Time	Recei
02/17/92	00:00	02/18

Referring Client	Client ID	Repor
BRYAN CAVINS		02/24

Test	Result	Units	Reference Limit
2,4,6-TRI CL PHENOL	ND		
HEXACHLOROBENZENE	ND		
VOLATILES			
ACETONE	<1.0	PPM	
ACRYLONITRILE	<0.10	PPM	
BROMOFORM	<0.10	PPM	
CARBON DISULFIDE	<0.10	PPM	
CARBON TETRACHLORIDE	<0.10	PPM	
DI-CL-DI-F-METHANE	<0.10	PPM	
CHLOROBENZENE	<0.10	PPM	
CHLORODIBRMETHANE	<0.10	PPM	
CHLOROETHANE	<0.10	PPM	
2-CLETHYVINYL ETHER	<0.10	PPM	
CHLOROFORM	<0.10	PPM	
CYCLOHEXANONE	<0.10	PPM	
DICHLOROBENZENES	<0.10	PPM	
DI-CL-BR-METHANE	<0.10	PPM	
1-1-DICHLOROETHANE	<0.10	PPM	
1,2-DICHLOROETHANE	<0.10	PPM	
1,1-DI-CL-ETHYLENE	<0.10	PPM	
1,2-DICHLOROETHYLENE	<0.10	PPM	
1,2-DICHLOROPROPANE	<0.10	PPM	
1,3-DICHLOROPROPENE	<0.10	PPM	
ETHYL ACETATE	<0.10	PPM	
ETHYLBENZENE	<0.10	PPM	
ETHYL ETHER	<0.10	PPM	
2-ETHOXYETHANOL	<1.0	PPM	
HEXANE	<0.10	PPM	
ISOBUTANOL	<5.0	PPM	
METHYL BROMIDE	<0.10	PPM	
METHYL CHLORIDE	<0.10	PPM	
2-BUTANONE (MEK)	<0.10	PPM	
4-METHYL-2-PENTANONE	<1.0	PPM	
METHYLENE CHLORIDE	<0.10	PPM	
N-BUTYLALCOHOL	<5.0	PPM	
TRI-CL-TRI-F-ETHANE	<0.10	PPM	

NATIONAL SALVAGE SERVICE CO.
ATT. MARY GUIDEN
243 E. WINSLOW RD.
BLOOMINGTON IN 47401 4704

SPECIALIZED ASSAYS
ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

Specimen	Specimen ID	Acce
FRAC TANK #46 (RAINWATER)	92823259	92 82

Collection Date	Time	Rece
02/17/92	00:00	02/1

Referring Client	Client ID	Repo
BRYAN CAVINS		02/2

Test	Result	Units	Reference Limi
TCLP METALS			
ARSENIC	<0.10	PPM	
BARIUM	<1.0	PPM	
CADMIUM	<0.10	PPM	
CHROMIUM, TOTAL	<0.50	PPM	
LEAD	<0.50	PPM	
MERCURY	<0.010	PPM	
SELENIUM	<0.10	PPM	
SILVER	<0.10	PPM	
TCLP VOLATILES			
METHOD NUMBER	8240		
QUANTITATION LIMIT	0.10	PPM	
BENZENE	ND		
CARBON TETRACHLORIDE	ND		
CHLOROBENZENE	ND		
CHLOROFORM	ND		
1,2-DICHLOROETHANE	ND		
1,1-DI-CL-ETHYLENE	ND		
2-BUTANONE (MEK)	<1.0	PPM	
TETRACHLOROETHYLENE	ND		
TRICHLOROETHYLENE	ND		
VINYL CHLORIDE	ND		
TCLP EXTRACTABLES			
METHOD NUMBER	8270		
QUANTITATION LIMIT	0.10	PPM	
PYRIDINE	ND		
O-CRESOL	ND		
M-CRESOL	ND		
P-CRESOL	ND		
1,4-DICHLOROBENZENE	ND		
2,4-DINITROTOLUENE	ND		
HEXACHLOROBUTADIENE	ND		
HEXACHLOROETHANE	ND		
NITROBENZENE	ND		
PENTACHLOROPHENOL	ND		
2,4,5-TRICHLORPHENOL	ND		

NATIONAL SALVAGE SERVICE CO.
ATT. MARY GUIDEN
243 E. WINSLOW RD.
BLOOMINGTON IN 47401 4704

ENCL(3)

SPECIALIZED ASSAYS
ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

Specimen	Specimen ID	Access
FRAC TANK #46 (RAINWATER)	92823259	92 8232

Collection Date	Time	Recei
02/17/92	00:00	02/18/

Referring Client	Client ID	Report
BRYAN CAVINS		02/24/

Test	Result	Units	Reference Limits
1,1,2.2 TET CL ETHAN	<0.10	PPM	
TETRACHLOROETHYLENE	<0.10	PPM	
TOLUENE	<0.10	PPM	
1,1,1-TRI-CL-ETHANE	<0.10	PPM	
1,1,2-TRI-CL-ETHANE	<0.10	PPM	
TRICHLOROETHYLENE	<0.10	PPM	
TRI-CL-F-METHANE	<0.10	PPM	
XYLENE	<0.10	PPM	
VINYL CHLORIDE	<0.10	PPM	

NATIONAL SALVAGE SERVICE CO.
ATT. MARY GUIDEN
243 E. WINSLOW RD.

SPECIALIZED ASSAYS
ENVIRONMENTAL
800 12th Ave. S.
Nashville, TN 37203

Specimen	Specimen ID	Access
FRAC TANK #R1 (RAINWATER)	92823257	92 8232

Collection Date	Time	Recei\
02/17/92	00:00	02/18/

Referring Client	Client ID	Report
BRYAN CAVINS		02/24/

Test	Result	Units	Reference Limits
TCLP METALS			
ARSENIC	<0.10	PPM	
BARIUM	<1.0	PPM	
CADMIUM	<0.10	PPM	
CHROMIUM, TOTAL	<0.50	PPM	
LEAD	<0.50	PPM	
MERCURY	<0.010	PPM	
SELENIUM	<0.10	PPM	
SILVER	<0.10	PPM	
TCLP VOLATILES			
METHOD NUMBER	8240		
QUANTITATION LIMIT	0.10	PPM	
BENZENE	ND		
CARBON TETRACHLORIDE	ND		
CHLOROBENZENE	ND		
CHLOROFORM	ND		
1,2-DICHLOROETHANE	ND		
1,1-DI-CL-ETHYLENE	ND		
2-BUTANONE (MEK)	2.3	PPM	
TETRACHLOROETHYLENE	ND		
TRICHLOROETHYLENE	ND		
VINYL CHLORIDE	ND		
TCLP EXTRACTABLES			
METHOD NUMBER	8270		
QUANTITATION LIMIT	0.10	PPM	
PYRIDINE	ND		
O-CRESOL	ND		
M-CRESOL	ND		
P-CRESOL	ND		
1,4-DICHLOROBENZENE	ND		
2,4-DINITROTOLUENE	ND		
HEXACHLOROBUTADIENE	ND		
HEXACHLOROETHANE	ND		
NITROBENZENE	ND		
PENTACHLOROPHENOL	ND		
2,4,5-TRICHLORPHENOL	ND		

NATIONAL SALVAGE SERVICE CO. Telephone: 812 339 9000
ATT. MARY GUIDEN
243 E. WINSLOW RD.
BLOOMINGTON IN 47401 4704

FROM SPECIALIZED ASSAYS ENVIORMENTAL 02.24.1992 13:23

SPECIALIZED ASSAYS
ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

Specimen	Specimen ID	Access
FRAC TANK #R1 (RAINWATER)	92823257	92 823

Collection Date	Time	Recei
02/17/92	00:00	02/18

Referring Client	Client ID	Repor
BRYAN CAVINS		02/24

Test	Result	Units	Reference Limit
2,4,6-TRI CL PHENOL	ND		
HEXACHLOROBENZENE	ND		
VOLATILES			
ACETONE	<1.0	PPM	
ACRYLONITRILE	<0.10	PPM	
BROMOFORM	<0.10	PPM	
CARBON DISULFIDE	<0.10	PPM	
CARBON TETRACHLORIDE	<0.10	PPM	
DI-CL-DI-F-METHANE	<0.10	PPM	
CHLOROBENZENE	<0.10	PPM	
CHLORODIBRMETHANE	<0.10	PPM	
CHLOROETHANE	<0.10	PPM	
2-CLETHYVINYL ETHER	<0.10	PPM	
CHLOROFORM	<0.10	PPM	
CYCLOHEXANONE	<0.10	PPM	
DICHLOROBENZENES	<0.10	PPM	
DI-CL-BR-METHANE	<0.10	PPM	
1-1-DICHLOROETHANE	<0.10	PPM	
1,2-DICHLOROETHANE	<0.10	PPM	
1,1-DI-CL-ETHYLENE	<0.10	PPM	
1,2-DICHLOROETHYLENE	<0.10	PPM	
1,2-DICHLOROPROPANE	<0.10	PPM	
1,3-DICHLOROPROPENE	<0.10	PPM	
ETHYL ACETATE	<0.10	PPM	
ETHYLBENZENE	<0.10	PPM	
ETHYL ETHER	<0.10	PPM	
2-ETHOXYETHANOL	<1.0	PPM	
HEXANE	<0.10	PPM	
ISOBUTANOL	<5.0	PPM	
METHYL BROMIDE	<0.10	PPM	
METHYL CHLORIDE	<0.10	PPM	
2-BUTANONE (MEK)	2.3	PPM	
4-METHYL-2-PENTANONE	<0.10	PPM	
METHYLENE CHLORIDE	<0.10	PPM	
N-BUTYLALCOHOL	<5.0	PPM	
TRI-CL-TRI-F-ETHANE	<0.10	PPM	

NATIONAL SALVAGE SERVICE CO. Telephone: 812 339 9000
ATT. MARY GUIDEN
243 E. WINSLOW RD.
BLOOMINGTON IN 47401

ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

FRAC TANK #R1 (RAINWATER) 92823257 92 B23

Collection Date	Time	Recei
02/17/92	00:00	02/18

Referring Client	Client ID	Repor
BRYAN CAVINS		02/24

Test	Result	Units	Reference Limit
1,1,2,2 TET CL ETHAN	<0.10	PPM	
TETRACHLOROETHYLENE	<0.10	PPM	
TOLUENE	<0.10	PPM	
1,1,1-TRI-CL-ETHANE	<0.10	PPM	
1,1,2-TRI-CL-ETHANE	<0.10	PPM	
TRICHLOROETHYLENE	<0.10	PPM	
TRI-CL-F-METHANE	<0.10	PPM	
XYLENE	<0.10	PPM	
VINYL CHLORIDE	<0.10	PPM	

NATIONAL SALVAGE SERVICE CO. Telephone: 812 339 9000
ATT. MARY GUIDEN
243 E. WINSLOW RD.
BLOOMINGTON IN 47401 4704

ENCL(1)

SPECIALIZED ASSAYS
ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

Specimen	Specimen ID	Access
FRAC TANK #33 (RAINWATER)	92823258	92 8232

Collection Date	Time	Recei
02/17/92	00:00	02/18/

Referring Client	Client ID	Report
BRYAN CAVINS		02/24/

Test	Result	Units	Reference Limits
TCLP METALS			
ARSENIC	<0.10	PPM	
BARIUM	<1.0	PPM	
CADMIUM	<0.10	PPM	
CHROMIUM, TOTAL	<0.50	PPM	
LEAD	<0.50	PPM	
MERCURY	<0.010	PPM	
SELENIUM	<0.10	PPM	
SILVER	<0.10	PPM	
TCLP VOLATILES			
METHOD NUMBER	8240		
QUANTITATION LIMIT	0.10	PPM	
BENZENE	ND		
CARBON TETRACHLORIDE	ND		
CHLOROBENZENE	ND		
CHLOROFORM	ND		
1,2-DICHLOROETHANE	ND		
1,1-DI-CL-ETHYLENE	ND		
2-BUTANONE (MEK)	<1.0	PPM	
TETRACHLOROETHYLENE	ND		
TRICHLOROETHYLENE	ND		
VINYL CHLORIDE	ND		
TCLP EXTRACTABLES			
METHOD NUMBER	0270		
QUANTITATION LIMIT	0.10	PPM	
PYRIDINE	ND		
O-CRESOL	ND		
M-CRESOL	ND		
P-CRESOL	ND		
1,4-DICHLOROBENZENE	ND		
2,4-DINITROTOLUENE	ND		
HEXACHLOROBUTADIENE	ND		
HEXACHLOROETHANE	ND		
NITROBENZENE	ND		
PENTACHLOROPHENOL	ND		
2.4.5-TRICHLORPHENOL	ND		

NATIONAL SALVAGE SERVICE CO.
ATT. MARY GUIDEN
243 E. WINSLOW RD.
BLOOMINGTON IN 47401 4704

FROM SPECIALIZED ASSAYS ENVIORMENTAL 02.24.1992 13:25

SPECIALIZED ASSAYS
ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

Specimen	Specimen ID	Access
FRAC TANK #33 (RAINWATER)	92823258	92 8232

Collection Date	Time	Recei
02/17/92	00:00	02/18/

Referring Client	Client ID	Report
BRYAN CAVINS		02/24/

Test	Result	Units	Reference Limit
2,4,6-TRI CL PHENOL	ND		
HEXACHLOROBENZENE	ND		
VOLATILES			
ACETONE	<1.0	PPM	
ACRYLONITRILE	<0.10	PPM	
BROMOFORM	<0.10	PPM	
CARBON DISULFIDE	<0.10	PPM	
CARBON TETRACHLORIDE	<0.10	PPM	
DI-CL-DI-F-METHANE	<0.10	PPM	
CHLOROBENZENE	<0.10	PPM	
CHLORODIBRMETHANE	<0.10	PPM	
CHLOROETHANE	<0.10	PPM	
2-CLETHYVINYL ETHER	<0.10	PPM	
CHLOROFORM	<0.10	PPM	
CYCLOHEXANONE	<0.10	PPM	
DICHLOROBENZENES	<0.10	PPM	
DI-CL-BR-METHANE	<0.10	PPM	
1-1-DICHLOROETHANE	<0.10	PPM	
1,2-DICHLOROETHANE	<0.10	PPM	
1,1-DI-CL-ETHYLENE	<0.10	PPM	
1,2-DICHLOROETHYLENE	<0.10	PPM	
1,2-DICHLOROPROPANE	<0.10	PPM	
1,3-DICHLOROPROPENE	<0.10	PPM	
ETHYL ACETATE	<0.10	PPM	
ETHYLBENZENE	<0.10	PPM	
ETHYL ETHER	<0.10	PPM	
2-ETHOXYETHANOL	<1.0	PPM	
HEXANE	<0.10	PPM	
ISOBUTANOL	<5.0	PPM	
METHYL BROMIDE	<0.10	PPM	
METHYL CHLORIDE	<0.10	PPM	
2-BUTANONE (MEK)	<1.0	PPM	
4-METHYL-2-PENTANONE	<0.10	PPM	
METHYLENE CHLORIDE	<0.10	PPM	
N-BUTYLALCOHOL	<5.0	PPM	
TRI-CL-TRI-F-ETHANE	<0.10	PPM	

NATIONAL SALVAGE SERVICE CO.
ATT. MARY GUIDEN
243 E. WINSLOW RD.
BLOOMINGTON IN 47401 4704

SPECIALIZED ASSAYS
ENVIRONMENTAL
300 12th Ave. S.
Nashville, TN 37202

Specimen	Specimen ID	Accessio
FRAC TANK #33 (RAINWATER)	92823258	92 823258

Collection Date	Time	Received
02/17/92	00:00	02/18/92

Referring Client	Client ID	Reported
BRYAN CAVINS		02/24/92

Test	Result	Units	Reference Limits
1,1,2,2 TET CL ETHAN	<0.10	PPM	
TETRACHLOROETHYLENE	<0.10	PPM	
TOLUENE	<0.10	PPM	
1,1,1-TRI-CL-ETHANE	<0.10	PPM	
1,1,2-TRI-CL-ETHANE	<0.10	PPM	
TRICHLOROETHYLENE	<0.10	PPM	
TRI-CL-F-METHANE	<0.10	PPM	
XYLENE	<0.10	PPM	
VINYL CHLORIDE	<0.10	PPM	

NATIONAL SALVAGE SERVICE CO.
ATT. MARY GUIDEN
243 F. WINSLOW RD.

Appendix B

DPT Piezocone and Hydrocone Plots

PIEZOCONE SOUNDING LOG

SOUNDING #: 15-P01 CLIENT: ENSAFE DATE: 05-16-1995
JOB NAME OR #: NASM094 LOCATION: SWMU15 ST1 DEPTH OF GROUNDWATER: 18 FE

Depth	PP	PT	SL	FR	Soil Type	N	VES	FA	RD	YM	USS	SEN	CM	OCR
2.00	-0.30	112.43	1.05	0.94	Silty Fine Sand	28	0.05	>45	100+	247	---	---	675	---
3.00	0.03	25.17	1.30	5.16	Clay	25	0.09	---	---	334	1.7	1.2	50	>10
4.00	0.02	26.20	0.14	0.53	Silty to Clayey F.S.	9	0.14	44	57	58	---	---	157	---
5.00	-0.00	31.86	0.32	1.01	Silty to Clayey F.S.	11	0.19	43	58	70	---	---	191	---
6.00	0.09	25.05	0.27	1.07	Silty to Clayey F.S.	8	0.23	41	48	55	---	---	150	---
7.00	0.01	24.57	0.40	1.63	Clayey Fine Sand	10	0.28	---	---	324	1.6	3.7	49	>10
8.00	0.05	23.35	0.45	1.93	Clayey Fine Sand	9	0.33	---	---	307	1.5	3.1	47	>10
9.00	0.12	16.52	0.27	1.65	Clayey Fine Sand	7	0.38	---	---	215	1.1	3.6	83	>10
10.00	0.14	18.43	0.12	0.63	Clayey Fine Sand	7	0.43	---	---	240	1.2	9.5	92	>10
11.00	0.16	17.90	0.19	1.08	Clayey Fine Sand	7	0.48	---	---	232	1.2	5.5	90	>10
12.00	0.20	18.20	0.25	1.40	Clayey Fine Sand	7	0.53	---	---	236	1.2	4.3	91	>10
13.00	0.22	14.17	0.17	1.22	Clayey Fine Sand	6	0.58	---	---	181	0.9	4.9	71	
15.00	1.13	30.77	0.80	2.60	Clayey Fine Sand	12	0.67	---	---	401	2.0	2.3	62	>10
16.00	1.31	14.66	0.31	2.14	Sandy Clay	7	0.72	---	---	186	0.9	2.8	73	7
17.00	1.29	11.00	0.14	1.23	Sandy Clay	5	0.76	---	---	137	0.7	4.9	55	3
18.00	1.30	6.53	0.10	1.60	Sandy Clay	3	0.81	---	---	76	0.4	3.8	46	1
19.00	1.36	12.58	0.12	0.93	Clayey Fine Sand	5	0.84	---	---	157	0.8	6.5	63	4
20.00	1.37	8.58	0.04	0.45	Sensitive Fine Grain	4	0.86	---	---	154	0.8	13.4	43	3
[illegible].00	1.39	10.18	0.02	0.18	Clayey Fine Sand	4	0.89	---	---	124	0.6	33.4	51	2
[illegible]2.00	1.40	10.60	0.05	0.48	Clayey Fine Sand	4	0.92	---	---	129	0.6	12.5	53	2
23.00	1.39	11.28	0.04	0.32	Clayey Fine Sand	5	0.95	---	---	138	0.7	18.7	56	2
24.00	1.46	13.78	0.10	0.73	Clayey Fine Sand	6	0.98	---	---	171	0.9	8.2	69	3
25.00	1.58	20.51	0.33	1.60	Clayey Fine Sand	8	1.01	---	---	260	1.3	3.7	41	6
26.00	1.65	14.89	0.20	1.34	Clayey Fine Sand	6	1.04	---	---	185	0.9	4.5	74	3
27.00	1.52	39.95	0.84	2.10	Clayey Fine Sand	16	1.07	---	---	518	2.6	2.9	80	>10
28.00	1.79	31.46	0.46	1.45	Clayey Fine Sand	13	1.10	---	---	405	2.0	4.1	63	>10
29.00	1.71	48.85	0.66	1.34	Silty to Clayey F.S.	16	1.14	36	45	107	---	---	293	---
30.00	1.73	46.92	1.76	3.75	Sandy Clay	23	1.16	---	---	610	3.1	1.6	94	>10
31.00	1.88	45.22	0.96	2.13	Clayey Fine Sand	18	1.19	---	---	587	2.9	2.8	90	>10
32.00	1.98	29.48	0.46	1.57	Clayey Fine Sand	12	1.22	---	---	377	1.9	3.8	59	
34.00	2.14	20.86	0.26	1.26	Clayey Fine Sand	8	1.29	---	---	261	1.3	4.8	42	4
35.00	2.19	30.28	0.30	0.98	Silty to Clayey F.S.	10	1.32	32	29	67	---	---	182	---
36.00	2.24	27.01	0.16	0.59	Silty to Clayey F.S.	9	1.35	31	25	59	---	---	162	---
37.00	2.37	27.52	0.23	0.82	Silty to Clayey F.S.	9	1.38	31	25	61	---	---	165	---
38.00	1.80	210.74	0.78	0.37	Fine Sand	42	1.41	43	83	464	---	---	1264	---
39.00	1.54	122.22	1.64	1.34	Silty Fine Sand	31	1.44	40	68	269	---	---	733	---
40.00	2.25	40.53	0.85	2.10	Clayey Fine Sand	16	1.47	---	---	521	2.6	2.9	81	
42.00	0.94	243.35	1.78	0.73	Fine Sand	49	1.54	43	86	535	---	---	1460	---
43.00	0.94	254.02	1.12	0.44	Cemented Sand to HardPan	42	1.58	43	87	559	---	---	1524	---
44.00	0.91	199.67	0.45	0.23	Fine Sand	40	1.61	42	80	439	---	---	1198	---

****

SOUNDING #: 15-P01 CLIENT: ENSAFE DATE: 05-16-1995

JOB NAME OR #: NASM094 LOCATION: SWMU15 ST1 DEPTH OF GROUNDWATER: 18 FE

****

Depth	PP	PT	SL	FR	Soil Type	N	VES	FA	RD	YM	USS	SEN	CM	OCR
45.00	0.88	207.99	0.75	0.36	Fine Sand	42	1.64	42	81	458	---	---	1248	---
46.00	0.69	307.65	1.74	0.57	Cemented Sand to HardPan	51	1.68	44	92	677	---	---	1846	---

PP - Pore Pressure (Kg/cm2)
PT - Point Bearing (Kg/cm2)
SL - Sleeve Friction (Kg/cm2)
FR - Friction Ratio (%)
GWD - Ground Water Depth

N - Equivalent SPT Blow Count (bpf)
VES - Vertical Effective Stress (Kg/cm2)
FA - Friction Angle (Degress)
RD - Relative Density (+ or - 5%)
YM - Youngs Modulus

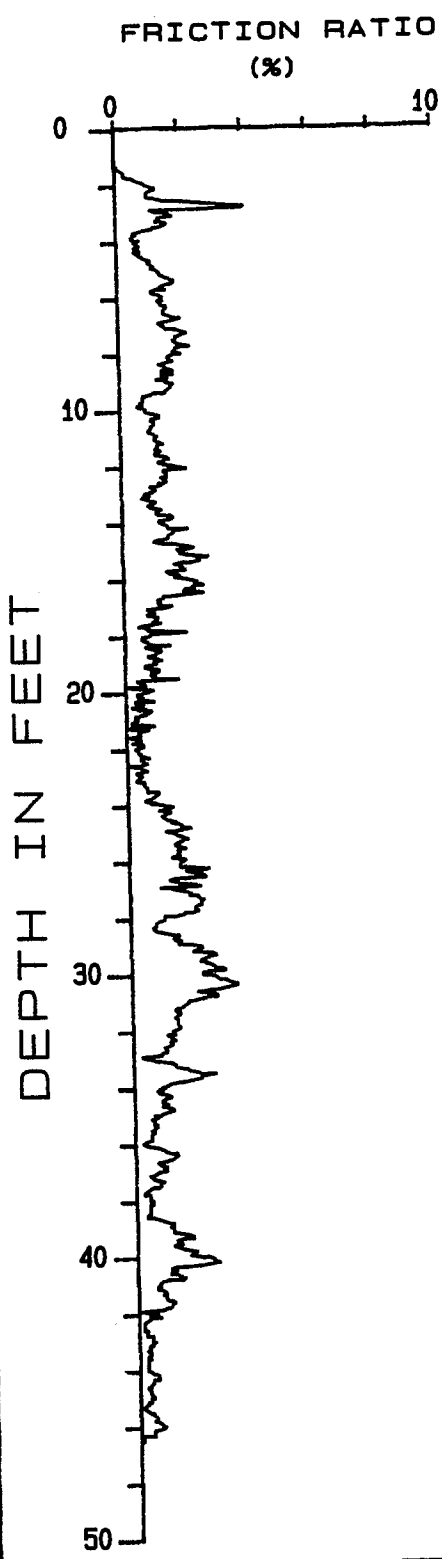
USS - Undrained Sheer Strength
SEN - Sensitivity
CM - Constrained Modulus
OCR - Estimated Over Consolidation Ratio

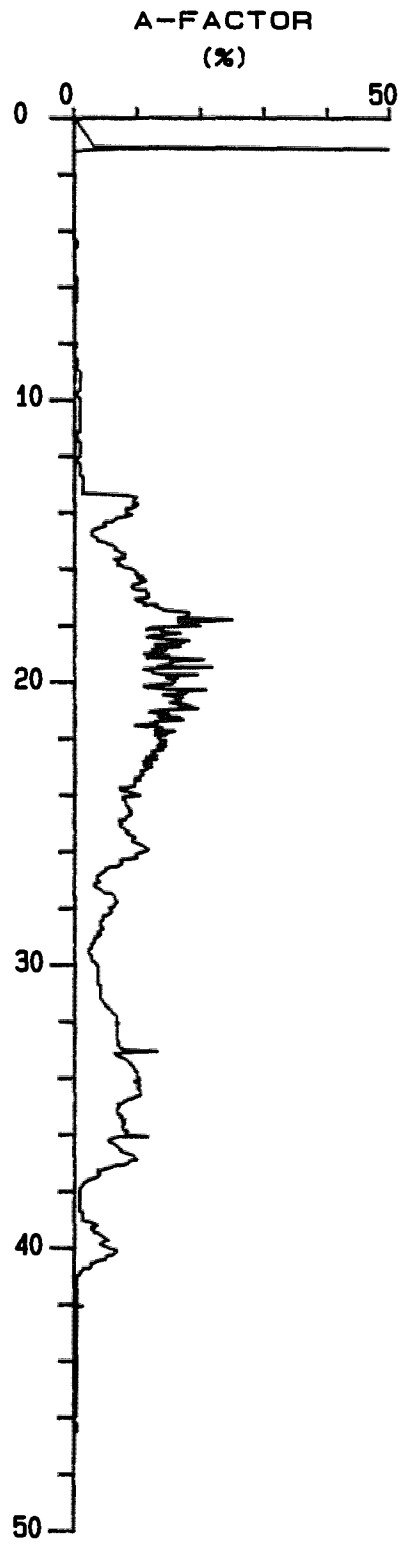
The above data was computed utilizing SST's in-house correlations and guidelines published in 'Guidelines for Use and Interpretation of the Electronic Cone Penetration Test', Robertson and Campanella, September, 1989.

PIEZOCONE SOUNDING LOG

SOUNDING #: 15-P18 CLIENT: ENSAFE DATE: 05-16-1995
JOB NAME OR #: NASM094 LOCATION: SWMU15 ST1 DEPTH OF GROUNDWATER: 18 FE

Depth	PP	PT	SL	FR	Soil Type	N	VES	FA	RD	YM	USS	SEN	CM	OCR
2.00	0.85	29.58	0.05	0.16	Silty to Clayey F.S.	10	0.05	>45	75	65	---	---	177	---
3.00	1.09	20.33	0.15	0.76	Clayey Fine Sand	8	0.10	---	---	270	1.3	7.9	41	>10
4.00	1.02	18.79	0.22	1.16	Clayey Fine Sand	8	0.15	---	---	249	1.2	5.2	94	>10
5.00	0.75	9.72	0.32	3.32	Silty Clay	6	0.19	---	---	127	0.6	1.8	49	>10
6.00	0.93	6.78	0.06	0.91	Sensitive Fine Grain	3	0.22	---	---	131	0.7	6.6	47	>10
7.00	0.19	104.21	0.53	0.50	Fine Sand	21	0.28	>45	87	229	---	---	625	---
8.00	1.06	6.20	0.09	1.44	Sandy Clay	3	0.32	---	---	78	0.4	4.2	43	5
9.00	1.11	1.40	0.15	10.63	Organic Material	1	0.35	---	---	---	---	---	---	---
10.00	1.02	2.94	0.10	3.29	Clay	3	0.39	---	---	34	0.2	1.8	21	1
11.00	1.07	0.19	0.09	47.22	Undefined	0	0.39	---	---	---	---	---	---	---
12.00	1.07	1.70	0.21	12.31	Organic Material	2	0.42	---	---	---	---	---	---	---
13.00	0.79	4.38	0.29	6.68	Clay	4	0.46	---	---	52	0.3	0.9	31	2
14.00	0.86	2.01	0.20	9.88	Organic Material	2	0.50	---	---	---	---	---	---	---
15.00	0.85	1.56	0.19	12.19	Organic Material	2	0.53	---	---	---	---	---	---	---
16.00	0.81	13.87	0.12	0.83	Clayey Fine Sand	6	0.58	---	---	177	0.9	7.2	69	
18.00	0.86	13.89	0.47	3.39	Silty Clay	9	0.66	---	---	176	0.9	1.8	69	7
19.00	0.79	23.12	0.46	2.00	Clayey Fine Sand	9	0.69	---	---	299	1.5	3.0	46	>10
20.00	0.84	28.99	0.40	1.39	Clayey Fine Sand	12	0.73	---	---	377	1.9	4.3	58	>10
21.00	0.84	29.81	0.28	0.95	Silty to Clayey F.S.	10	0.76	35	36	66	---	---	179	---
22.00	0.63	60.76	0.90	1.49	Silty to Clayey F.S.	20	0.79	39	56	134	---	---	365	---
23.00	0.84	30.49	0.60	1.97	Clayey Fine Sand	12	0.82	---	---	396	2.0	3.0	61	>10
24.00	0.94	22.33	0.18	0.81	Silty to Clayey F.S.	7	0.85	33	26	49	---	---	134	---
25.00	0.98	19.93	0.40	1.99	Clayey Fine Sand	8	0.88	---	---	254	1.3	3.0	100	10
26.00	1.02	15.29	0.23	1.48	Clayey Fine Sand	6	0.91	---	---	192	1.0	4.0	76	4
27.00	1.04	8.90	0.05	0.51	Sensitive Fine Grain	4	0.93	---	---	159	0.8	11.7	44	3
28.00	1.07	12.17	0.10	0.83	Clayey Fine Sand	5	0.96	---	---	149	0.7	7.2	61	3
29.00	1.07	11.26	0.01	0.10	Clayey Fine Sand	5	0.99	---	---	137	0.7	60.6	56	2
30.00	1.10	14.85	0.11	0.71	Clayey Fine Sand	6	1.02	---	---	184	0.9	8.4	74	3
31.00	1.08	15.62	0.22	1.38	Clayey Fine Sand	6	1.06	---	---	194	1.0	4.3	78	3
32.00	1.00	31.16	0.61	1.96	Clayey Fine Sand	12	1.09	---	---	401	2.0	3.1	62	>10
33.00	0.63	92.72	0.14	0.15	Fine Sand	19	1.12	39	63	204	---	---	556	---
34.00	0.57	123.69	0.12	0.10	Fine Sand	25	1.15	41	71	272	---	---	742	---
35.00	0.59	135.83	0.30	0.22	Fine Sand	27	1.19	41	73	299	---	---	815	---
36.00	0.52	153.68	0.54	0.35	Fine Sand	31	1.22	42	76	338	---	---	922	---
37.00	0.51	194.56	0.77	0.39	Fine Sand	39	1.25	43	83	428	---	---	1167	---
38.00	0.51	196.73	0.75	0.38	Fine Sand	39	1.29	43	83	433	---	---	1180	---
39.00	0.53	225.44	1.16	0.51	Fine Sand	45	1.32	43	86	496	---	---	1353	---
40.00	0.70	208.64	1.81	0.87	Fine Sand	42	1.35	43	84	459	---	---	1252	---
41.00	0.65	249.47	1.61	0.65	Fine Sand	50	1.38	44	89	549	---	---	1497	---
42.00	0.67	246.77	2.30	0.93	Fine Sand	49	1.42	43	88	543	---	---	1481	---
43.00	0.77	237.14	2.13	0.90	Fine Sand	47	1.45	43	86	522	---	---	1423	---
44.00	0.77	153.31	1.54	1.00	Fine Sand	31	1.48	41	74	337	---	---	920	---





SOUNDING #:

DATE: 05-16-1995 LOCATI

JOB: NASM094 CLIENT

PERFORMED BY:

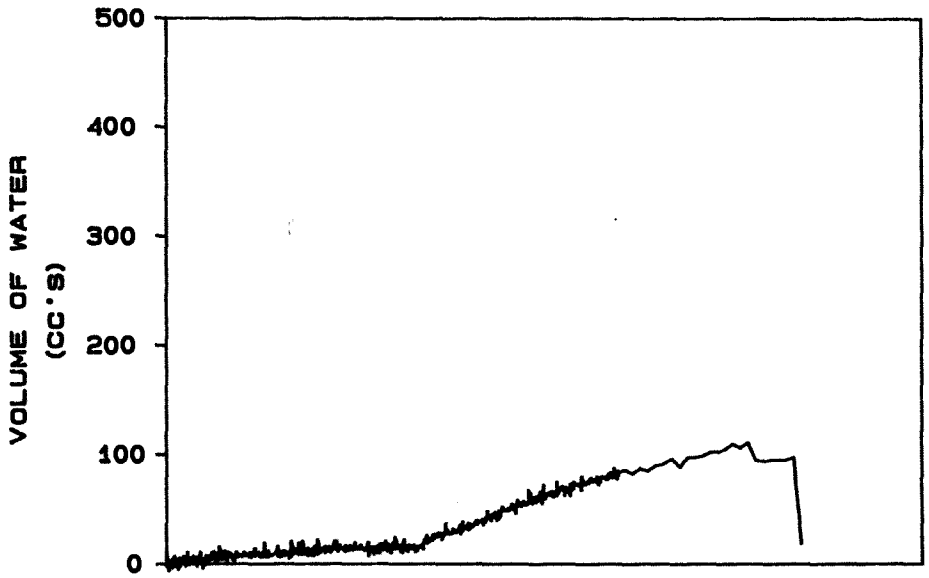
JBSURFACE
CHNOLOGY

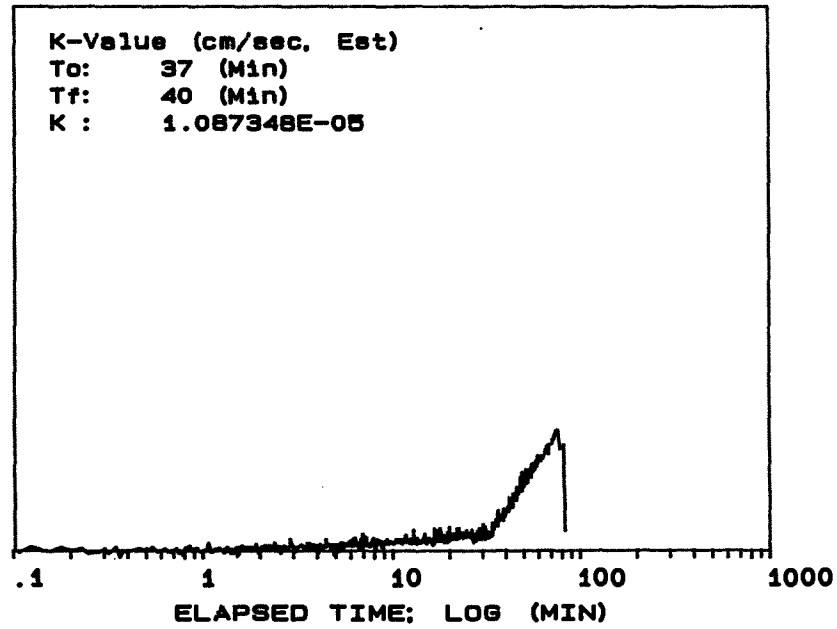
SOUNDING #: 15-P18 CLIENT: ENSAFE DATE: 05-16-1995
JOB NAME OR #: NASM094 LOCATION: SWMU15 ST1 DEPTH OF GROUNDWATER: 18 FE

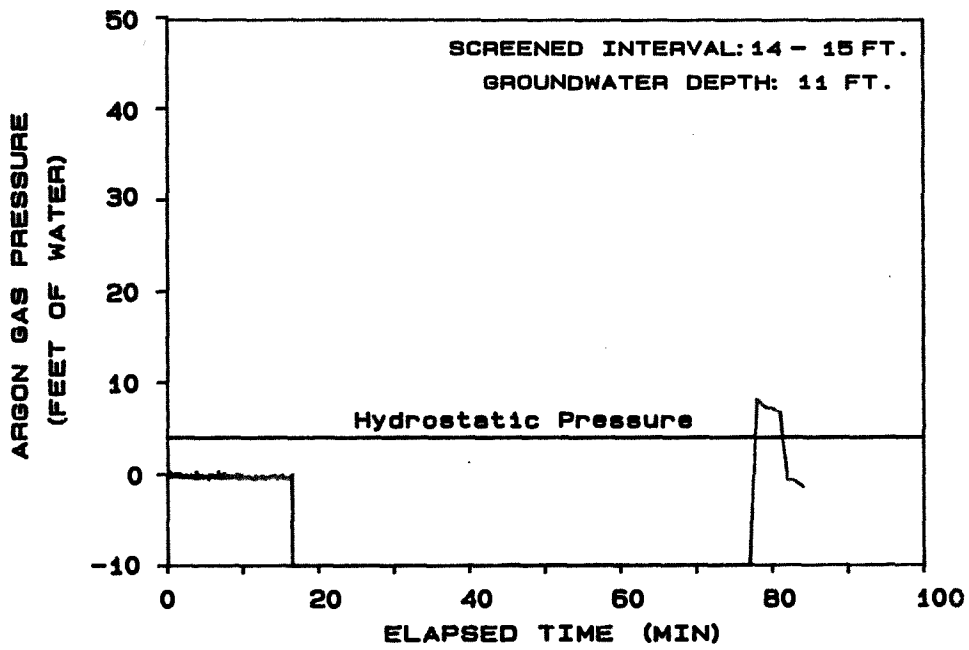
Depth	PP	PT	SL	FR	Soil Type	N	VES	FA	RD	YM	USS	SEN	CM	OCR
45.00	0.75	271.85	1.48	0.54	Cemented Sand to HardPan	45	1.52	43	90	598	---	---	1631	---
46.00	0.90	264.74	1.49	0.56	Fine Sand	53	1.55	43	89	582	---	---	1588	---
47.00	0.80	373.91	1.77	0.47	Cemented Sand to HardPan	62	1.59	45	98	823	---	---	2243	---
48.00	0.90	446.37	3.20	0.72	Cemented Sand to HardPan	74	1.63	>45	100+	982	---	---	2678	---

PP - Pore Pressure (Kg/cm2)
PT - Point Bearing (Kg/cm2)
SL - Sleeve Friction (Kg/cm2)
FR - Friction Ratio (%)
GWD - Ground Water Depth
N - Equivalent SPT Blow Count (bpf)
VES - Vertical Effective Stress (Kg/cm2)
FA - Friction Angle (Degress)
RD - Relative Density (+ or - 5%)
YM - Youngs Modulus
USS - Undrained Sheer Strength
SEN - Sensitivity
CM - Constrained Modulus
OCR - Estimated Over Consolidation Ratio

The above data was computed utilizing SST's in-house correlations and guidelines published in 'Guidelines for Use and Interpretation of the Electronic Cone Penetration Test', Robertson and Campanella, September, 1989.







GS-1 SAMPLE PLOT

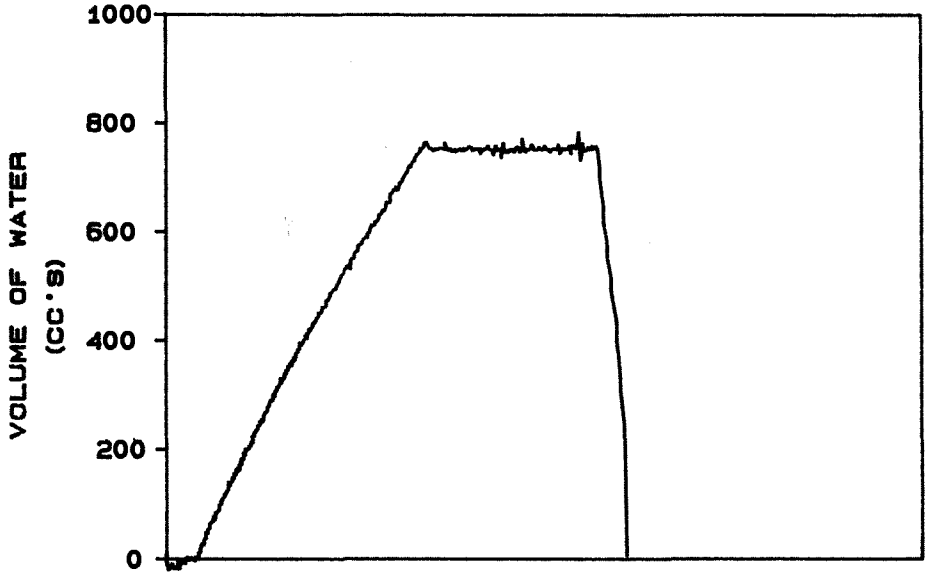
SAMPLE #: 15GH0115

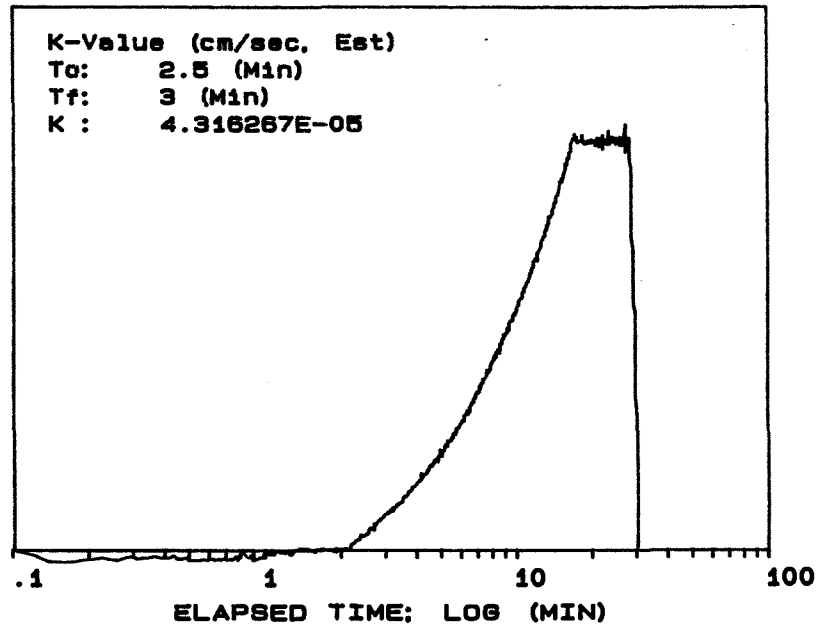
CLIENT: ENSAFE JOB: NASM094

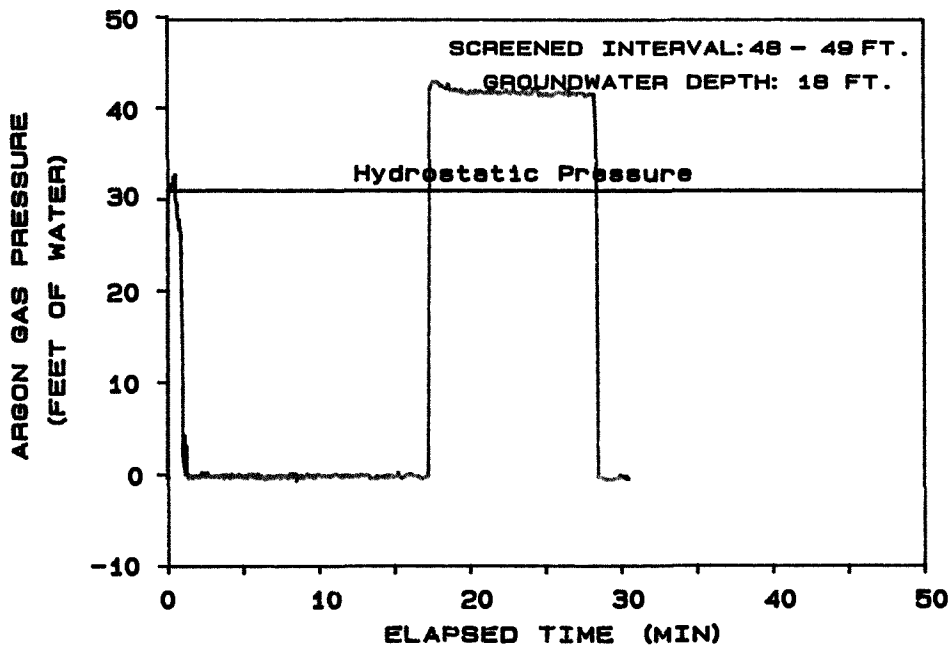
DATE: 5-16-95 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

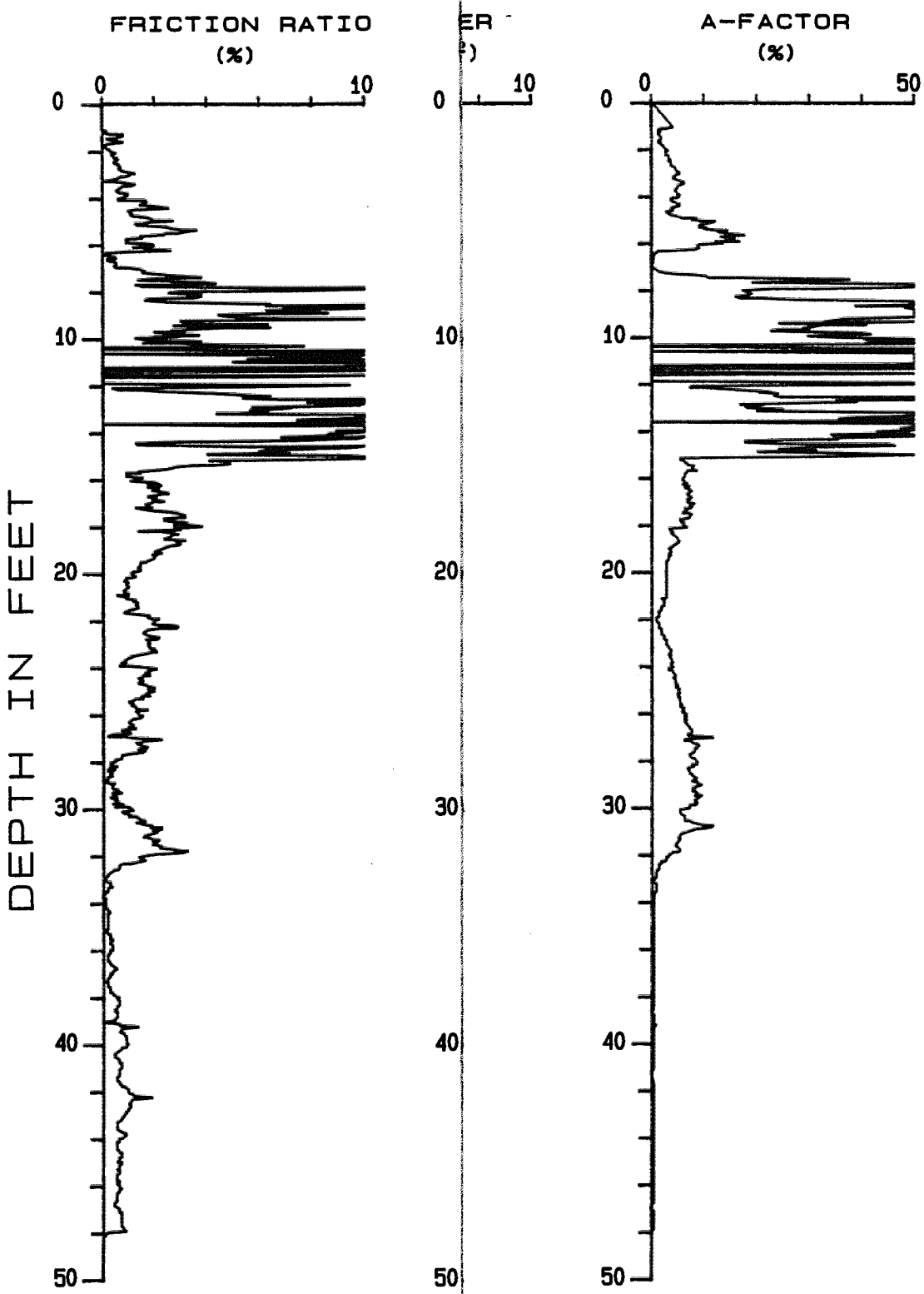
SAMPLE #: 15GH0149

CLIENT: ENSAFE JOB: NASM094

DATE: 05-21-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY



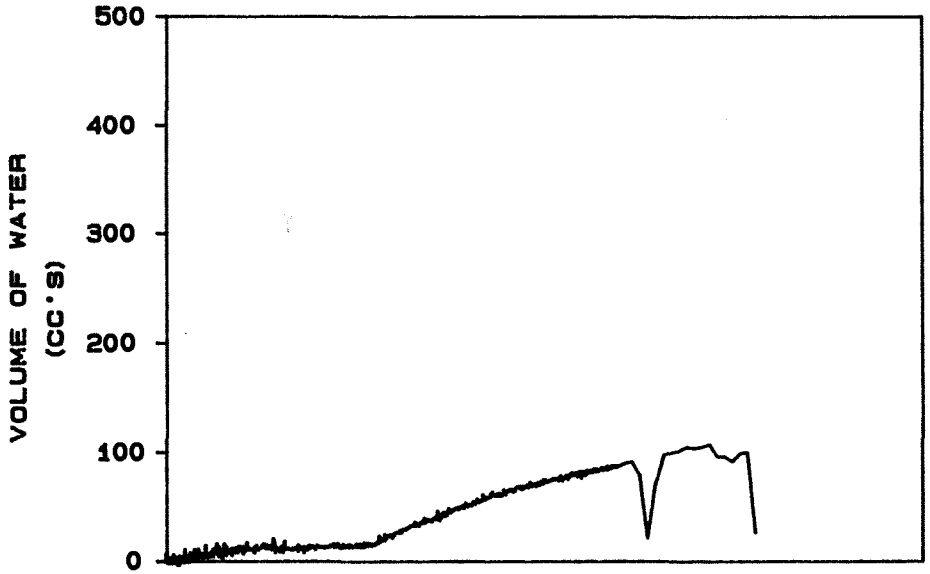
SOUNDING #:

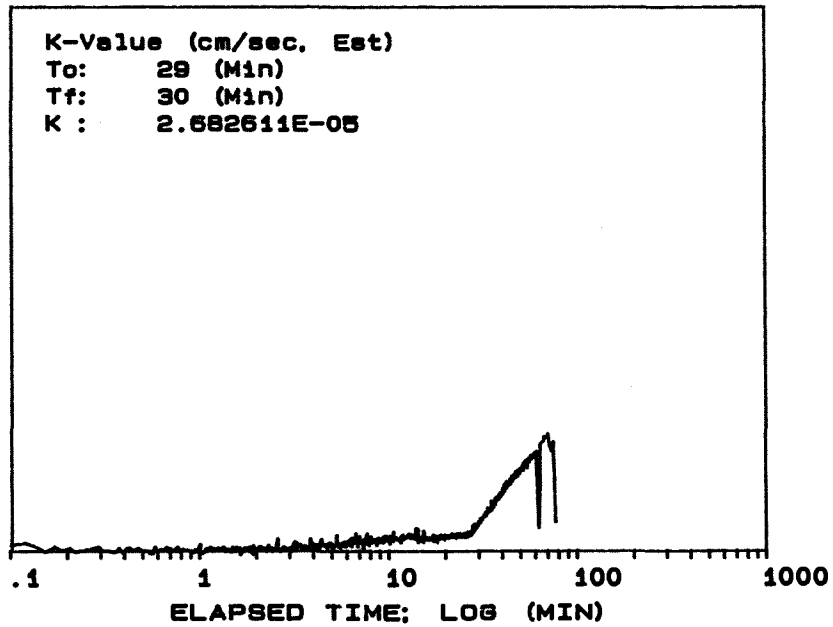
DATE: 05-16-1995 LOCATI

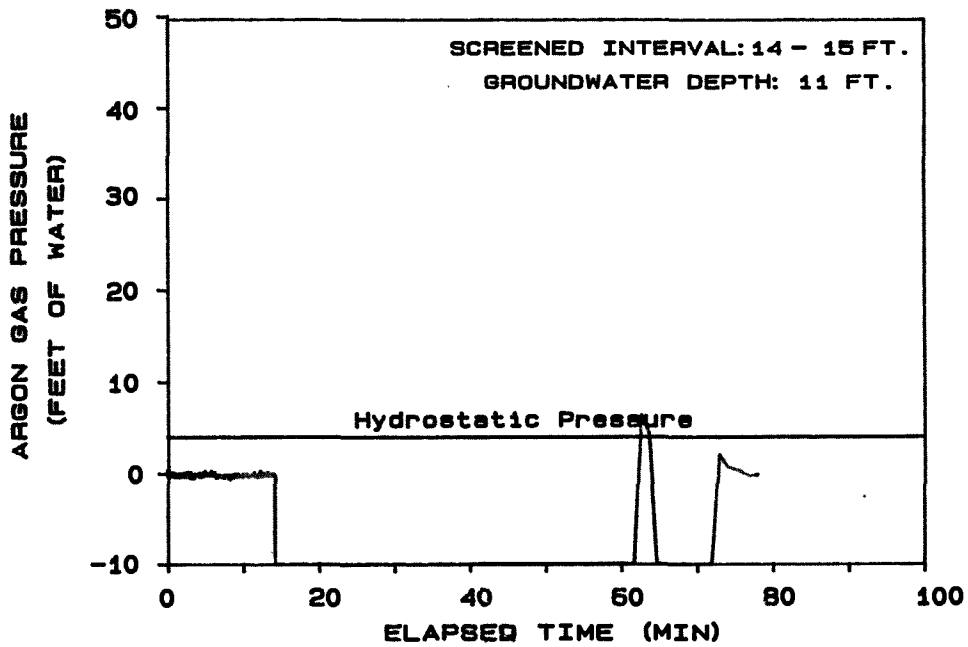
JOB: NASM094 CLIENT:

PERFORMED BY:

UBSURFACE
ECHNOLOGY







GS-1 SAMPLE PLOT

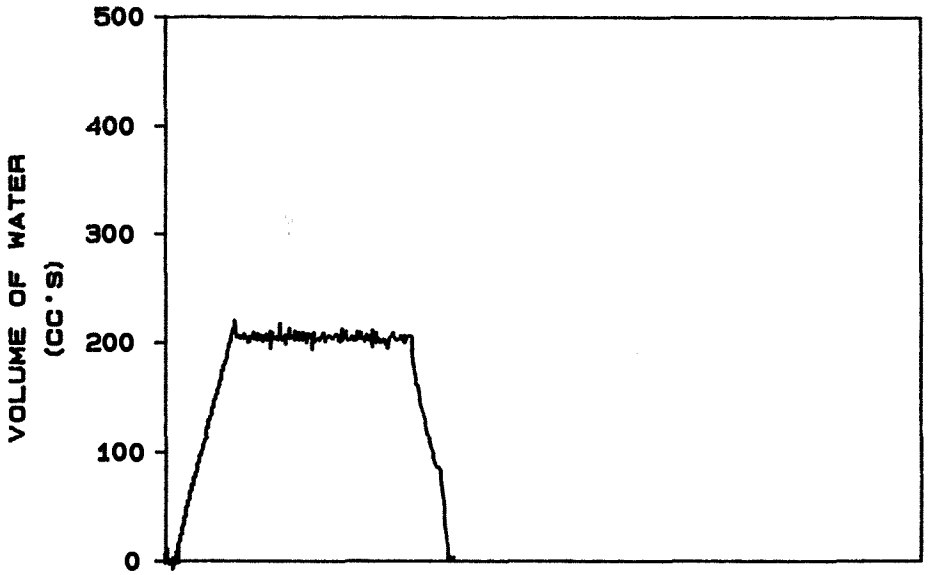
SAMPLE #: 15GH021E

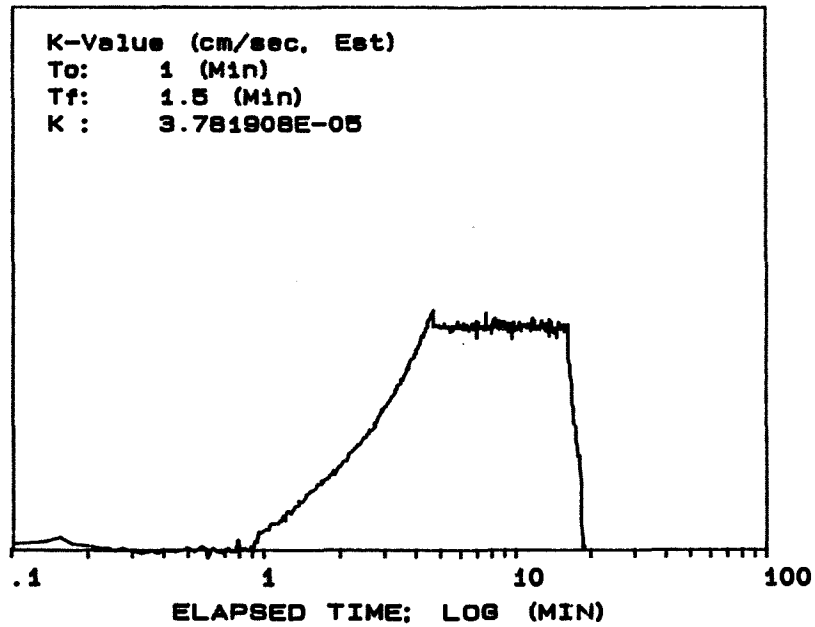
CLIENT: ENSAFE JOB: NASM094

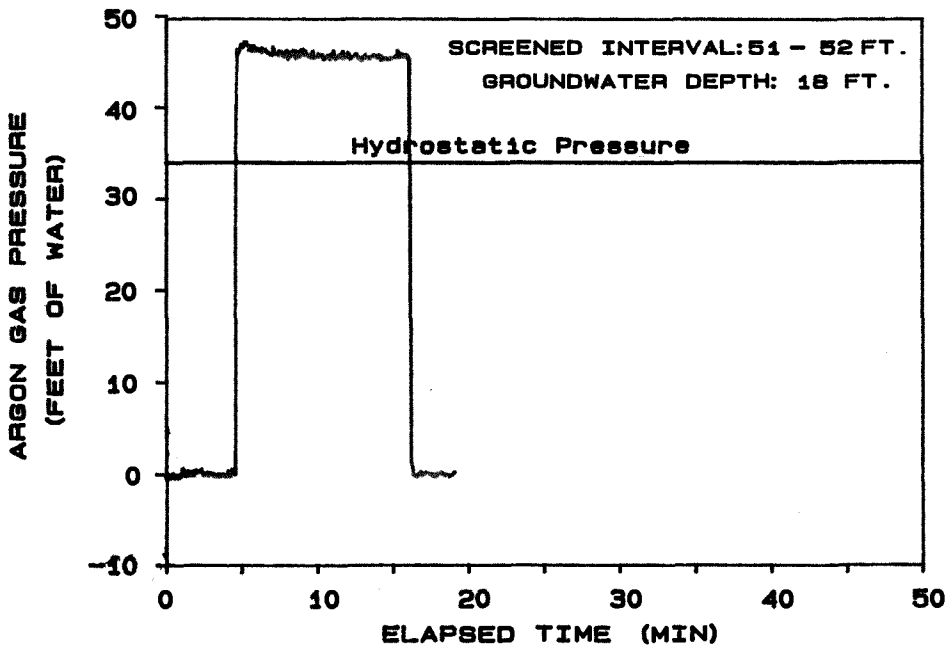
DATE: 5-16-95 LOCATION: SWMU15 ST2

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

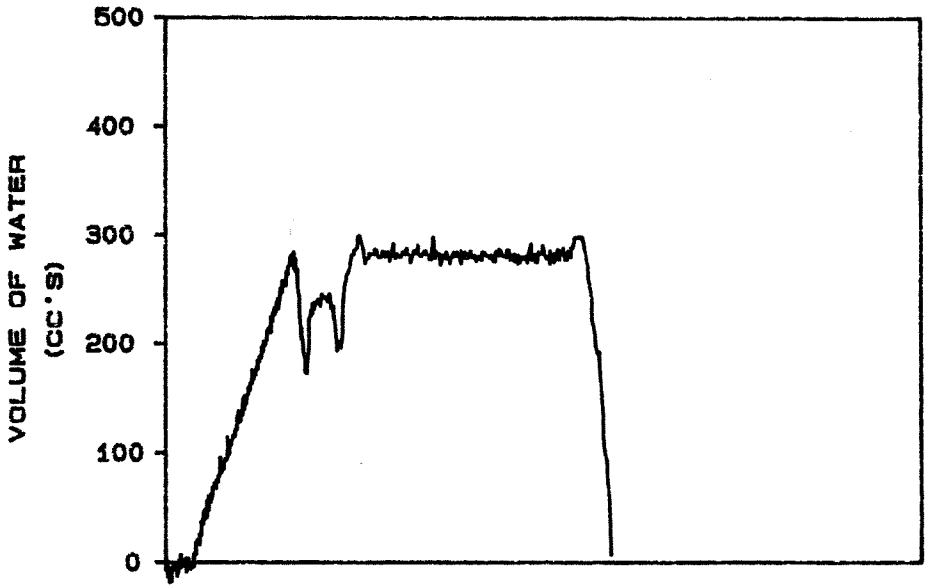
SAMPLE #: 15GH0252

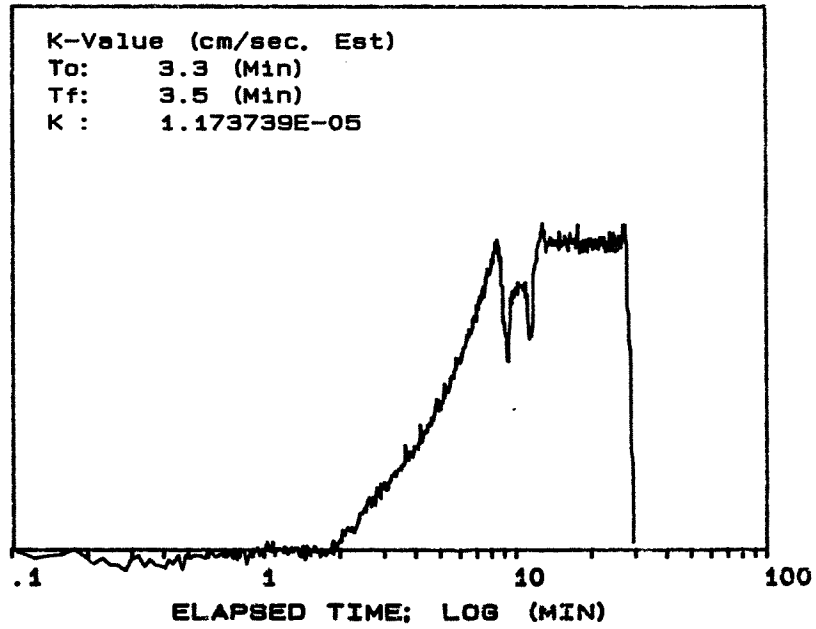
CLIENT: ENSAFE JOB: NASM094

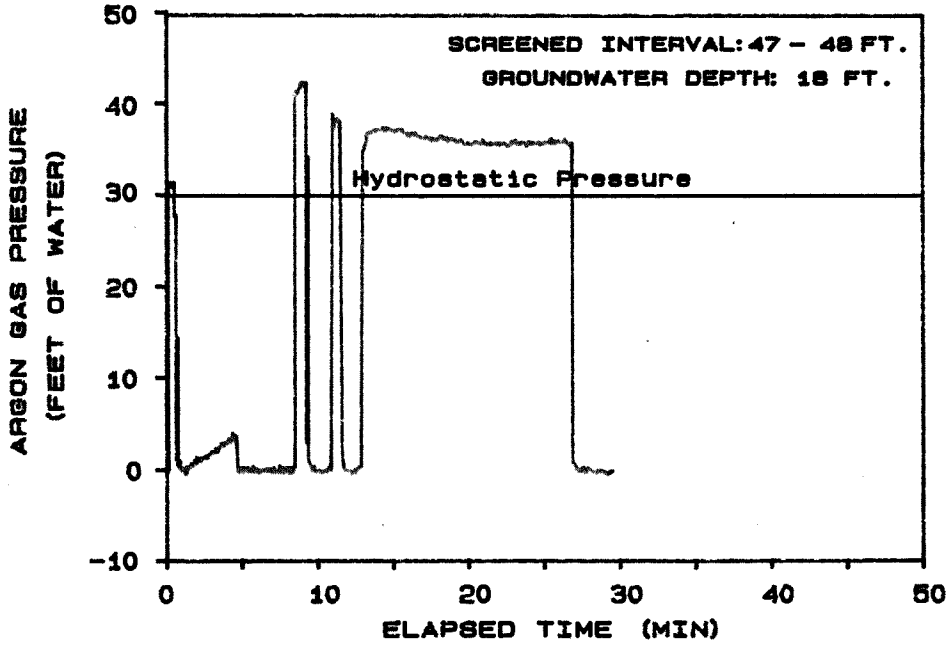
DATE: 5-16-95 LOCATION: SWMU15 ST2

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

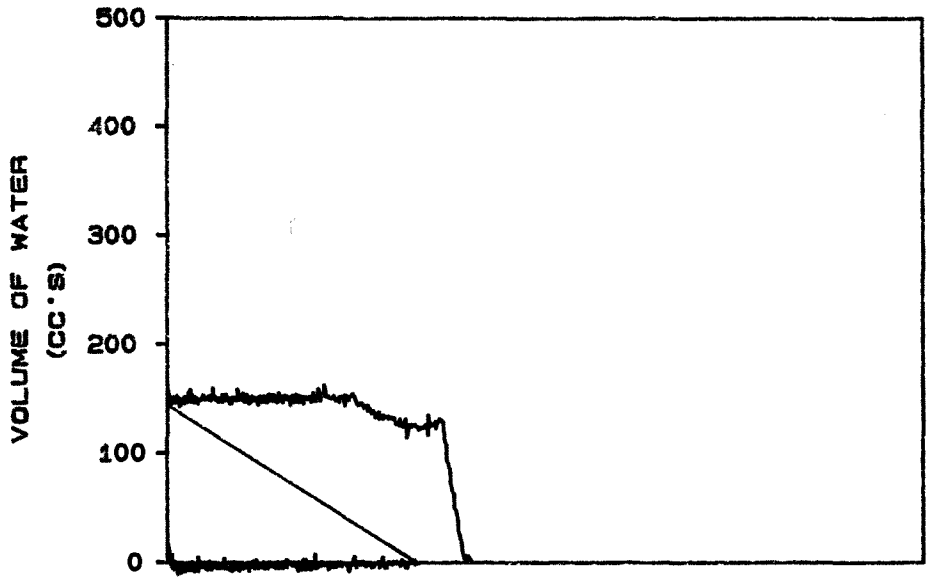
SAMPLE #: 15GH0348

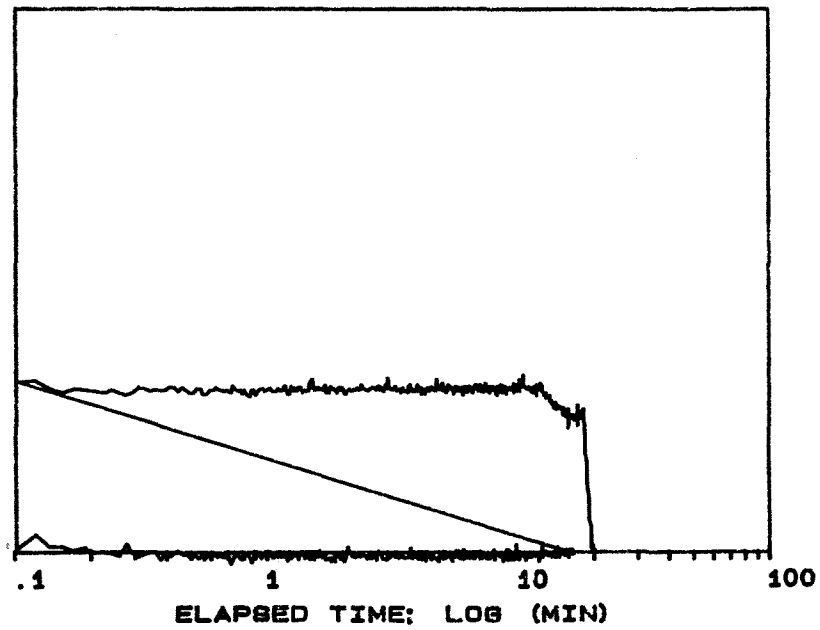
CLIENT: ENSAFE JOB: NASM094

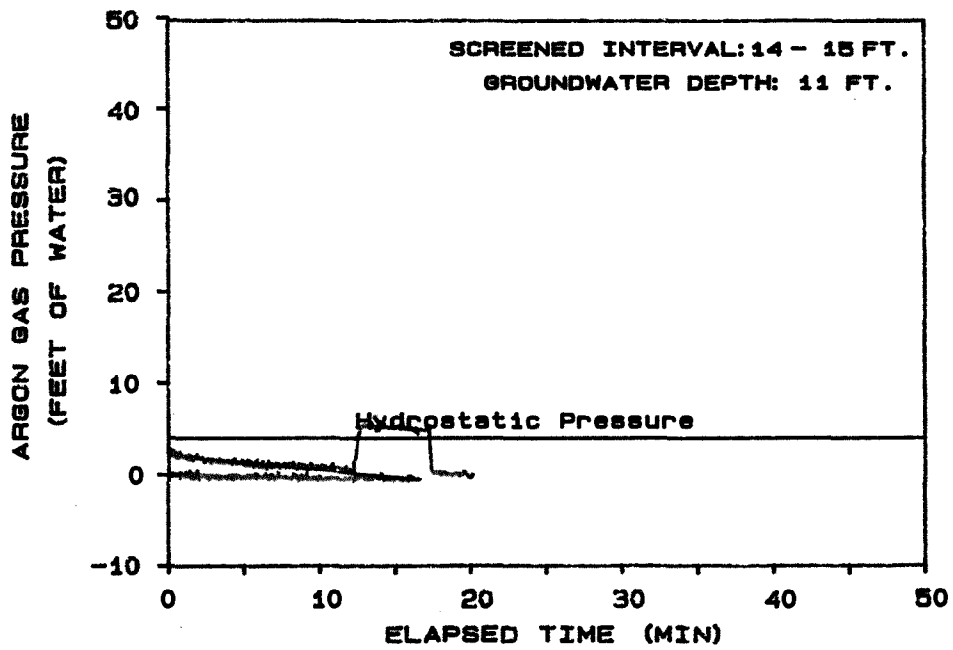
DATE: 05-21-1998 LOCATION: SWMU15 ST3

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

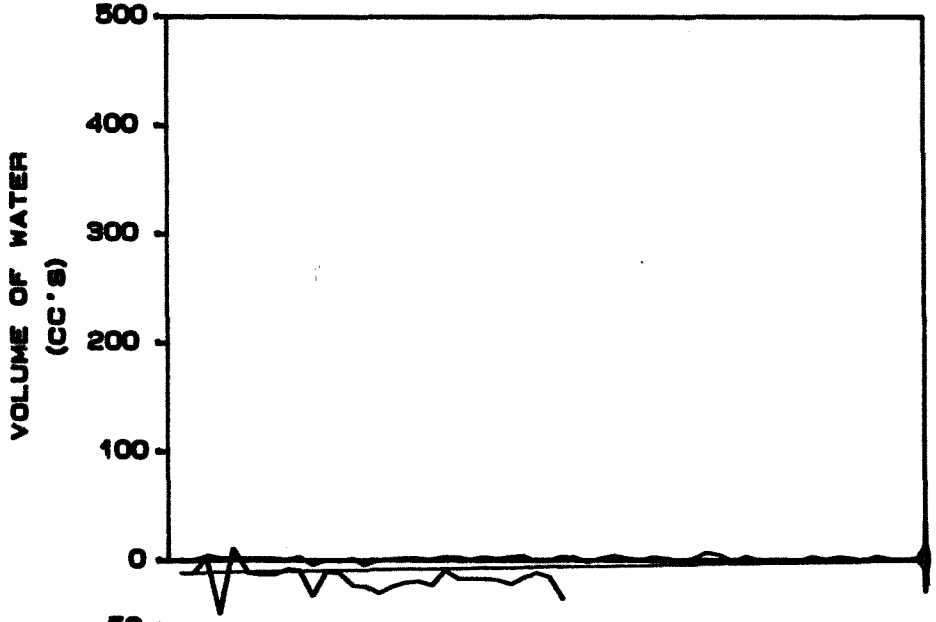
SAMPLE #: 15GH041E

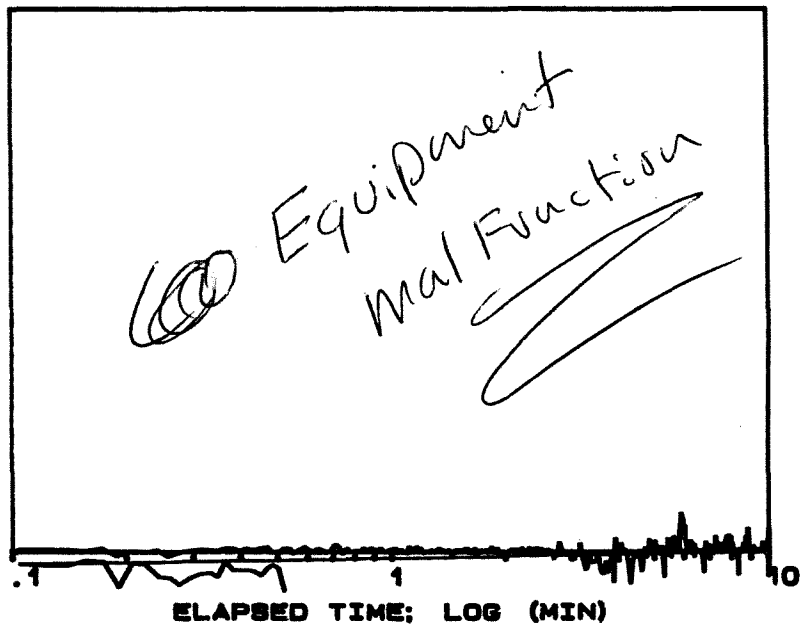
CLIENT: ENSAFE JOB: NASM094

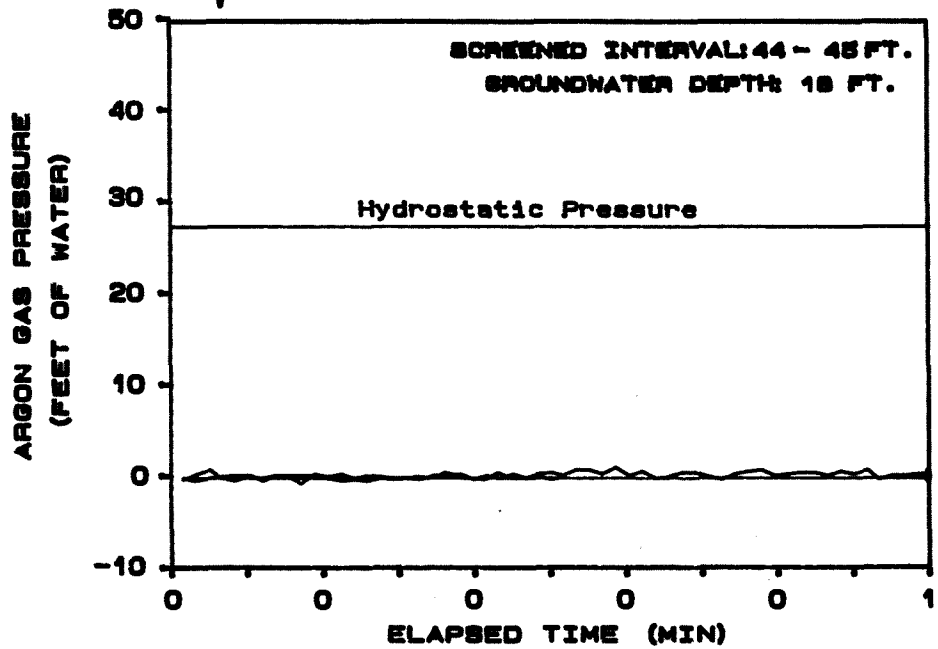
DATE: 5-16-95 LOCATION: SWMU15 ST4

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

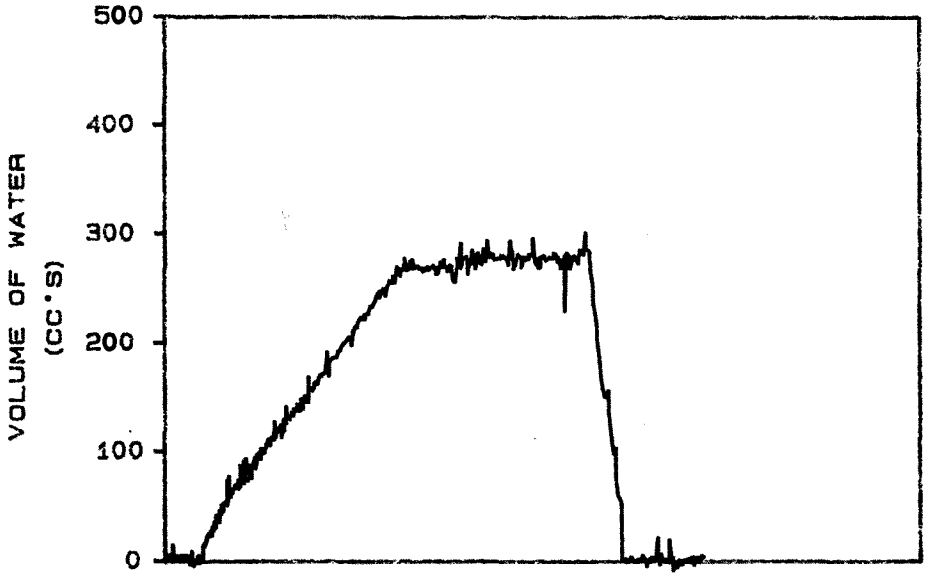
SAMPLE #: 15GH0445

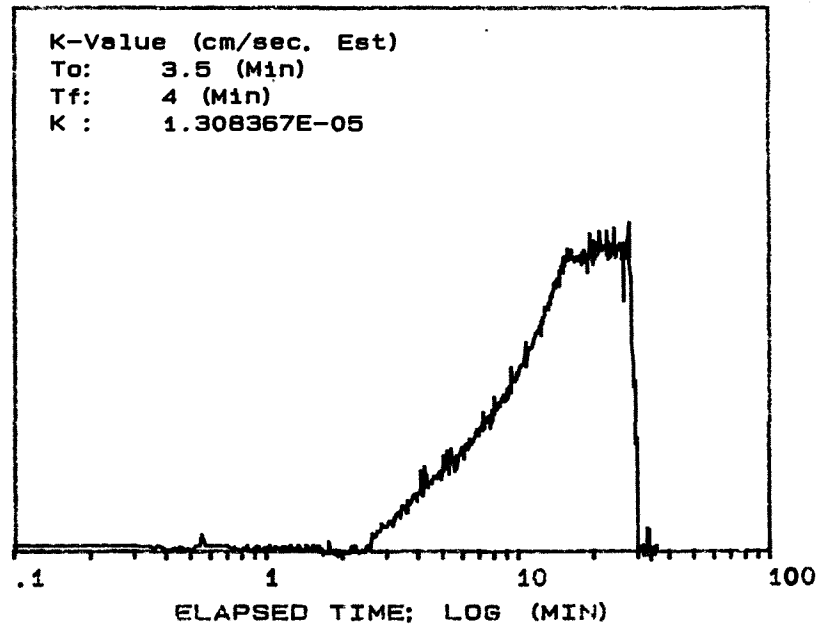
CLIENT: ENSAFE JOB: NASM094

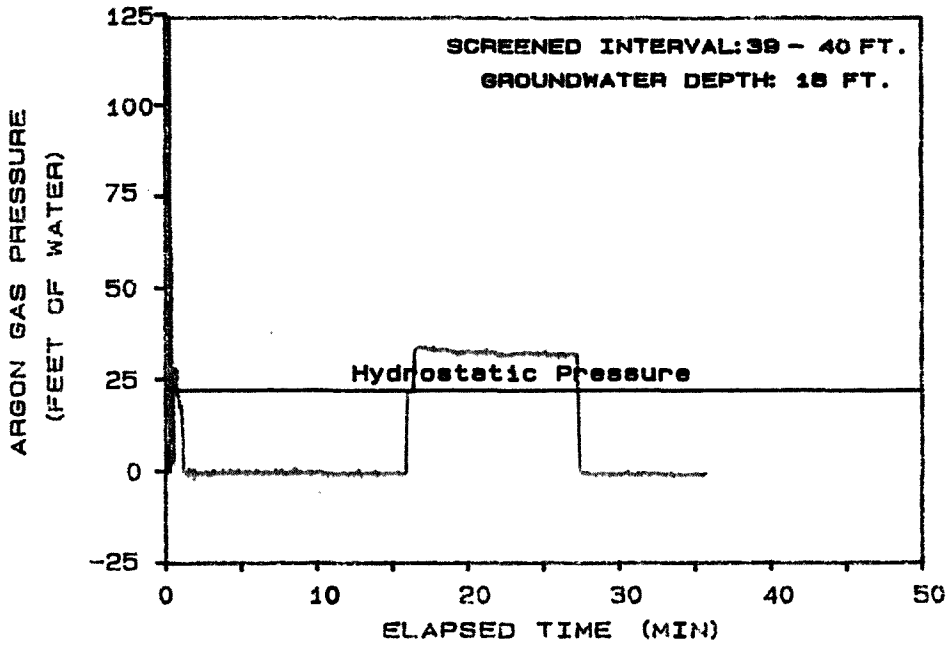
DATE: 05-16-1995 LOCATION: SWMU15 ST4

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

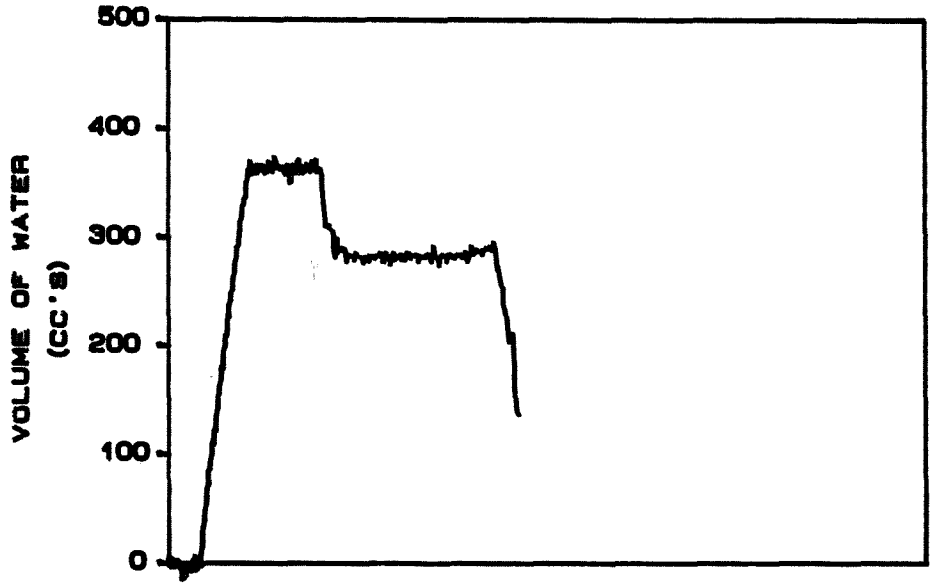
SAMPLE #: 15GH0540

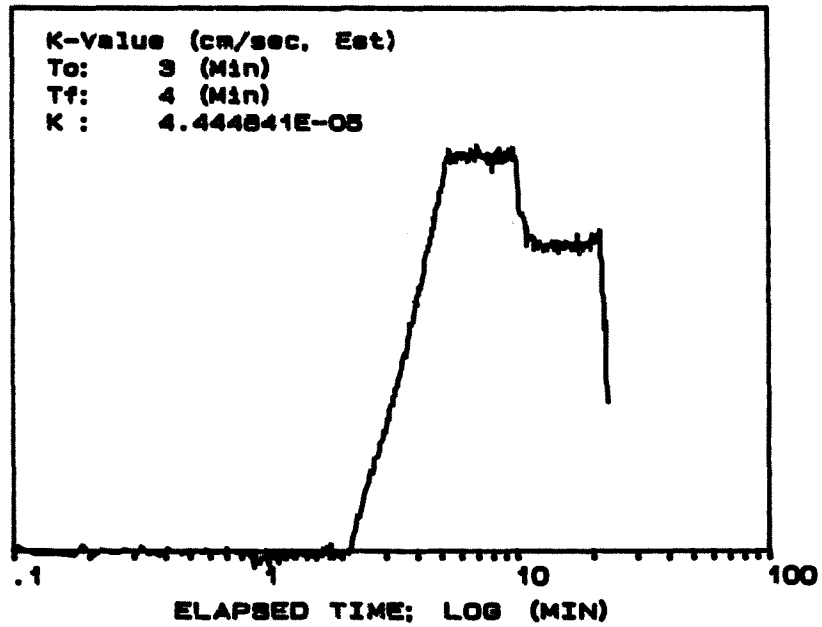
CLIENT: ENSAFE JOB: NASM094

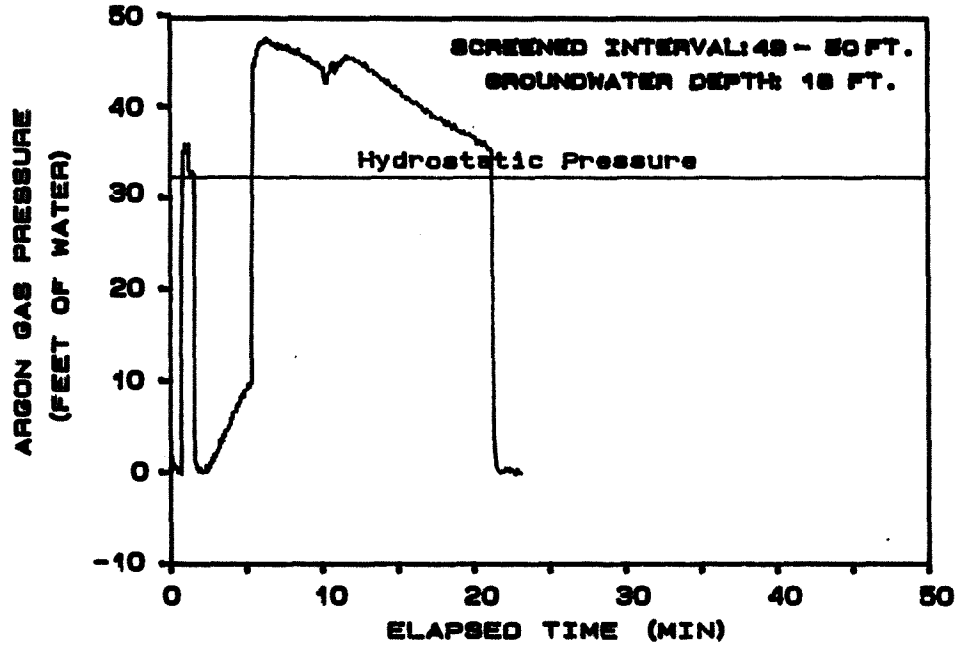
DATE: 5-23-95 LOCATION: SWMU15 ST5

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

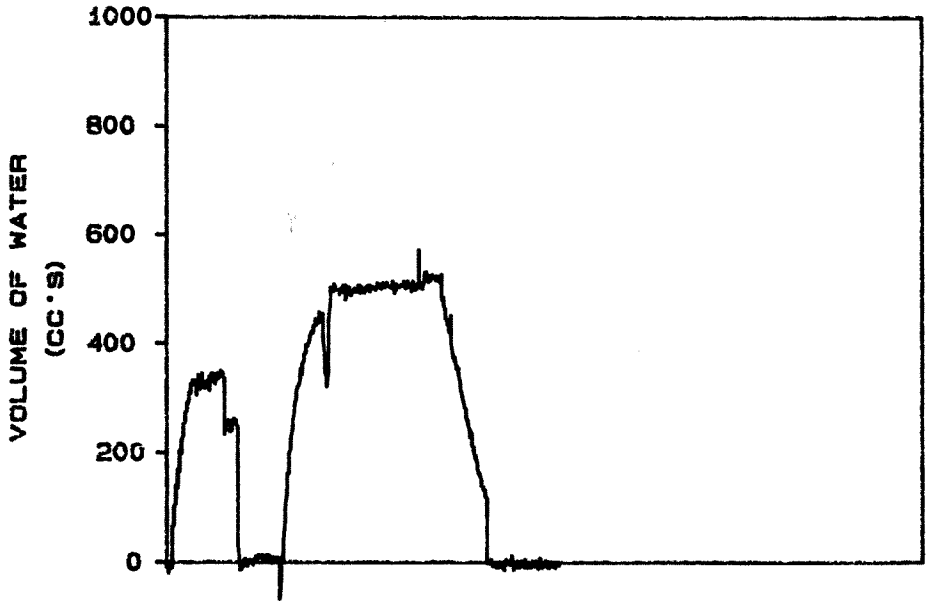
SAMPLE #: 15GH0650

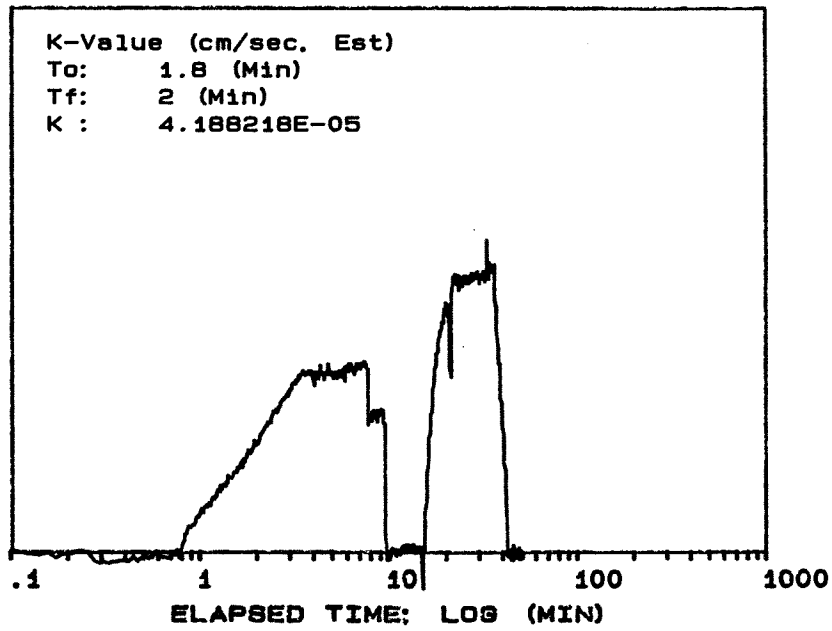
CLIENT: ENSAFE JOB: NASM094

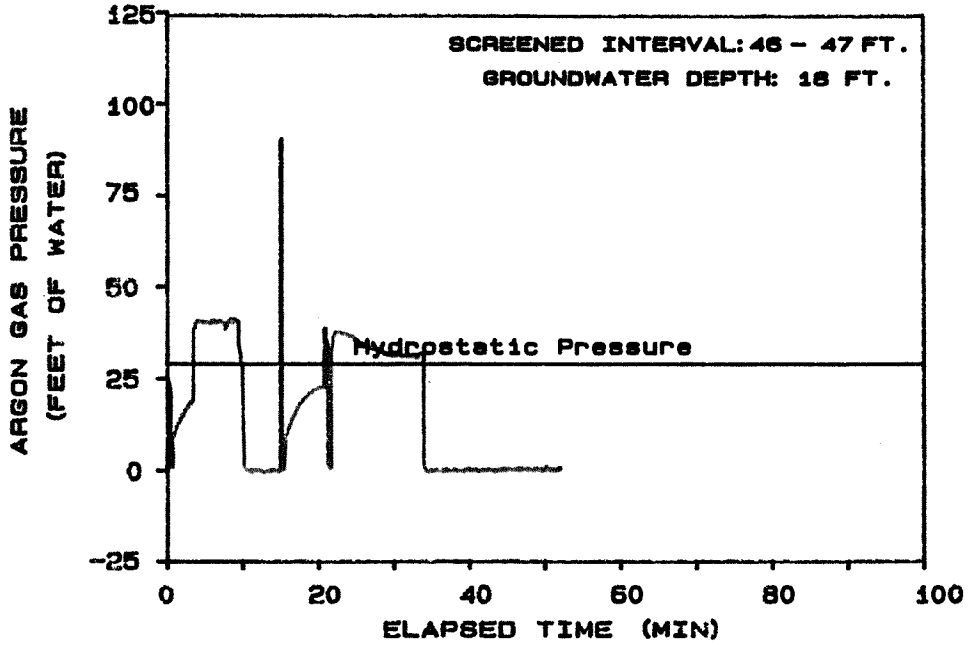
DATE: 05-18-1995 LOCATION: SWMU15 ST6

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

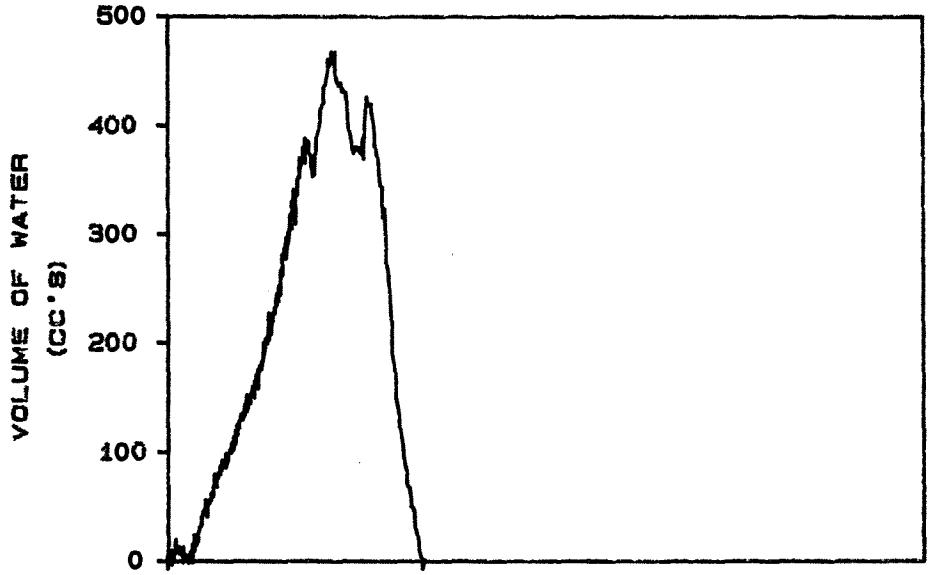
SAMPLE #: 15GH0747

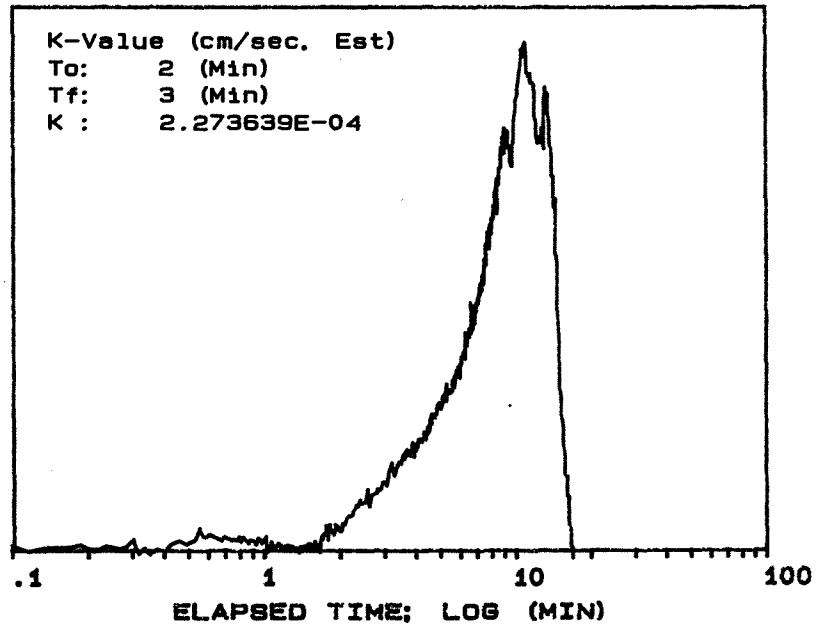
CLIENT: ENSAFE JOB: NASM094

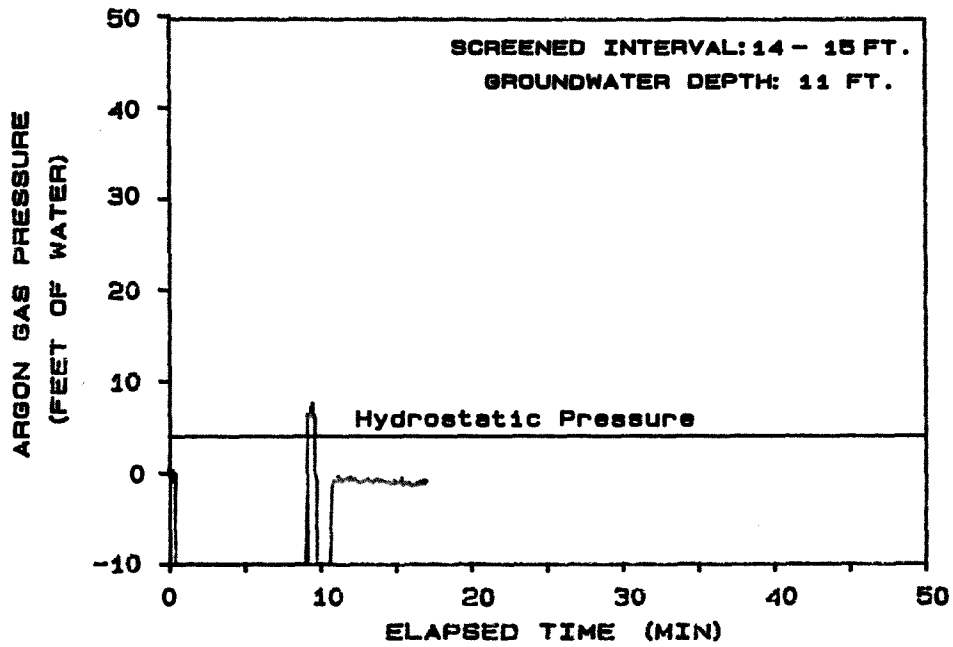
DATE: 06-21-1995 LOCATION: SWMU15 ST7

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

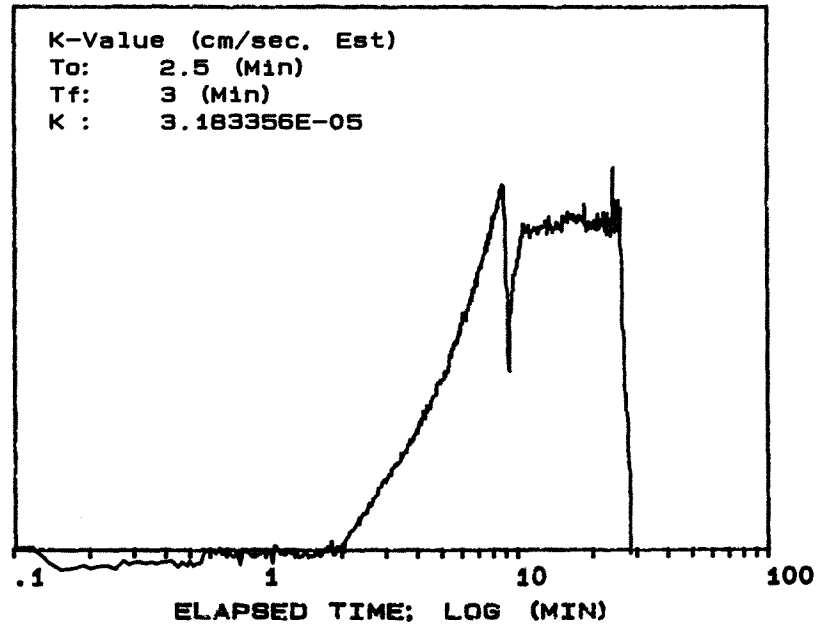
SAMPLE #: 15GH0815

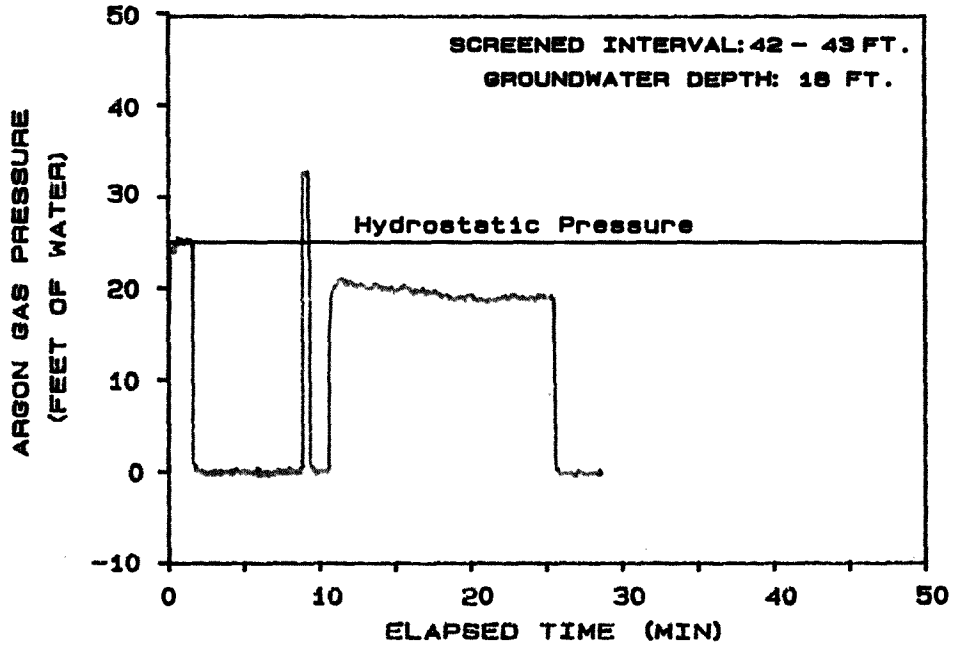
CLIENT: ENSAFE JOB: NASM094

DATE: 05-21-1995 LOCATION: SWMU15 ST8

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

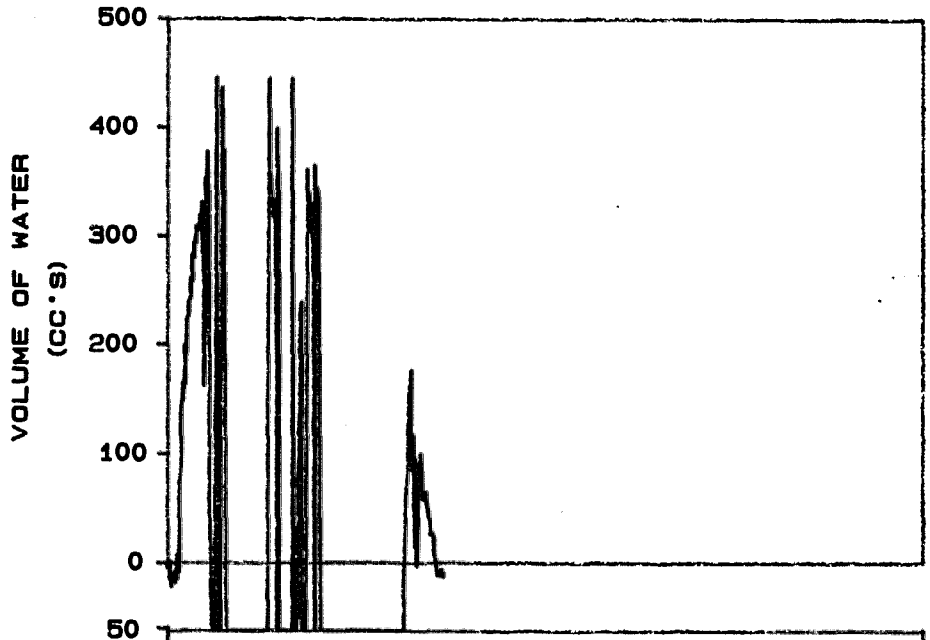
SAMPLE #: 15GH0843

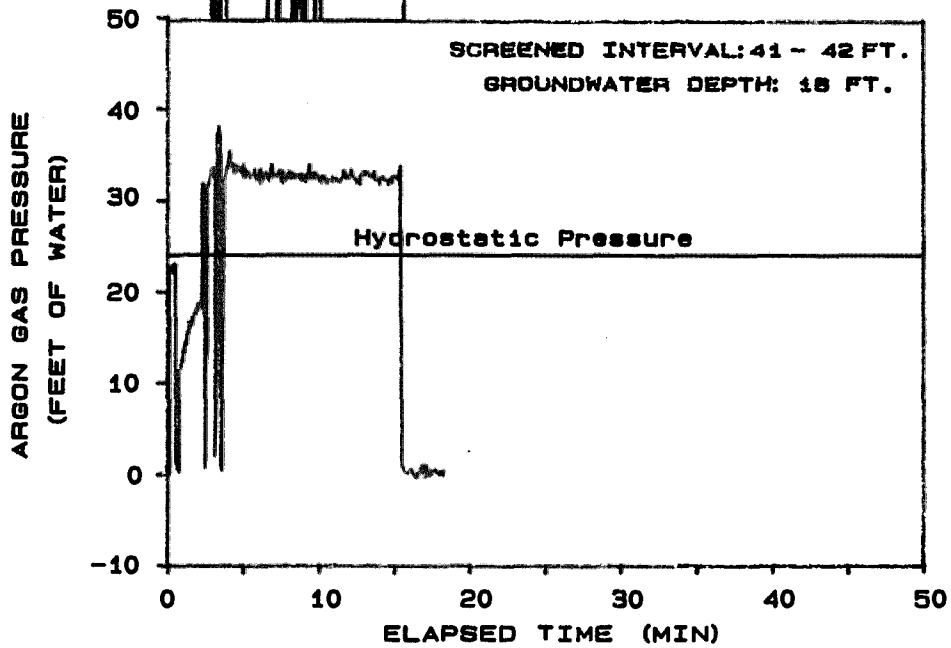
CLIENT: ENSAFE JOB: NASM094

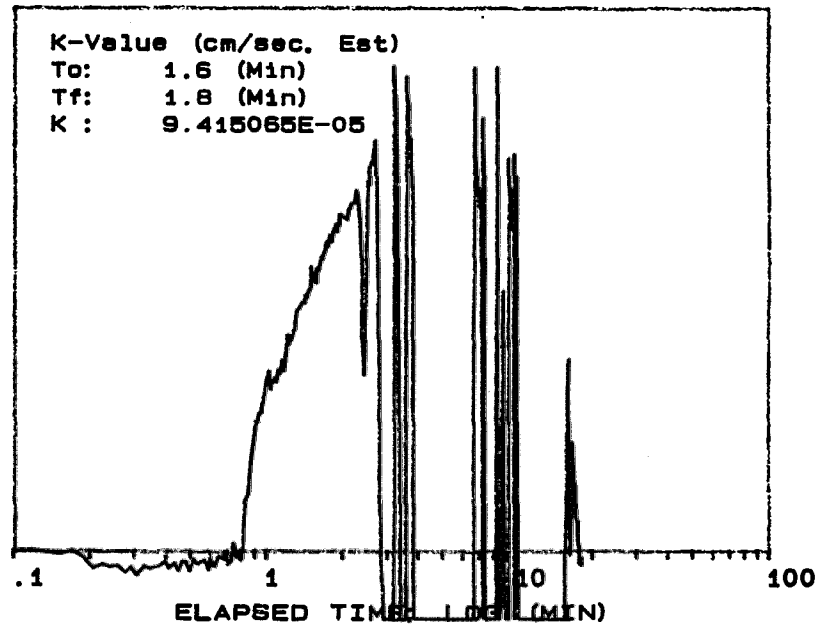
DATE: 05-21-1995 LOCATION: SWMU15 ST8

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

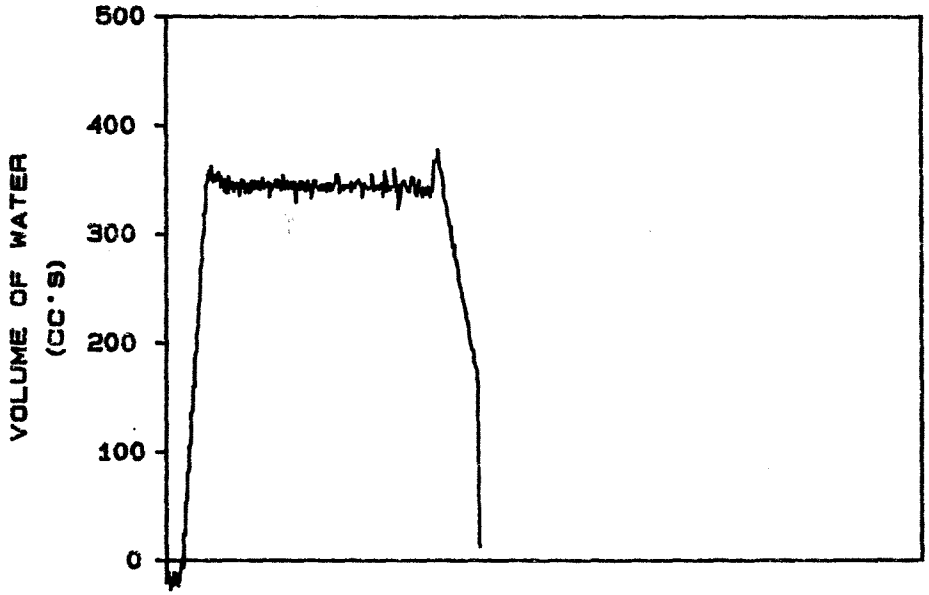
SAMPLE #: 15GH094E

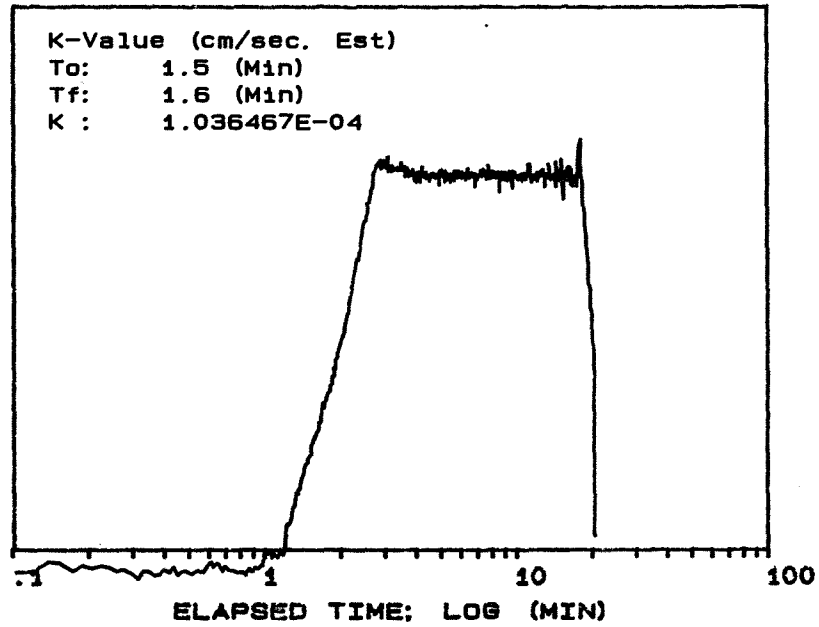
CLIENT: ENSAFE JOB: NASM094

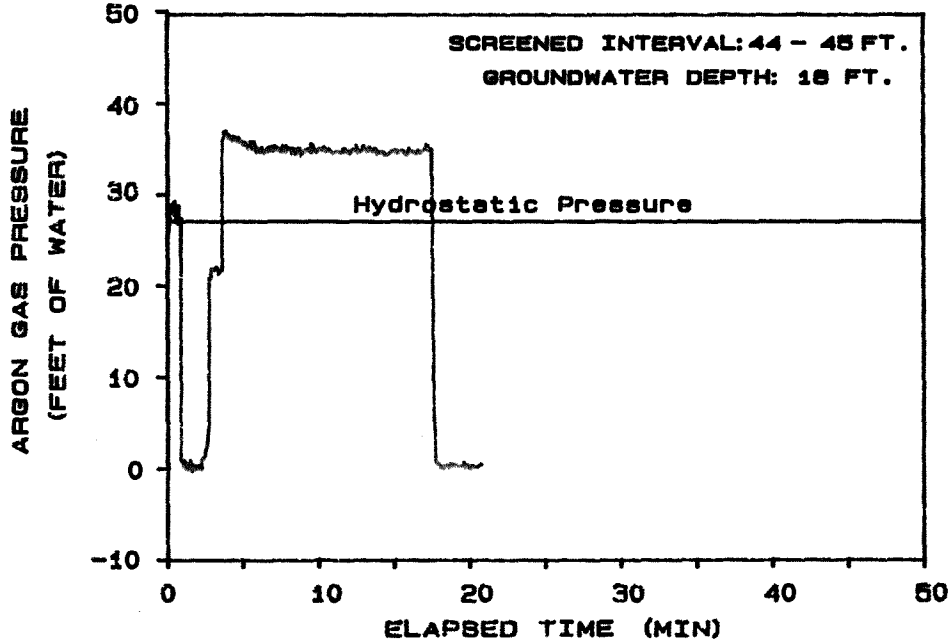
DATE: 5-23-1995 LOCATION: SWMU15 ST9

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

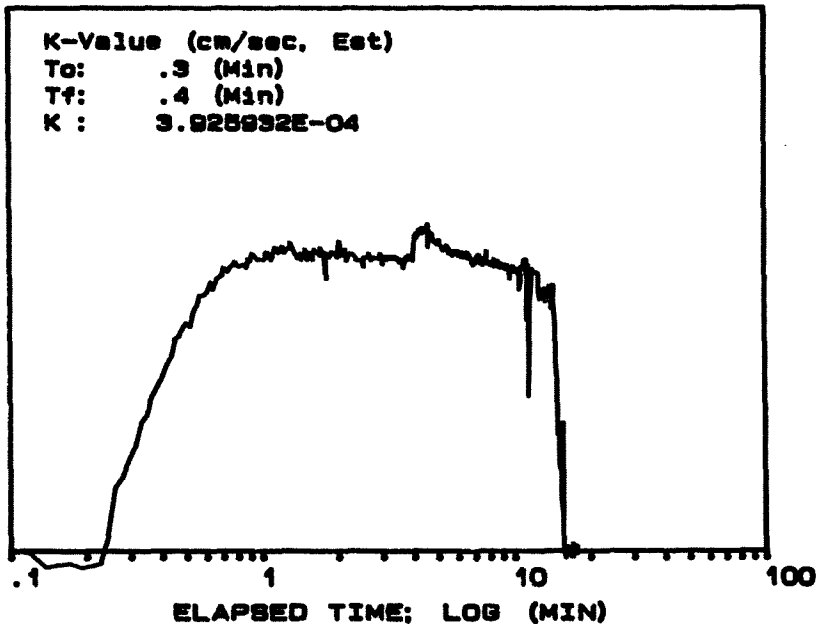
SAMPLE #: 15GH1045

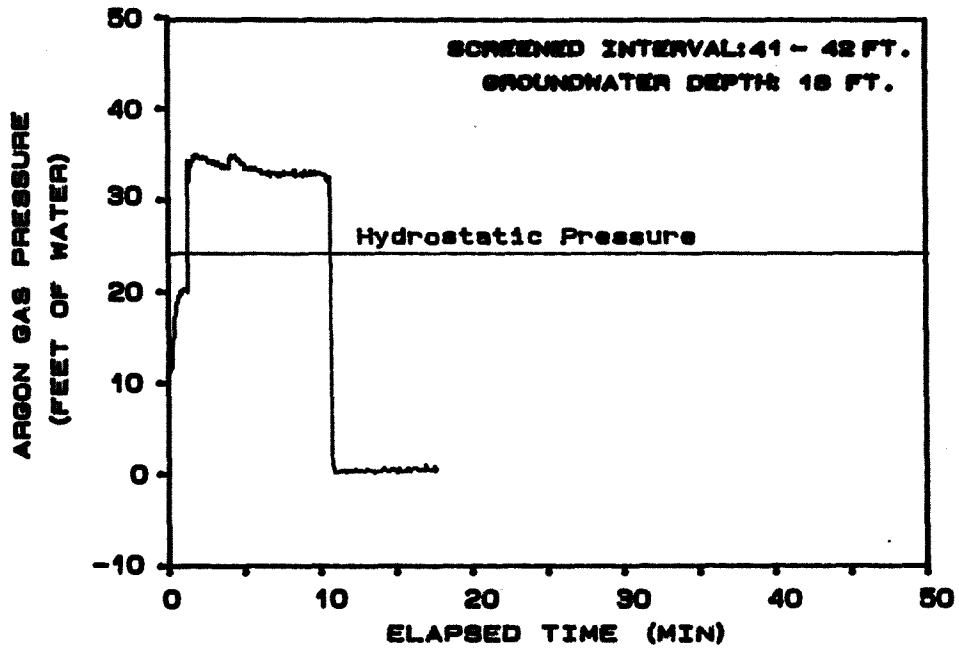
CLIENT: ENSAFE JOB: NASM094

DATE: 05-21-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

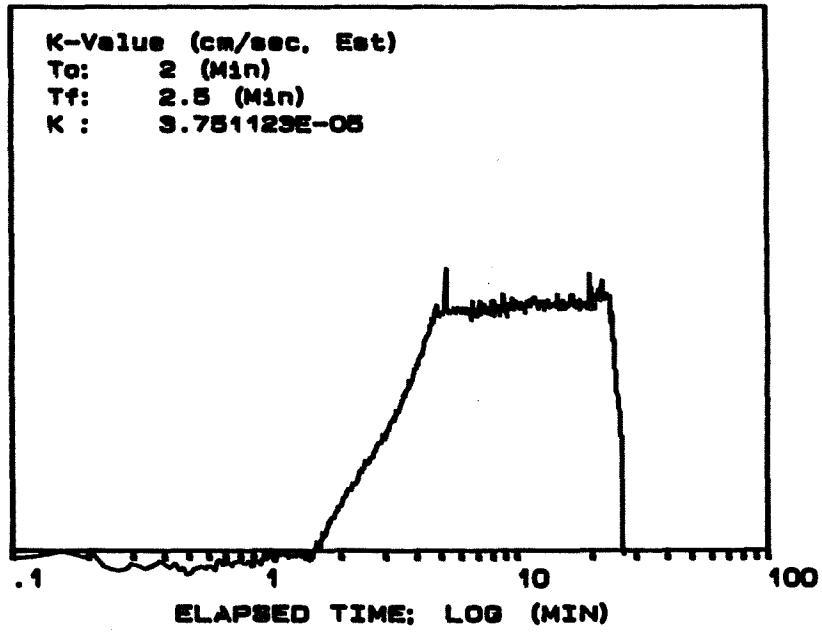
SAMPLE #: 15GH1142

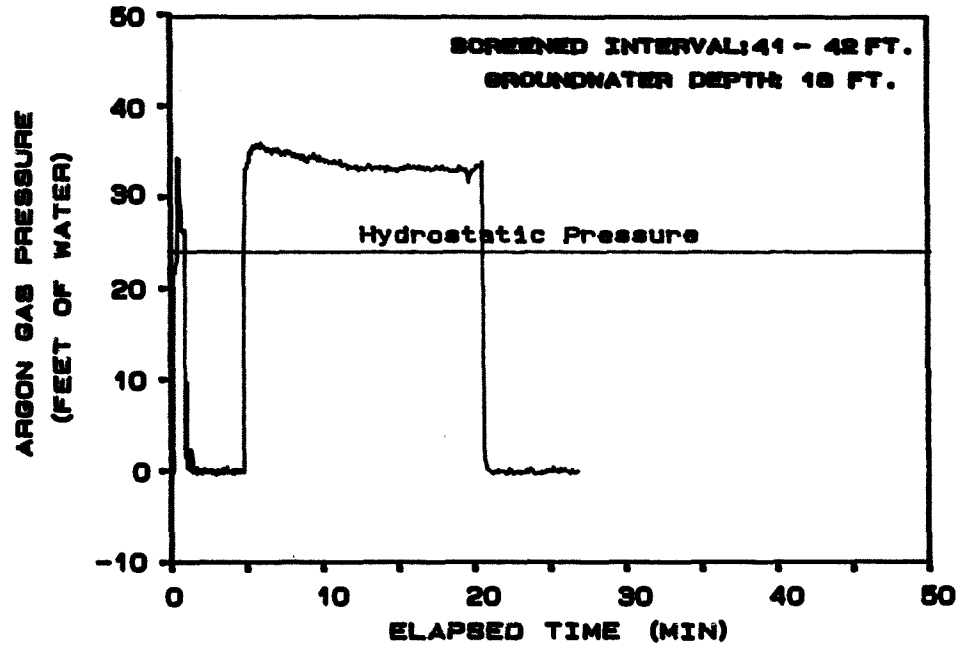
CLIENT: ENSAFE JOB: NASM094

DATE: 05-17-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

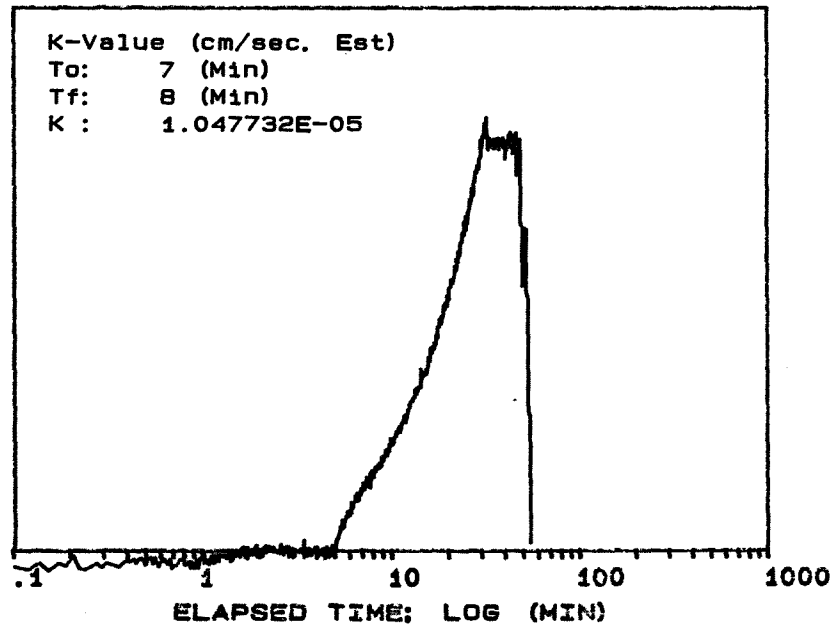
SAMPLE #: 15GH1242

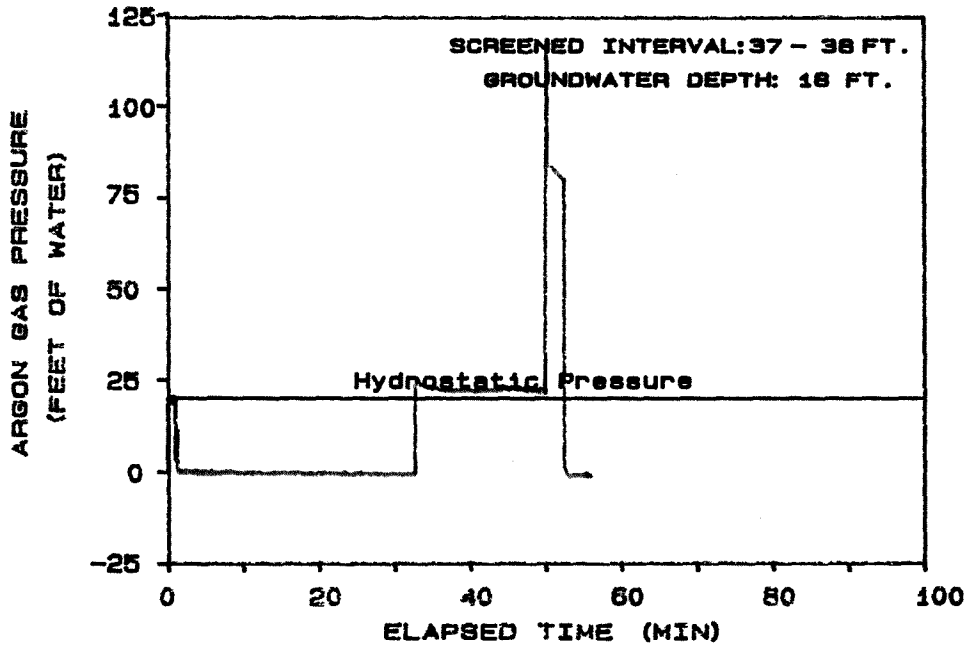
CLIENT: ENSAFE JOB: NASM094

DATE: 05-17-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

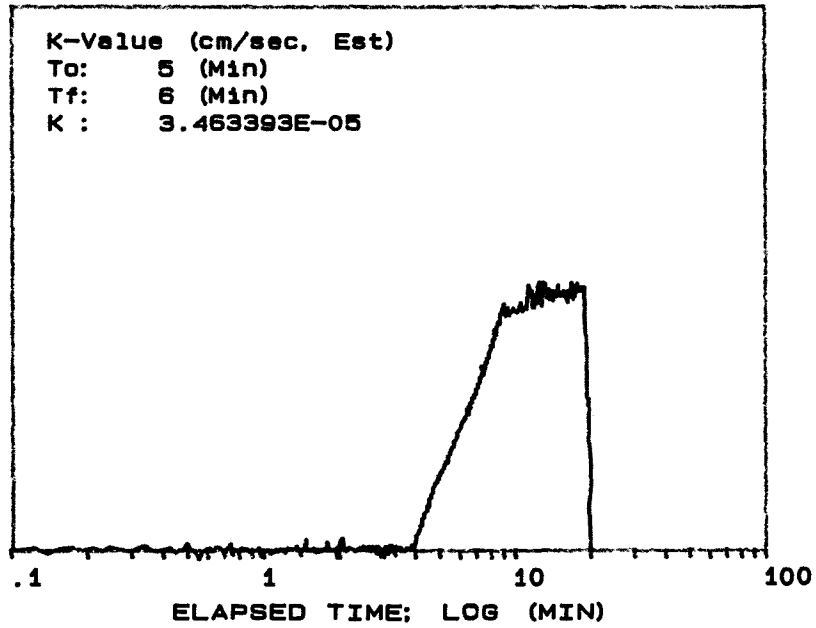
SAMPLE #: 15GH1338

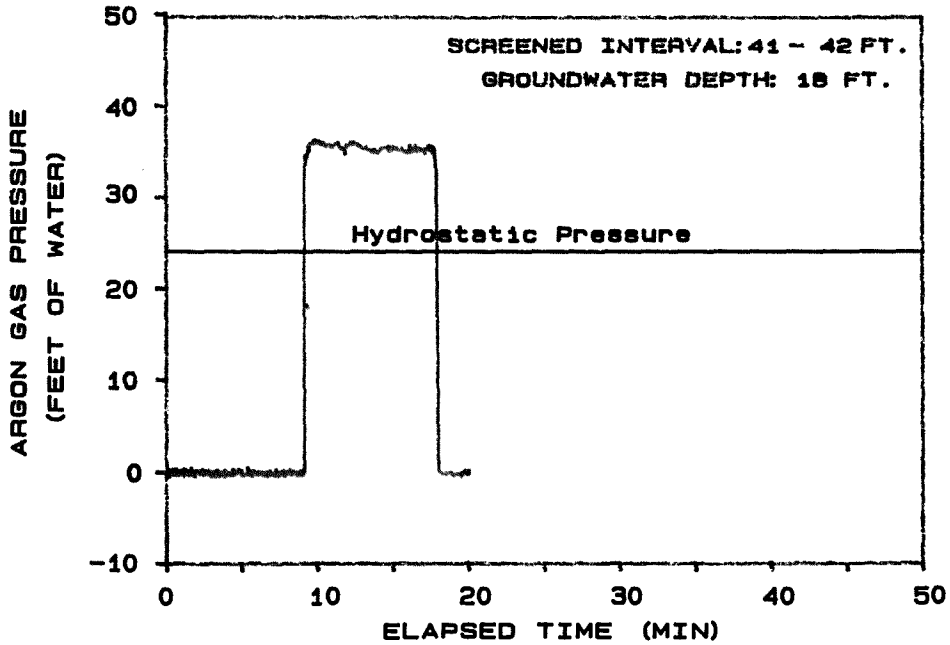
CLIENT: ENSAFE JOB: NASM094

DATE: 05-21-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

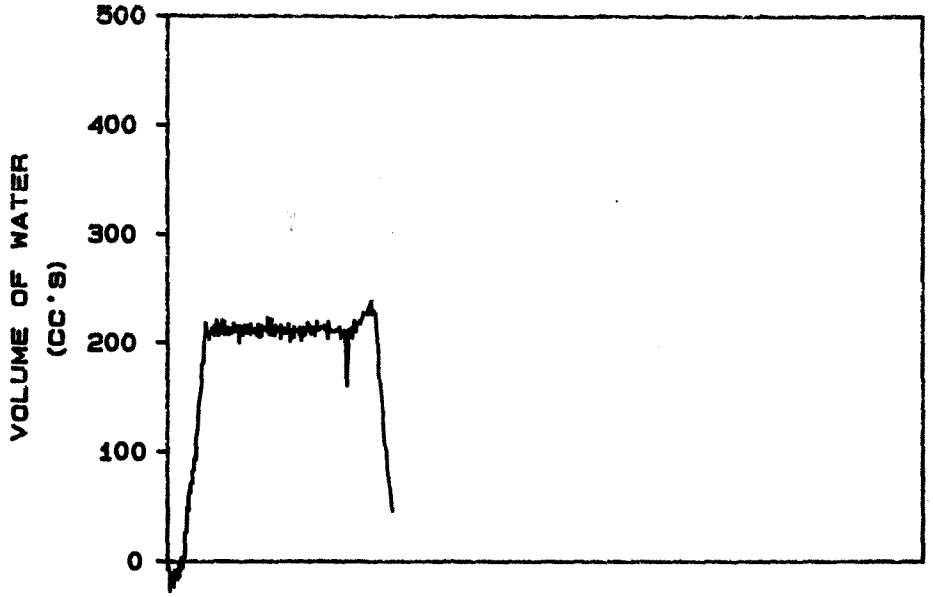
SAMPLE #: 15GH144E

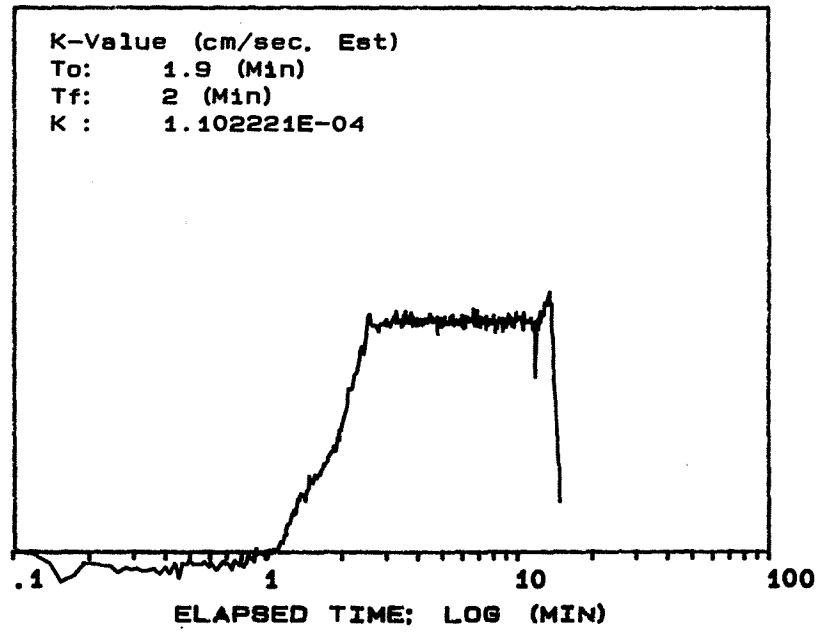
CLIENT: ENSAFE JOB: NASM094

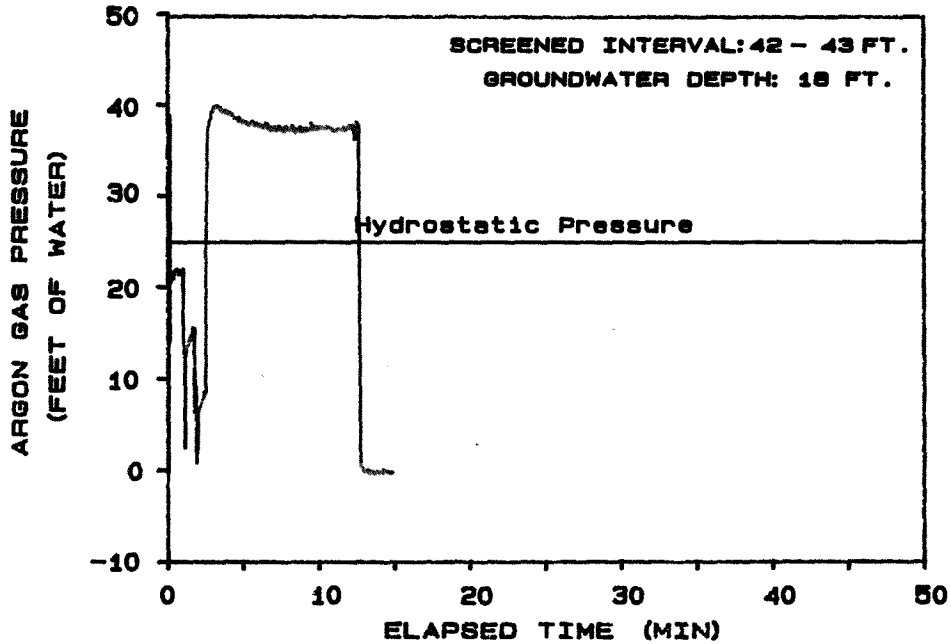
DATE: 05-17-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

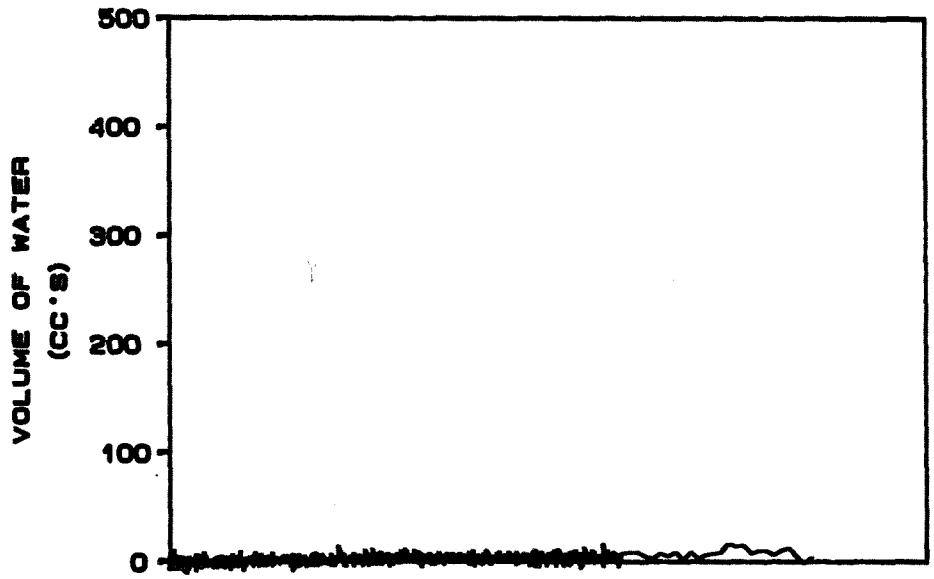
SAMPLE #: 15GH1543

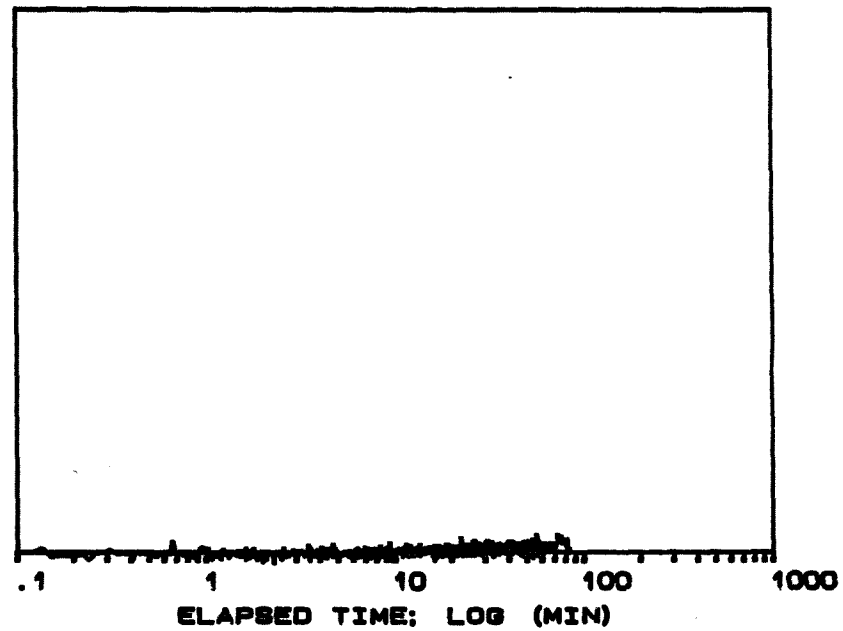
CLIENT: ENSAFE JOB: NASM094

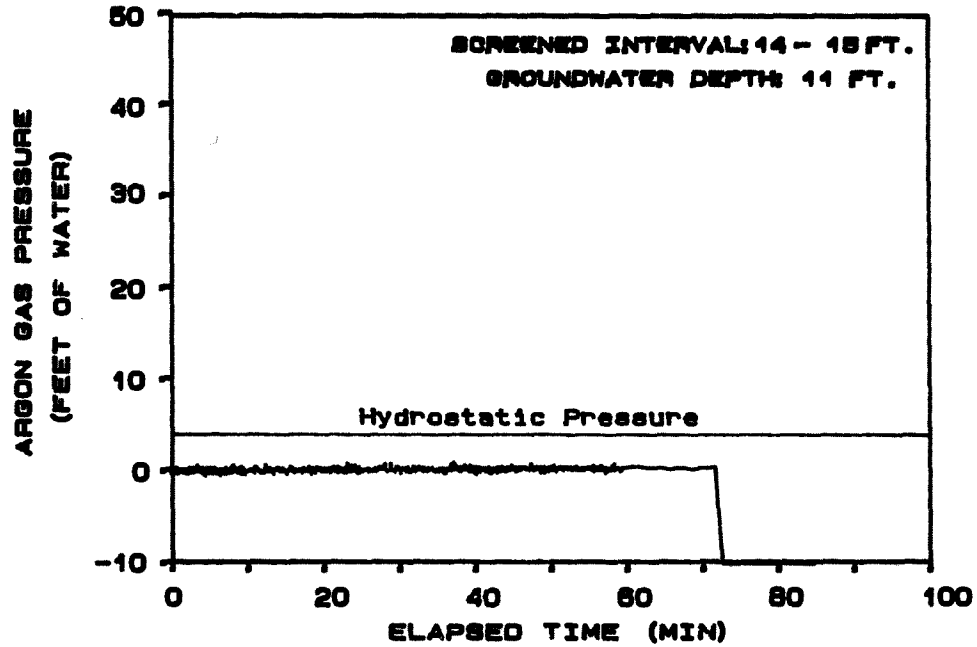
DATE: 05-17-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

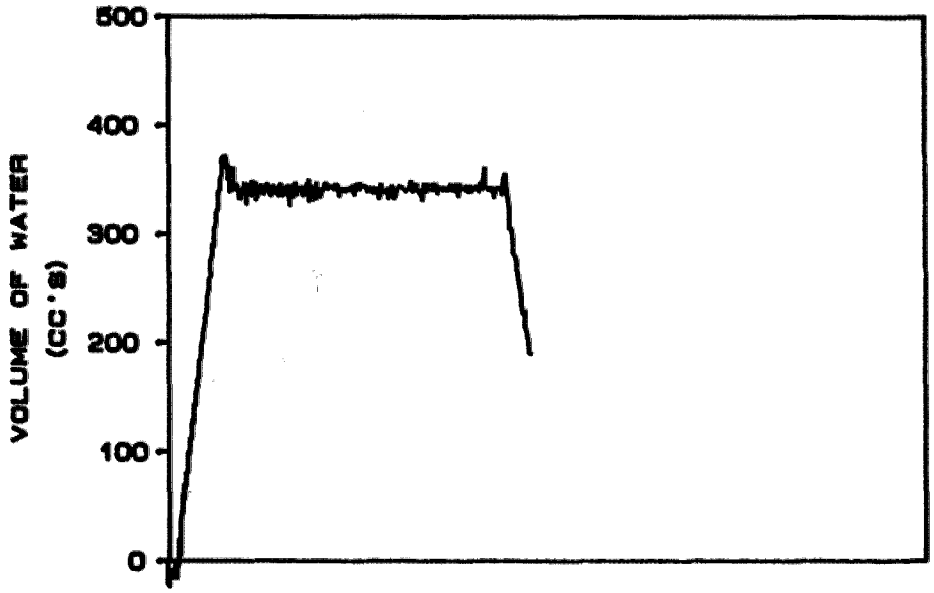
SAMPLE #: 15GH1615

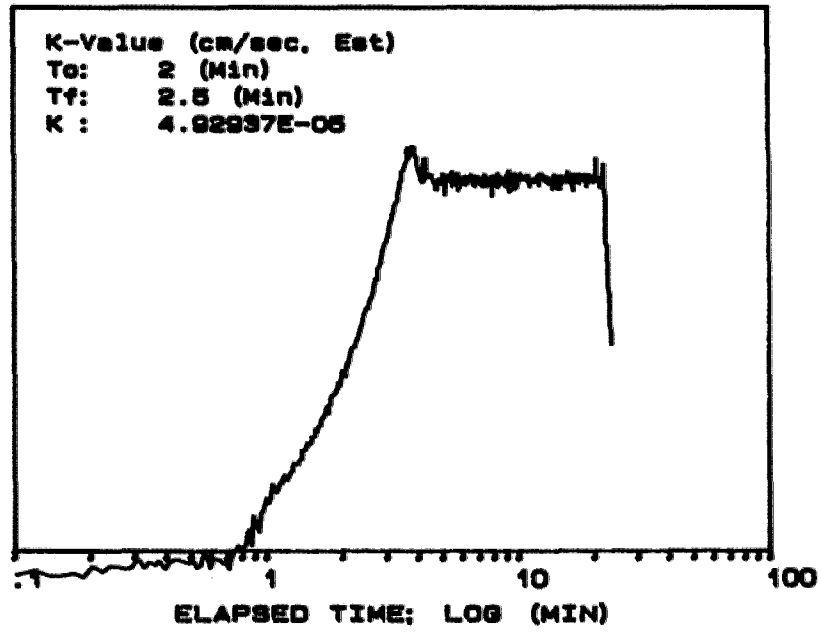
CLIENT: ENSAFE JOB: NASM094

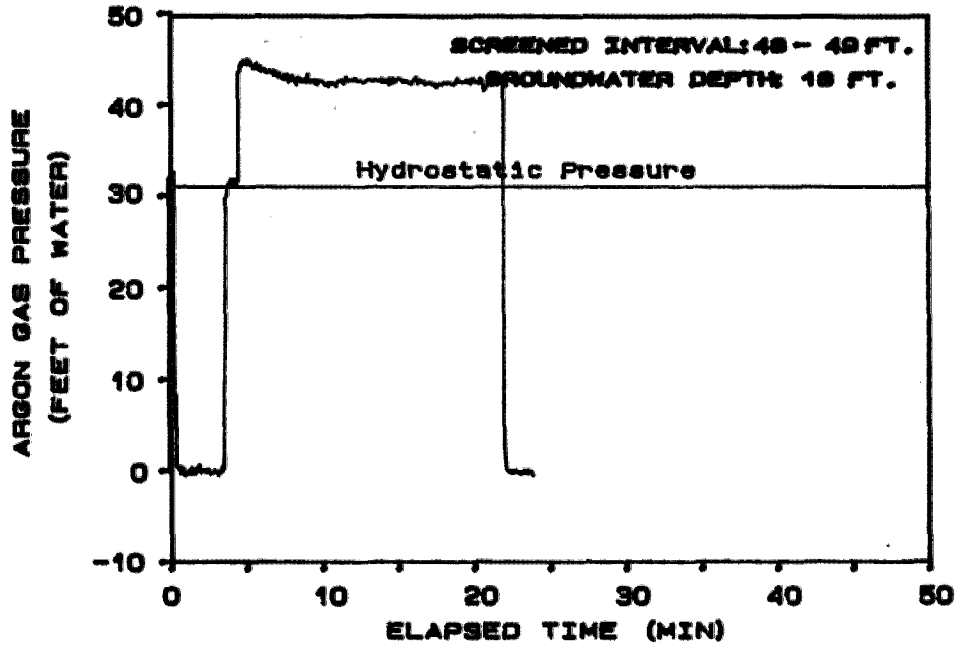
DATE: 05-21-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

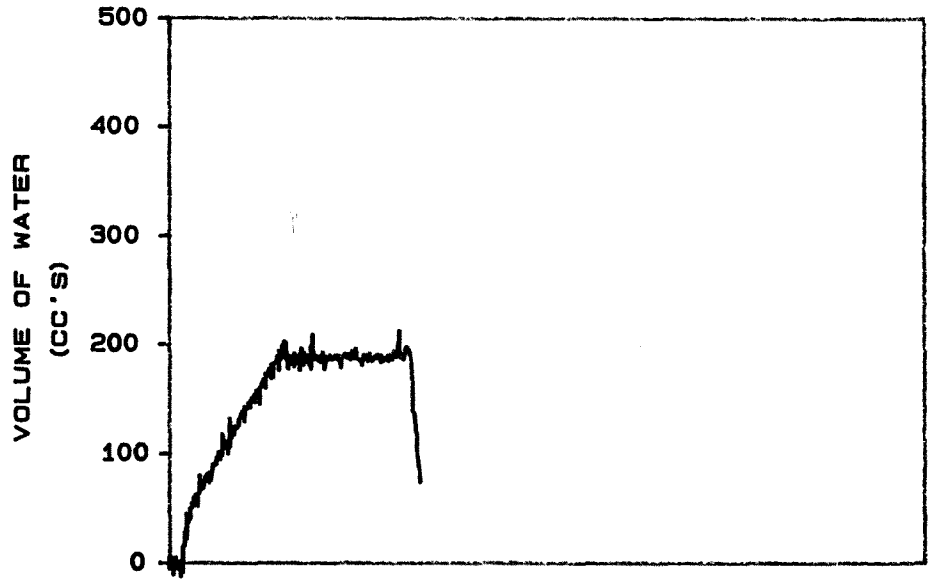
SAMPLE #: 15GH1649

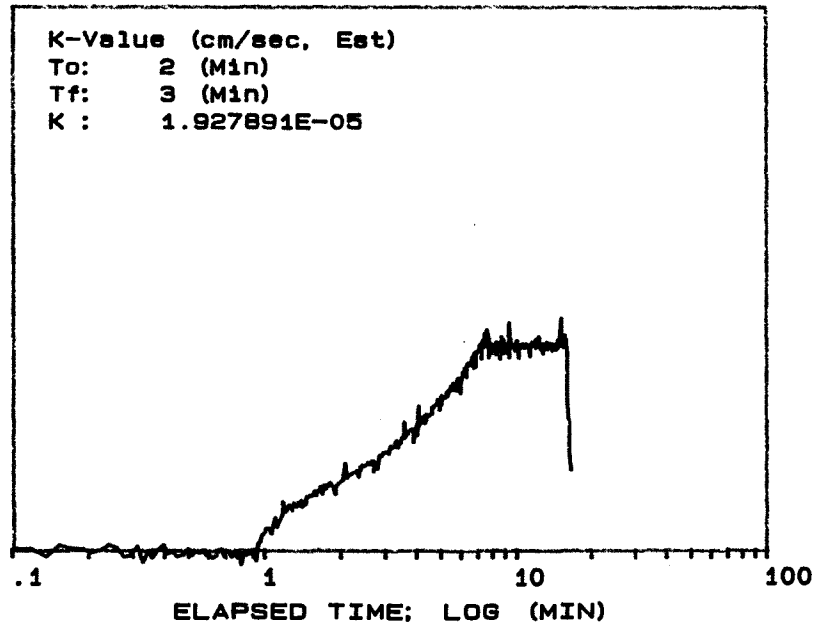
CLIENT: ENSAFE JOB: NASM094

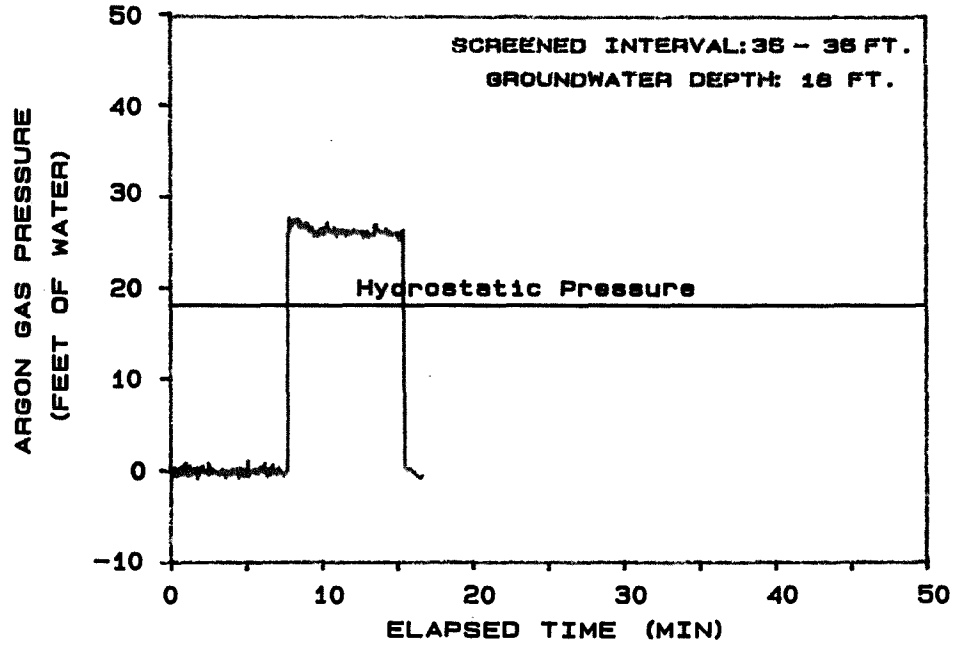
DATE: 05-21-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

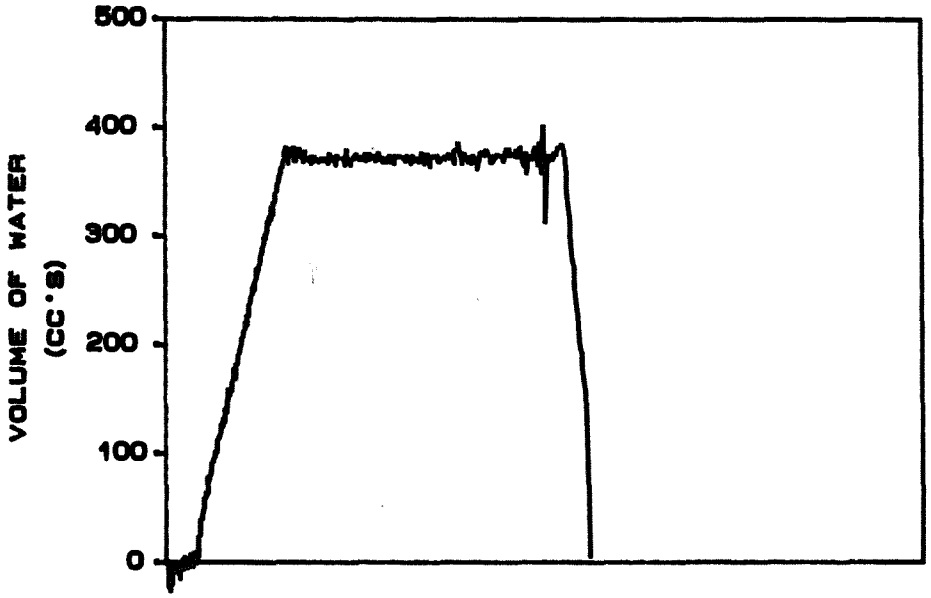
SAMPLE #: 15GH173E

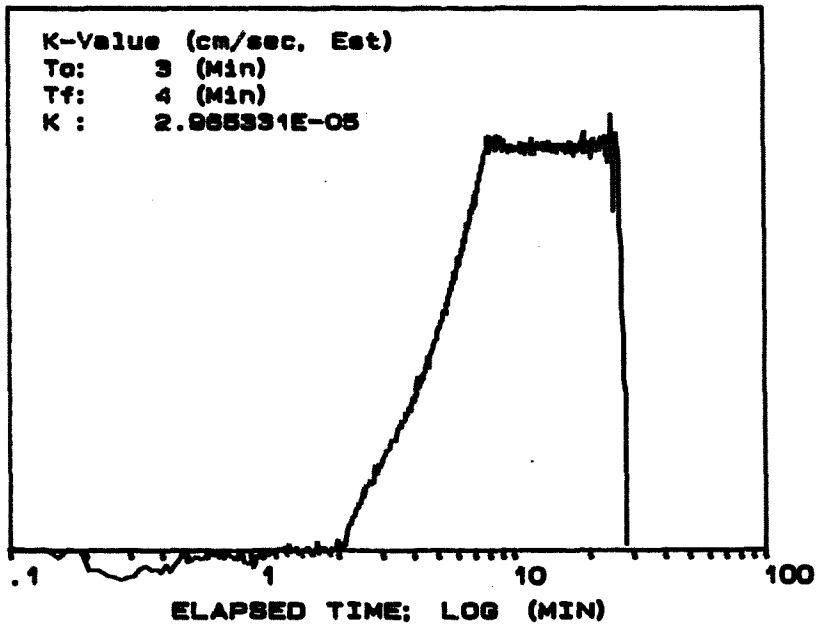
CLIENT: ENSAFE JOB: NASM094

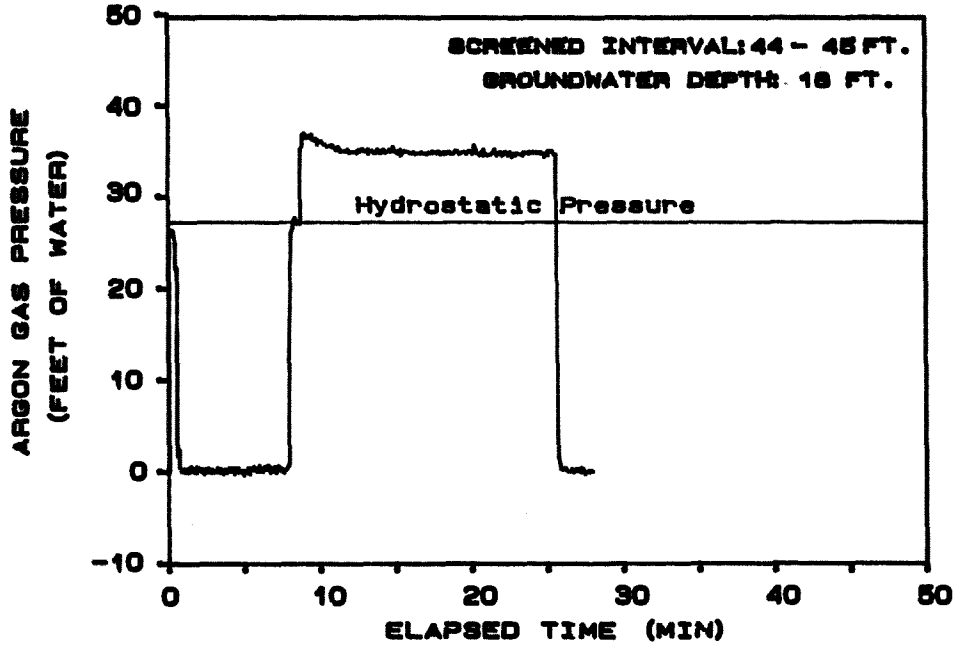
DATE: 05-23-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

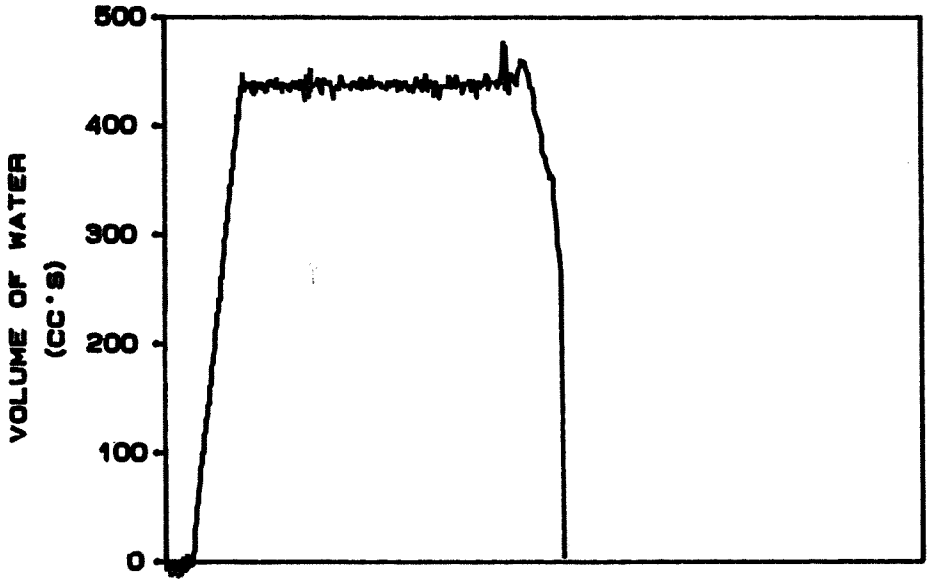
SAMPLE #: 15GH1845

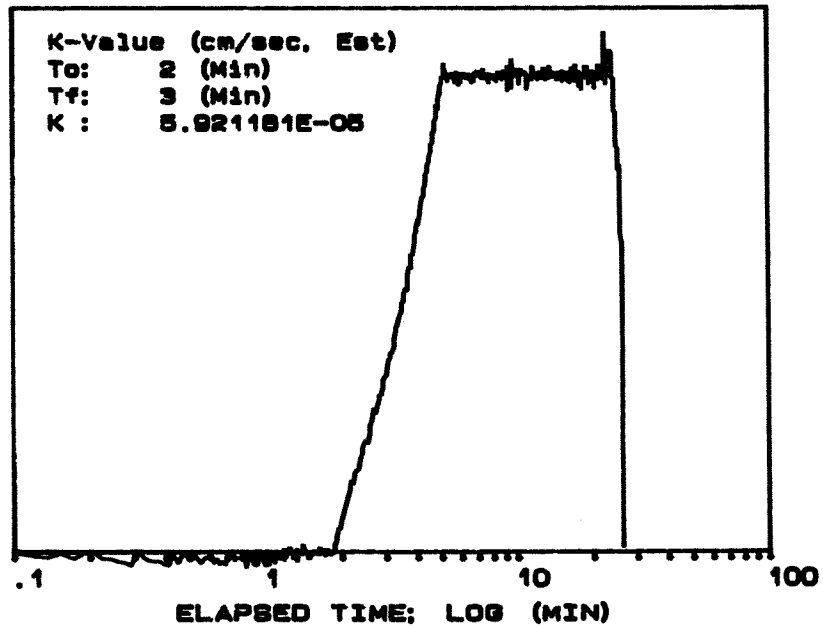
CLIENT: ENSAFE JOB: NASM094

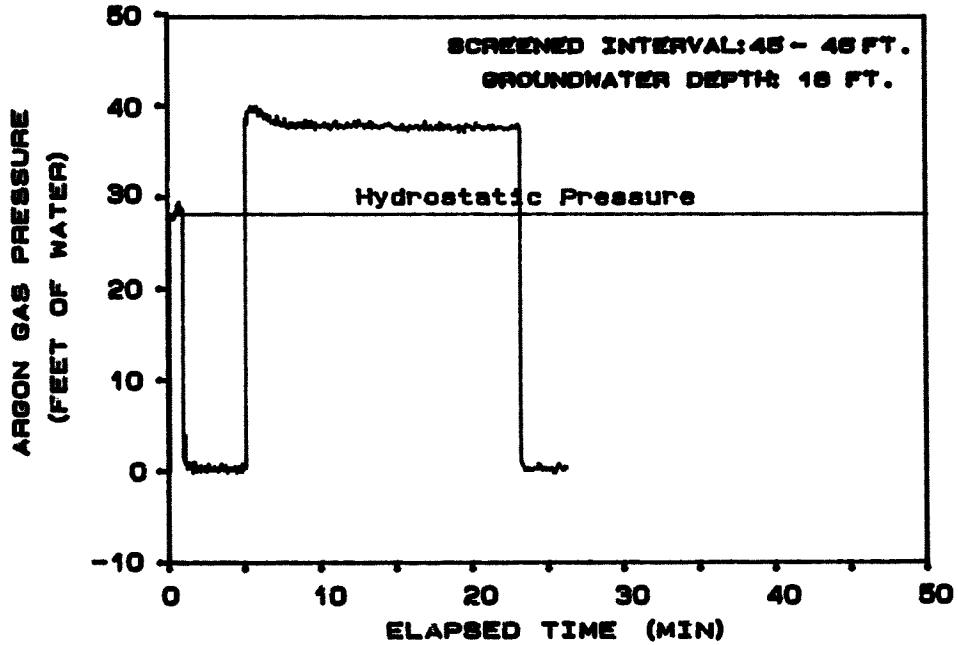
DATE: 05-21-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

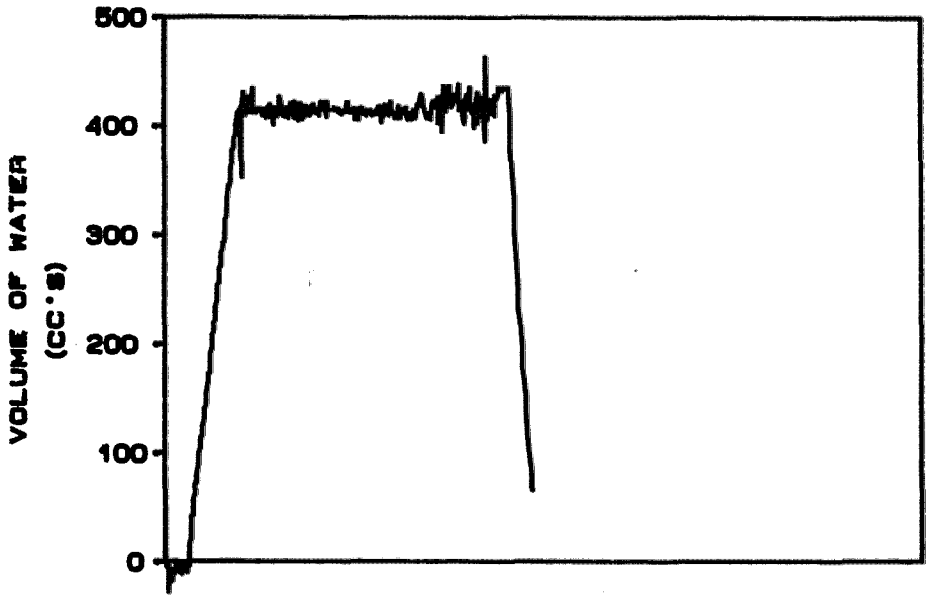
SAMPLE #: 15GH1946

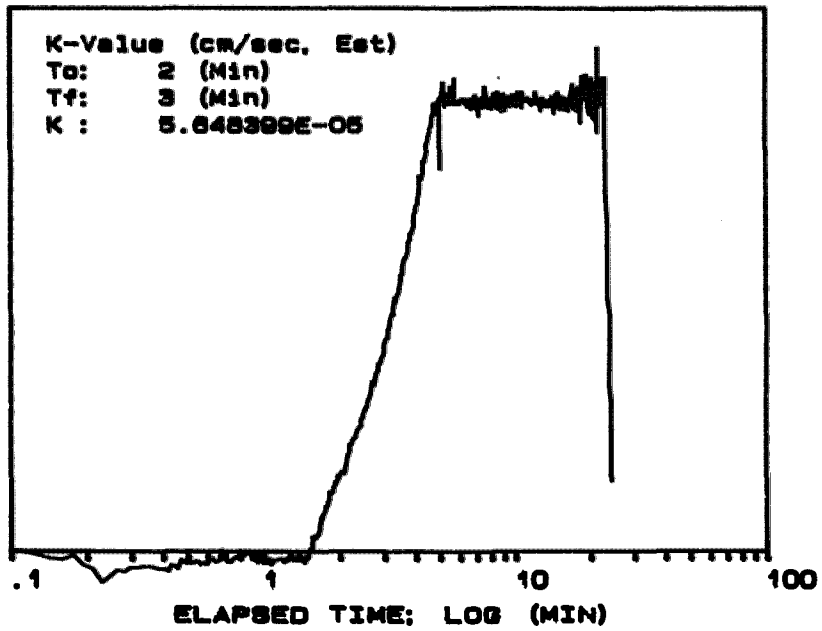
CLIENT: ENSAFE JOB: NASM094

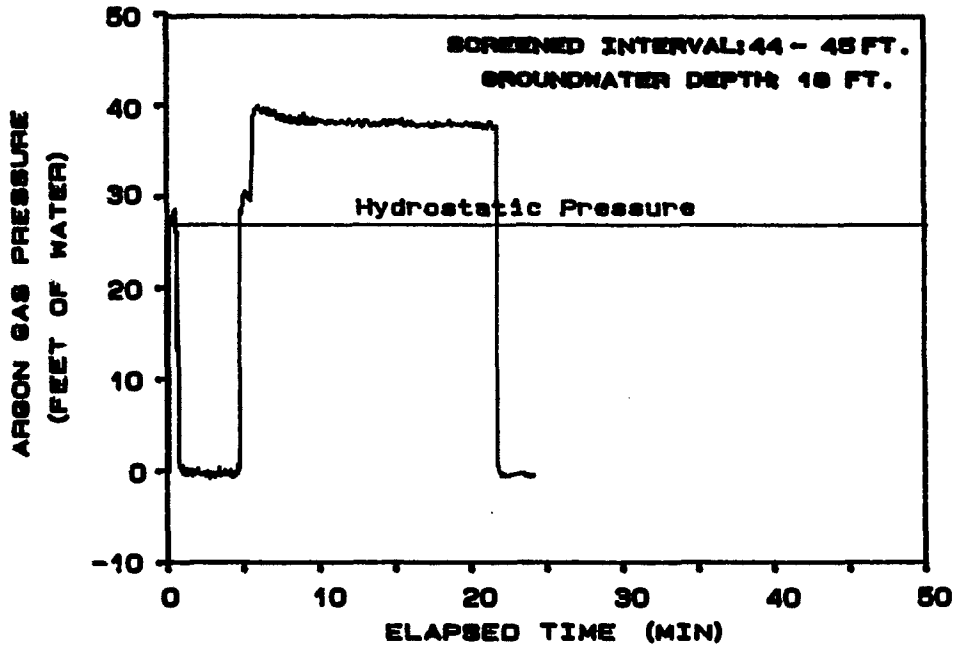
DATE: 05-21-1995 LOCATION: SWMU15 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

SAMPLE #: 15GH2045

CLIENT: ENSAFE JOB: NASM094

DATE: 05-21-1995 LOCATION: SWMU15 ST2

PERFORMED BY:

SUBSURFACE TECHNOLOGY

Appendix C

Analytical Data

FORMAT: *XXXX* \ 1 2 3 4 5 6 7 8 9 0

XXXX \ - OPTIONAL project prefix
1 2 3 - SITE where sample collected
4 - MATRIX / QC code
5 6 7 8 - SAMPLING LOCATION
9 0 - DEPTH, INTERVAL, SERIAL #

All spaces MUST be filled and no extra characters included.
Use zeroes as space-fillers. Indicate MS/MSDs on COCs.

MATRIX/QC CODES:
S - soil (surface, borings, and trenches)
C - soil duplicate sample
M - sediment (settled, fluid-borne solid)
N - sediment duplicate
G - groundwater
H - groundwater duplicate sample
W - surface water
R - surface water duplicate sample
U - sludge
Y - sludge duplicate
A - air
Z - liquid waste (including IDW drums)
V - solid waste (including IDW drums) ,

T - trip blank
E - equipment rinsate blank
D - DI system blank
P - potable water blank
F - field blank
L - filter blank
B - EPA blind spike sample
2 - cement blank
3 - drilling mud
4 - grout blank
5 - bentonite blank
6 - sand blank

NAS MEMPHIS
NAS MEMPHIS, RFI, ASSEMBLY C
SWMU 15 - Primary Samples

VOA													
	SAMPLE ID ------->	015-H-0001-03		015-C-0002-01		015-H-0002-03		015-H-0004-02		015-C-0012-02		015-C-0015-02	
	ORIGINAL ID ----->	015H000103		015C000201		015H000203		015H000402		015C001202		015C001502	
	LAB SAMPLE ID --->	123670		123672		123671		123675		123673		123674	
	ID FROM REPORT -->	015H000103		015C000201		015H000203		015H000402		015C001202		015C001502	
	SAMPLE DATE ----->	05/16/95		05/16/95		05/16/95		05/17/95		05/17/95		05/17/95	
	DATE ANALYZED --->	05/25/95		05/26/95		05/26/95		05/24/95		05/25/95		05/25/95	
	MATRIX ---------->	Water		Soil		Water		Water		Soil		Soil	
	UNITS ---------->	UG/L		UG/KG		UG/L		UG/L		UG/KG		UG/KG	
CAS #	Parameter	1407	VAL	1407	VAL	1407	VAL	1407	VAL	1407	VAL	1407	VAL
74-87-3	Chloromethane	10.	UJ	12.	U	20.	UJ	100.	U	13.	UJ	13.	UJ
74-83-9	Bromomethane	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
75-01-4	Vinyl chloride	10.	UJ	12.	U	20.	UJ	100.	U	13.	U	13.	U
75-00-3	Chloroethane	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
75-09-2	Methylene chloride	7.	J	12.	U	3.	J	100.	U	3.	J	2.	J
67-64-1	Acetone	10.	U	58.	U	330.		810.		13.	U	13.	U
75-15-0	Carbon disulfide	3.	J	12.	U	3.	J	100.	U	13.	U	13.	U
75-35-4	1,1-Dichloroethene	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
75-34-3	1,1-Dichloroethane	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
540-59-0	1,2-Dichloroethene (total)	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
67-66-3	Chloroform	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
107-06-2	1,2-Dichloroethane	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
78-93-3	2-Butanone (MEK)	10.	U	6.	J	20.	U	100.	U	13.	U	13.	U
71-55-6	1,1,1-Trichloroethane	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
56-23-5	Carbon tetrachloride	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
75-27-4	Bromodichloromethane	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
78-87-5	1,2-Dichloropropane	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
10061-01-5	cis-1,3-Dichloropropene	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
79-01-6	Trichloroethene	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
124-48-1	Dibromochloromethane	10.	U	12.	UJ	20.	U	100.	U	13.	U	13.	U
79-00-5	1,1,2-Trichloroethane	10.	U	12.	UJ	20.	U	100.	U	13.	U	13.	U
71-43-2	Benzene	10.	U	12.	U	20.	U	1800.		13.	U	6.	J
10061-02-6	trans-1,3-Dichloropropene	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
75-25-2	Bromoform	10.	U	12.	U	20.	U	100.	U	13.	U	13.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	10.	U	12.	U	20.	U	100.	U	13.	UJ	13.	U
591-78-6	2-Hexanone	10.	U	12.	U	20.	U	100.	U	13.	UJ	13.	U
127-18-4	Tetrachloroethene	10.	U	12.	U	20.	U	100.	U	13.	UJ	13.	U
79-34-5	1,1,2,2-Tetrachloroethane	10.	U	12.	U	20.	U	100.	U	13.	UJ	13.	U
108-88-3	Toluene	2.	J	12.	U	3.	J	180.		13.	UJ	13.	U
108-90-7	Chlorobenzene	10.	U	12.	U	20.	U	100.	U	13.	UJ	13.	U
100-41-4	Ethylbenzene	10.	U	27.		20.	U	720.		8600.	D	200.	
100-42-5	Styrene	10.	U	12.	U	20.	U	100.	U	13.	UJ	13.	U
1330-20-7	Xylene (Total)	2.	J	12.	U	3.	J	1600.		39000.	D	130.	

*** Validation Complete ***

NAS MEMPHIS
NAS MEMPHIS, RFI, ASSEMBLY C
SWMU 15 - Primary Samples

VOA													
	SAMPLE ID ------->	015-C-0050-07		015-H-0080-15		015-H-0080-43		015-C-0100-07		015-C-0100-17		015-H-0100-45	
	ORIGINAL ID ----->	015C005007		015H008015		015H008043		015C010007		015C010017		015H010045	
	LAB SAMPLE ID --->	123954		123749		123750		123745		123746		123748	
	ID FROM REPORT -->	015C005007		015H008015		015H008043		015C010007		015C010017		015H010045	
	SAMPLE DATE ----->	05/23/95		05/19/95		05/19/95		05/19/95		05/19/95		05/19/95	
	DATE ANALYZED --->	05/26/95		05/25/95		05/30/95		05/26/95		05/26/95		05/23/95	
	MATRIX ---------->	Soil		Water		Water		Soil		Soil		Water	
	UNITS ---------->	UG/KG		UG/L		UG/L		UG/KG		UG/KG		UG/L	
CAS #	Parameter	1411	VAL	1407	VAL	1407	VAL	1407	VAL	1407	VAL	1407	VAL
74-87-3	Chloromethane	12.	U	50.	UJ	10.	UJ	12.	U	13.	U	10.	U
74-83-9	Bromomethane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
75-01-4	Vinyl chloride	12.	U	50.	UJ	10.	UJ	12.	U	13.	U	10.	U
75-00-3	Chloroethane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
75-09-2	Methylene chloride	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
67-64-1	Acetone	26.	U	50.	U	10.	U	14.	UJ	25.	UJ	10.	U
75-15-0	Carbon disulfide	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
75-35-4	1,1-Dichloroethene	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
75-34-3	1,1-Dichloroethane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
540-59-0	1,2-Dichloroethene (total)	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
67-66-3	Chloroform	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
107-06-2	1,2-Dichloroethane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
78-93-3	2-Butanone (MEK)	12.	U	50.	U	10.	U	5.	J	13.	U	10.	U
71-55-6	1,1,1-Trichloroethane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
56-23-5	Carbon tetrachloride	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
75-27-4	Bromodichloromethane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
78-87-5	1,2-Dichloropropane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
10061-01-5	cis-1,3-Dichloropropene	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
79-01-6	Trichloroethene	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
124-48-1	Dibromochloromethane	12.	UJ	50.	U	10.	U	12.	U	13.	U	10.	U
79-00-5	1,1,2-Trichloroethane	12.	UJ	50.	U	10.	U	12.	U	13.	U	10.	U
71-43-2	Benzene	12.	U	78.		68.		12.	U	13.	U	2.	J
10061-02-6	trans-1,3-Dichloropropene	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
75-25-2	Bromoform	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
591-78-6	2-Hexanone	12.	U	50.	U	10.	U	12.	UJ	13.	UJ	10.	U
127-18-4	Tetrachloroethene	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
79-34-5	1,1,2,2-Tetrachloroethane	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
108-88-3	Toluene	12.	U	50.	U	1.	J	12.	U	13.	U	10.	U
108-90-7	Chlorobenzene	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
100-41-4	Ethylbenzene	12.	U	240.		12.		6.	J	10.	J	2.	J
100-42-5	Styrene	12.	U	50.	U	10.	U	12.	U	13.	U	10.	U
1330-20-7	Xylene (Total)	12.	U	83.		2.	J	25.		4.	J	10.	U

*** Validation Complete ***

NAS MEMPHIS
NAS MEMPHIS, RFI, ASSEMBLY C
SWMU 15 - Primary Samples

VOA											
	SAMPLE ID ------->	015-C-0180-07		015-C-0190-17		015-C-0200-07					
	ORIGINAL ID ----->	015C018007		015C019017		015C020007					
	LAB SAMPLE ID --->	123747		123953		123952					
	ID FROM REPORT -->	015C018007		015C019017		015C020007					
	SAMPLE DATE ----->	05/19/95		05/23/95		05/23/95					
	DATE ANALYZED --->	05/26/95		05/26/95		05/26/95					
	MATRIX ---------->	Soil		Soil		Soil					
	UNITS ---------->	UG/KG		UG/KG		UG/KG					
CAS #	Parameter	1407	VAL	1411	VAL	1411	VAL				
74-87-3	Chloromethane	12.	U	13.	U	12.	U				
74-83-9	Bromomethane	12.	U	13.	U	12.	U				
75-01-4	Vinyl chloride	12.	U	13.	U	12.	U				
75-00-3	Chloroethane	12.	U	13.	U	12.	U				
75-09-2	Methylene chloride	12.	U	13.	U	12.	U				
67-64-1	Acetone	21.	UJ	69.	U	33.	U				
75-15-0	Carbon disulfide	12.	U	13.	U	12.	U				
75-35-4	1,1-Dichloroethene	12.	U	13.	U	12.	U				
75-34-3	1,1-Dichloroethane	12.	U	13.	U	12.	U				
540-59-0	1,2-Dichloroethene (total)	12.	U	13.	U	12.	U				
67-66-3	Chloroform	12.	U	13.	U	12.	U				
107-06-2	1,2-Dichloroethane	12.	U	13.	U	12.	U				
78-93-3	2-Butanone (MEK)	12.	U	13.	U	12.	U				
71-55-6	1,1,1-Trichloroethane	12.	U	13.	U	12.	U				
56-23-5	Carbon tetrachloride	12.	U	13.	U	12.	U				
75-27-4	Bromodichloromethane	12.	U	13.	U	12.	U				
78-87-5	1,2-Dichloropropane	12.	U	13.	U	12.	U				
10061-01-5	cis-1,3-Dichloropropene	12.	U	13.	U	12.	U				
79-01-6	Trichloroethene	12.	U	13.	U	12.	U				
124-48-1	Dibromochloromethane	12.	U	13.	UJ	12.	UJ				
79-00-5	1,1,2-Trichloroethane	12.	U	13.	UJ	12.	UJ				
71-43-2	Benzene	12.	U	13.	U	12.	U				
10061-02-6	trans-1,3-Dichloropropene	12.	U	13.	U	12.	U				
75-25-2	Bromoform	12.	U	13.	U	12.	U				
108-10-1	4-Methyl-2-Pentanone (MIBK)	12.	U	13.	U	12.	U				
591-78-6	2-Hexanone	12.	UJ	13.	U	12.	U				
127-18-4	Tetrachloroethene	12.	U	13.	U	12.	U				
79-34-5	1,1,2,2-Tetrachloroethane	12.	U	13.	U	12.	U				
108-88-3	Toluene	12.	U	13.	U	12.	U				
108-90-7	Chlorobenzene	12.	U	13.	U	12.	U				
100-41-4	Ethylbenzene	12.	U	13.	U	12.	U				
100-42-5	Styrene	12.	U	13.	U	12.	U				
1330-20-7	Xylene (Total)	2.	J	13.	U	12.	U				

*** Validation Complete ***

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000101 Date: 06/06/95 Dilution: 1
Lab File ID:NAS69A.001 Blank: blk0606.001
Calibration Std.:vc0606.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	83	69.5	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	11	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000102 Date: 06/07/95 Dilution: 1
Lab File ID:NAS68A.001 Blank: blk0607.001
Calibration Std.:vc0607.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	79.6	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	61	n/a	
m,p-Xylenes	5.5	n/a	
Styrene	BDL	n/a	
o-Xylene	5	n/a	
BFB (surrogate)	103	87.3	
40,42	8.4	n/a	
n-Propylbenzene	9.7	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000103 Date: 05/16/95 Dilution: 1
Lab File ID:NAS73.001 Blank: blk0516.001
Calibration Std.:vc0516.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	8.1	n/a	
m,p-Xylenes	21.2	n/a	
Styrene	14.4	n/a	
o-Xylene	38.9	n/a	
BFB (surrogate)	83.4	81.2	
40,42	5.2	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	11
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000201 Date: 05/16/95 Dilution: 1
Lab File ID:nas74.001 Blank: blk0516.001
Calibration Std.:vc0516.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	36.8	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	39.8	n/a	
m,p-Xylenes	68.5	n/a	
Styrene	BDL	n/a	
o-Xylene	26.8	n/a	
BFB (surrogate)	589	55.3	
40,42	44.5	n/a	
n-Propylbenzene	7.7	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	7.2	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	15	11
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000201 Date: 05/17/95 Dilution: 3.23
Lab File ID:nas74a.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	48.5	n/a	
m,p-Xylenes	64.8	n/a	
Styrene	BDL	n/a	
o-Xylene	29.7	n/a	
BFB (surrogate)	113	74.1	
40,42	25.2	n/a	
n-Propylbenzene	21.7	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	18.0	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000202 Date: 05/16/95 Dilution: 1
Lab File ID:nas71.001 Blank: blk0516.001
Calibration Std.:vc0516.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	13	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	15	n/a	
m,p-Xylenes	8	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	185	78.5	
40,42	5.7	n/a	
n-Propylbenzene	43.2	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	9.5	n/a	
s-butylbenzene/1,3-DCB	10.2	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	11
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000202 RA | Date: 05/17/95 | Dilution: 10
Lab File ID:nas71a.001 | Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	20	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	34.8	n/a	
m,p-Xylenes	34.9	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	101	81	
40,42	BDL	n/a	
n-Propylbenzene	71.4	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S003007 Date: 05/18/95 Dilution: 2
Lab File ID:NAS93.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	70.5	48.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S003007 Date: 05/21/95 Dilution: 1
Lab File ID:NAS93A.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	81.8	45.4	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	20	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S003017 Date: 05/18/95 Dilution: 2
Lab File ID:NAS94.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethiene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	41.7	n/a	
m,p-Xylenes	47.3	n/a	
Styrene	10.6	n/a	
o-Xylene	2.5	n/a	
BFB (surrogate)	83.6	47.7	
40,42	17.6	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	15.8	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	17.2	n/a	
s-butylbenzene/1,3-DCB	10.5	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G003048 ra
Lab File ID:NAS91A.001
Calibration Std.:vc0519.001

Date: 05/19/95
Blank: blk0519.001

Dilution: 1

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	87.5	79.3	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000401 Date: 05/17/95 Dilution: 4.35
Lab File ID:nas75a.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	23.1	n/a	
m,p-Xylenes	55.5	n/a	
Styrene	15.2	n/a	
o-Xylene	31.5	n/a	
BFB (surrogate)	99.8	69.1	
40,42	28.5	n/a	
n-Propylbenzene	41.3	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	144	n/a	
s-butylbenzene/1,3-DCB	26.4	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	60	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000402 Date: 05/17/95 Dilution: 10
Lab File ID:nas77.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	2900	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	186	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	820	n/a	
m,p-Xylenes	3000	n/a	
Styrene	BDL	n/a	
o-Xylene	349	n/a	
BFB (surrogate)	97.3	79.2	
40,42	BDL	n/a	
n-Propylbenzene	98	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	222	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	540	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000402 Date: 05/18/95 Dilution: 100
Lab File ID:NAS77A.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	3200	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	1300	n/a	
m,p-Xylenes	4200	n/a	
Styrene	BDL	n/a	
o-Xylene	500	n/a	
BFB (surrogate)	91.8	85.4	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	550	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000403 Date: 05/16/95 Dilution: 104
Lab File ID:nas72.001 Blank: blk0516.001
Calibration Std.:vc0516.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	5.5	n/a	
o-Xylene	9.4	n/a	
BFB (surrogate)	82.4	82.2	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	11
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000502 Date: 05/23/95 Dilution: 1
Lab File ID:NAS129.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	13.1	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	71.4	50.2	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000503 Date: 05/23/95 Dilution: 1
Lab File ID:NAS126.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	741	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	27.2	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	101	70.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000503 RA
Lab File ID:NAS126A.001
Calibration Std.:vc0524.001

Date: 05/24/95
Blank: blk0524.001

Dilution: 1

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	538	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	98.5	88.5	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000601 Date: 05/18/95 Dilution: 1
Lab File ID:NAS89.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	85.2	66.2	
40,42	5.9	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	8.4	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	6.1	n/a	
s-butylbenzene/1,3-DCB	5.9	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	14	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S006017 Date: 05/18/95 Dilution: 2.78
Lab File ID:NAS92.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	210	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	190	n/a	
m,p-Xylenes	450	n/a	
Styrene	BDL	n/a	
o-Xylene	14	n/a	
BFB (surrogate)	92.6	62.4	
40,42	BDL	n/a	
n-Propylbenzene	34.6	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	48.8	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	160	n/a	
s-butylbenzene/1,3-DCB	14.4	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	40.3	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G006050 ra
Lab File ID:NAS90A.001
Calibration Std.:vc0519.001

Date: 05/19/95
Blank: blk0519.001

Dilution: 1

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	71.8	53	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S007007 Date: 05/19/95 Dilution: 1
Lab File ID:NAS96.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	91.9	78.3	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	12	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S007017 Date: 05/19/95 Dilution: 1
Lab File ID:NAS97.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	6.2	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	18.6	n/a	
m,p-Xylenes	5.7	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	119	70.2	
40,42	7.5	n/a	
n-Propylbenzene	22	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	10.2	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G007047 Date: 05/19/95 Dilution: 1
Lab File ID:NAS95A.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	92.9	77.9	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S008007 Date: 05/19/95 Dilution: 3.03
Lab File ID:NAS98.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	73.7	51.9	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	42	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G008007 RA | Date: 05/21/95 | Dilution: 1
Lab File ID:NAS98A.001 | Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	71	44	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G008015 Date: 05/19/95 Dilution: 20
Lab File ID:NAS99.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	230	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	390	n/a	
m,p-Xylenes	340	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	90.6	90.9	
40,42	BDL	n/a	
n-Propylbenzene	140	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G008043 Date: 05/19/95 Dilution: 2
Lab File ID:NAS100.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	176	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	17.7	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	98.7	97.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	16	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000901 Date: 05/23/95 Dilution: 1.72
Lab File ID:NAS130.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	6.0	n/a	
Styrene	7.1	n/a	
o-Xylene	18.4	n/a	
BFB (surrogate)	74.7	51.6	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	20	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000901 RA
Lab File ID:NAS130A.001
Calibration Std.:vc0524.001

Date: 05/24/95
Blank: blk0524.001

Dilution: 1

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	5.2	n/a	
o-Xylene	13.6	n/a	
BFB (surrogate)	96.5	55.5	
40,42	6.6	n/a	
n-Propylbenzene	13.3	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	15	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000902 Date: 05/23/95 Dilution: 1
Lab File ID:NAS131.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	163	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	15.9	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	7.1	n/a	
m,p-Xylenes	22.3	n/a	
Styrene	14.1	n/a	
o-Xylene	51.8	n/a	
BFB (surrogate)	188	38.6	
40,42	26.1	n/a	
n-Propylbenzene	11.4	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	'57.5	n/a	
1,2,4-Trimethylbenzene	5.0	n/a	
s-butylbenzene/1,3-DCB	191	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	6.9	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	10.2	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	17	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000902 RA | Date: 05/24/95 | Dilution: 9.09
Lab File ID:NAS131A.001 | Blank: blk0524.001
Calibration Std.:vc0524.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	48.1	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	83.5	n/a	
m,p-Xylenes	176	n/a	
Styrene	BDL	n/a	
o-Xylene	41.3	n/a	
BFB (surrogate)	96	76.9	
40,42	BDL	n/a	
n-Propylbenzene	79.1	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	135	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	209	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S000902 Date: 05/25/95 Dilution: 100
Lab File ID:NAS131A.001 Blank: blk0525.001
Calibration Std.:vc0525.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	1900	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	834	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	1140	n/a	
BFB (surrogate)	90.1	133	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	16
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G000903 Date: 05/23/95 Dilution: 1
Lab File ID:NAS127.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	94.5	70.6	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S0100007 Date: 05/19/95 Dilution: 1
Lab File ID:NAS101.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	83.2	68.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	14	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S010017 Date: 05/19/95 Dilution: 1
Lab File ID:NAS105.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	86.3	75.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G010045 Date: 05/19/95 Dilution: 2
Lab File ID:NAS102.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	9.8	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	89	97.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	15	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G010045 RA | Date: 05/21/95 | Dilution: 1
Lab File ID:NAS102A.001 | Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	12.9	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	10.4	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	86.2	77.5	
40,42	5.1	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S001101 Date: 05/18/95 Dilution: 1.54
Lab File ID:NAS88.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	119	n/a	
m,p-Xylenes	206	n/a	
Styrene	BDL	n/a	
o-Xylene	191	n/a	
BFB (surrogate)	102	69.2	
40,42	18.5	n/a	
n-Propylbenzene	12	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	23.6	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	13.6	n/a	
s-butylbenzene/1,3-DCB	20.8	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	9.2	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	22.2	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	12.3	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S001102 Date: 05/18/95 Dilution: 1
NAS86.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	76.1	60.3	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	19	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G001103 Date: 05/17/95 Dilution: 2
Lab File ID:nas79.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	714	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	353	n/a	
m,p-Xylenes	13.6	n/a	
Styrene	BDL	n/a	
o-Xylene	13.7	n/a	
BFB (surrogate)	103	83.5	
40,42	BDL	n/a	
n-Propylbenzene	22.1	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	19	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G001103 Date: 05/18/95 Dilution: 20
Lab File ID:NAS79A.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	780	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	490	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	82.9	73.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Memphis Naval Air Station

Sample Location:015S001201 Date: 05/17/95 Dilution: 0.09
Lab File ID:nas81.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	48.8	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	644	n/a	
m,p-Xylenes	170	n/a	
Styrene	46.3	n/a	
o-Xylene	81.1	n/a	
BFB (surrogate)	155	67.8	
40,42	100	n/a	
n-Propylbenzene	328	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	343	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	115	n/a	
s-butylbenzene/1,3-DCB	115	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	66.2	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	41.1	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:015S001202 RA | Date: 05/21/95 | Dilution: 90.9
Lab File ID:NAS82A.001 | Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	1100	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	1300	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	1500	n/a	
m,p-Xylenes	7500	n/a	
Styrene	BDL	n/a	
o-Xylene	2100	n/a	
BFB (surrogate)	176	114	
40,42	3300	n/a	
n-Propylbenzene	928	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	1700	n/a	
t-Butylbenzene	2800	n/a	
1,2,4-Trimethylbenzene	548	n/a	
s-butylbenzene/1,3-DCB	9600	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G001203 Date: 05/17/95 Dilution: 2
Lab File ID:nas78.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	399	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	111	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	21.5	n/a	
BFB (surrogate)	98.1	78.8	
40,42	20.6	n/a	
n-Propylbenzene	10	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	11.9	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Memphis Naval Air Station

Sample Location:015G001203 Date: 05/18/95 Dilution: 10
Lab File ID:NAS78A.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	370	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	140	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	86.4	78.5	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:015S013007 Date: 05/21/95 Dilution: 1
Lab File ID:NAS114.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	7.8	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	74.5	56.3	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Data - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S013017 Date: 05/21/95 Dilution: 3.7
Lab File ID:NAS115.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	320	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	45.6	n/a	
m,p-Xylenes	32.8	n/a	
Styrene	BDL	n/a	
o-Xylene	60.1	n/a	
BFB (surrogate)	85.1	66.6	
40,42	21.6	n/a	
n-Propylbenzene	77.3	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	63.3	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	20.1	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:015G013038 Date: 05/22/95 Dilution: 1
Lab File ID:NAS116.001 Blank: blk0522.001
Calibration Std.:vc0522.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	89.5	86.8	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	6	14
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S001401 Date: 05/21/95 Dilution: 100
Lab File ID:NAS84A.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	1700	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	1200	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	2700	n/a	
m,p-Xylenes	9900	n/a	
Styrene	1200	n/a	
o-Xylene	4000	n/a	
BFB (surrogate)	141	113	
40,42	3700	n/a	
n-Propylbenzene	1100	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	1800	n/a	
t-Butylbenzene	2900	n/a	
1,2,4-Trimethylbenzene	677	n/a	
s-butylbenzene/1,3-DCB	9500	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S001402 Date: 05/21/95 Dilution: 100
Lab File ID:NAS85A.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	1300	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	2000	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	2200	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	93.3	107	
40,42	631	n/a	
n-Propylbenzene	708	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	1100	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	1500	n/a	
s-butylbenzene/1,3-DCB	505	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G001403 Date: 05/17/95 Dilution: 2
Lab File ID:nas76.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	100	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	292	n/a	
m,p-Xylenes	20.6	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	70.5	54.5	
40,42	BDL	n/a	
n-Propylbenzene	20.2	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	18	13
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G001403 ra
Lab File ID:NAS76A.001
Calibration Std.:vc0518.001

Date: 05/18/95
Blank: blk0518.001

Dilution: 10

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	85	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	330	n/a	
m,p-Xylenes	45	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	75.6	54.8	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S001501 Date: 05/21/95 Dilution: 92.6
Lab File ID:NAS83A.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	1100	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	3500	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	1300	n/a	
Styrene	BDL	n/a	
o-Xylene	1700	n/a	
BFB (surrogate)	114	107	
40,42	1300	n/a	
n-Propylbenzene	915	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	1800	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	1700	n/a	
s-butylbenzene/1,3-DCB	727	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S001502 Date: 05/18/95 Dilution: 3.03
Lab File ID:NAS87.001 Blank: blk0518.001
Calibration Std.:vc0518.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	174	n/a	
m,p-Xylenes	144	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	78.7	66	
40,42	BDL	n/a	
n-Propylbenzene	16.2	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	35.4	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	63.5	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	103	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	12	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G001503 Date: 05/17/95 Dilution: 2
Lab File ID:nas80.001 Blank: blk0517.001
Calibration Std.:vc0517.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	58	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	224	n/a	
m,p-Xylenes	19.5	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	99.3	71.9	
40,42	BDL	n/a	
n-Propylbenzene	18.2	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	63.4	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	20	13
1,1-Dichloroethane	n/a	23	
Bromochloromethane	n/a	80	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G001503 RA
Lab File ID:NAS80A.001
Calibration Std.:vc0518.001

Date: 05/18/95
Blank: blk0518.001

Dilution: 10

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	60	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	260	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	85.1	79.2	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	163	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S016007 Date: 05/25/95 Dilution: 200
Lab File ID:NAS112B.001 Blank: blk0525.001
Calibration Std.:vc0525.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	6000	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	1000	n/a	
m,p-Xylenes	8000	n/a	
Styrene	BDL	n/a	
o-Xylene	1120	n/a	
BFB (surrogate)	86.9	150	
40,42	5500	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	1300	n/a	
s-butylbenzene/1,3-DCB	1240	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	1150	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	16
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S016007 RA
Lab File ID:NAS112A.001
Calibration Std.:vc0522.001

Date: 05/22/95
Blank: blk0522.001

Dilution: 3.44

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	411	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	202	n/a	
m,p-Xylenes	944	n/a	
Styrene	207	n/a	
o-Xylene	193	n/a	
BFB (surrogate)	107	75	
40,42	220	n/a	
n-Propylbenzene	810	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	154	n/a	
t-Butylbenzene	145	n/a	
1,2,4-Trimethylbenzene	264	n/a	
s-butylbenzene/1,3-DCB	344	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	134	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	405	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	63.5	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	33	14
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
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Sample Location:015S016017 Date: 05/25/95 Dilution: 100
Lab File ID:NAS111C.001 Blank: blk0525.001
Calibration Std.:vc0525.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	673	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	1400	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	88.1	140	
40,42	BDL	n/a	
n-Propylbenzene	607	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	16
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S016017 Date: 05/22/95 Dilution: 2.04
Lab File ID:NAS111A.001 Blank: blk0522.001
Calibration Std.:vc0522.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	28.6	n/a	
Styrene	8.3	n/a	
o-Xylene	10.8	n/a	
BFB (surrogate)	68.5	59.6	
40,42	23.9	n/a	
n-Propylbenzene	37.4	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	7.2	n/a	
1,2,4-Trimethylbenzene	10.3	n/a	
s-butylbenzene/1,3-DCB	9.6	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	6.8	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	21	14
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S016017 RA
Lab File ID:NAS111B.001
Calibration Std.:vc0524.001

Date: 05/24/95
Blank: blk0524.001

Dilution: 1

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	5.2	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	21	n/a	
Styrene	8.1	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	69.5	56.2	
40,42	14.7	n/a	
n-Propylbenzene	36.9	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	5.3	n/a	
s-butylbenzene/1,3-DCB	7.0	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	5.2	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	16	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G016049 Date: 05/21/95 Dilution: 1
Lab File ID:NAS113.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	37.4	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	112	n/a	
m,p-Xylenes	12.2	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	104.4	84.6	
40,42	6.9	n/a	
n-Propylbenzene	20.3	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	6.6	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G01649 RA
Lab File ID:NAS113A.001
Calibration Std.:vc0522.001

Date: 05/22/95
Blank: blk0522.001

Dilution: 1

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	48.8	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	5.0	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	124	n/a	
m,p-Xylenes	8.1	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	93.6	87.9	
40,42	5.1	n/a	
n-Propylbenzene	18.0	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	5.2	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	6	14
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S001701 Date: 05/23/95 Dilution: 1
Lab File ID:NAS132.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	69.3	40.8	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	14	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
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Sample Location:015S001702 Date: 05/23/95 Dilution: 1
Lab File ID:NAS133.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	71.2	48.6	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:015G001703 Date: 05/23/95 Dilution: 1
Lab File ID:NAS128.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	88.3	66.4	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:015S018007 Date: 05/19/95 Dilution: 1
Lab File ID:NAS103.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	80.2	67.2	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Memphis Naval Air Station

Sample Location:015S018014 Date: 05/19/95 Dilution: 1
Lab File ID:NAS104.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	82.3	74.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	13	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
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Sample Location:015G018045 Date: 05/19/95 Dilution: 1
Lab File ID:NAS106.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	13.9	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	81.7	n/a	
m,p-Xylenes	14.6	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	95.7	91.8	
40,42	BDL	n/a	
n-Propylbenzene	11.0	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	5.0	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S019007 Date: 05/19/95 Dilution: 1
Lab File ID:NAS107.001 Blank: blk0519.001
Calibration Std.:vc0519.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	76.7	57.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	14	12
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
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Sample Location:015C019017 Date: 05/21/95 Dilution: 1
Lab File ID:NAS109.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	6.1	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	10.2	n/a	
m,p-Xylenes	26.9	n/a	
Styrene	BDL	n/a	
o-Xylene	9.0	n/a	
BFB (surrogate)	90.8	51.9	
40,42	78.5	n/a	
n-Propylbenzene	7.4	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	33.4	n/a	
t-Butylbenzene	7.6	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	13.0	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	14	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S020007 Date: 05/21/95 Dilution: 1
Lab File ID:NAS107.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	5.8	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	78.6	45.6	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	17	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015S020017 Date: 05/22/95 Dilution: 1
Lab File ID:NAS117.001 Blank: blk0522.001
Calibration Std.:vc0522.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	73.5	57.2	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	10	14
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:015G020045 Date: 05/21/95 Dilution: 1
Lab File ID:NAS110A.001 Blank: blk0521.001
Calibration Std.:vc0521.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	9.7	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	20.4	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	155	n/a	
m,p-Xylenes	41.9	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	98.9	104	
40,42	6.2	n/a	
n-Propylbenzene	28.5	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	5.2	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

ASSEMBLY C CSI REPORT
NAVAL SUPPORT ACTIVITY MEMPHIS
MILLINGTON, TENNESSEE

RCRA FACILITY INVESTIGATION
SWMU 21 — N-10 UNDERGROUND WASTE TANK

CTO-094
Contract No. N62467-89-D-0318

Prepared for:

Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina

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November 1, 1995

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LIST OF ACRONYMS AND ABBREVIATIONS

BRAC	Base Realignment and Closure
bls	Below land surface
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm/sec	Centimeters per second
CSI	Confirmatory Sampling Investigation
DPT	Direct Push Technology
DQO	Data Quality Objectives
DRO	Diesel range organics
E/A&H	EnSafe/Allen & Hoshall
FSA	Full Scan Analysis
GRO	Gasoline range organics
MCL	Maximum Contaminant Level
N/A	Not analyzed
ND	Not detected
NSA	Naval Support Activity (formerly Naval Air Station)
PCBs	Polychlorinated biphenyls
PID	Photoionization detector
ppb	Parts per billion
ppm	Parts per million
RBC	Risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SIP	Site Investigation Plan
SOUTHNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
SST	Subsurface Technologies, Inc.
TDEC	Tennessee Department of Environment and Conservation
TPH	Total petroleum hydrocarbons
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The *Assembly C Site Investigation Plans* proposed two phases of investigation for a Confirmatory Sampling Investigation (CSI) at Solid Waste Management Unit (SWMU) 21, the N-10 Underground Waste Tank. The first phase consisted of a soil and groundwater investigation using Direct Push Technology (DPT) equipment, which identified a release of contaminants at the site. Based on the results of the first phase, the second phase, a RCRA Facility Investigation (RFI), is required to define the nature and extent of the release. This report summarizes the activities conducted during the CSI's first phase and outlines the proposed RFI activities.

Analytical results indicate no volatile organic compounds (VOCs) in subsurface soil samples exceeded the risk-based concentrations (RBCs) for residential and industrial soil, and no VOCs in loess groundwater exceeded the RBC for tap water or the maximum contaminant level (MCL) for drinking water. However, benzene and carbon tetrachloride concentrations in the fluvial deposits groundwater exceed both the RBC for tap water and the MCL for drinking water. Benzene was detected at Location 2 at a concentration of 11.6 parts per billion (ppb), which exceeds both the RBC (0.31 ppb) and the MCL (5 ppb). Carbon tetrachloride, detected at four DPT locations at concentrations ranging from 4.8 ppb to 163 ppb, exceeded the RBC (0.16 ppb) at all four locations (Locations 2, 4, 5, and 6) and the MCL (5 ppb) at Locations 2, 4, and 6.

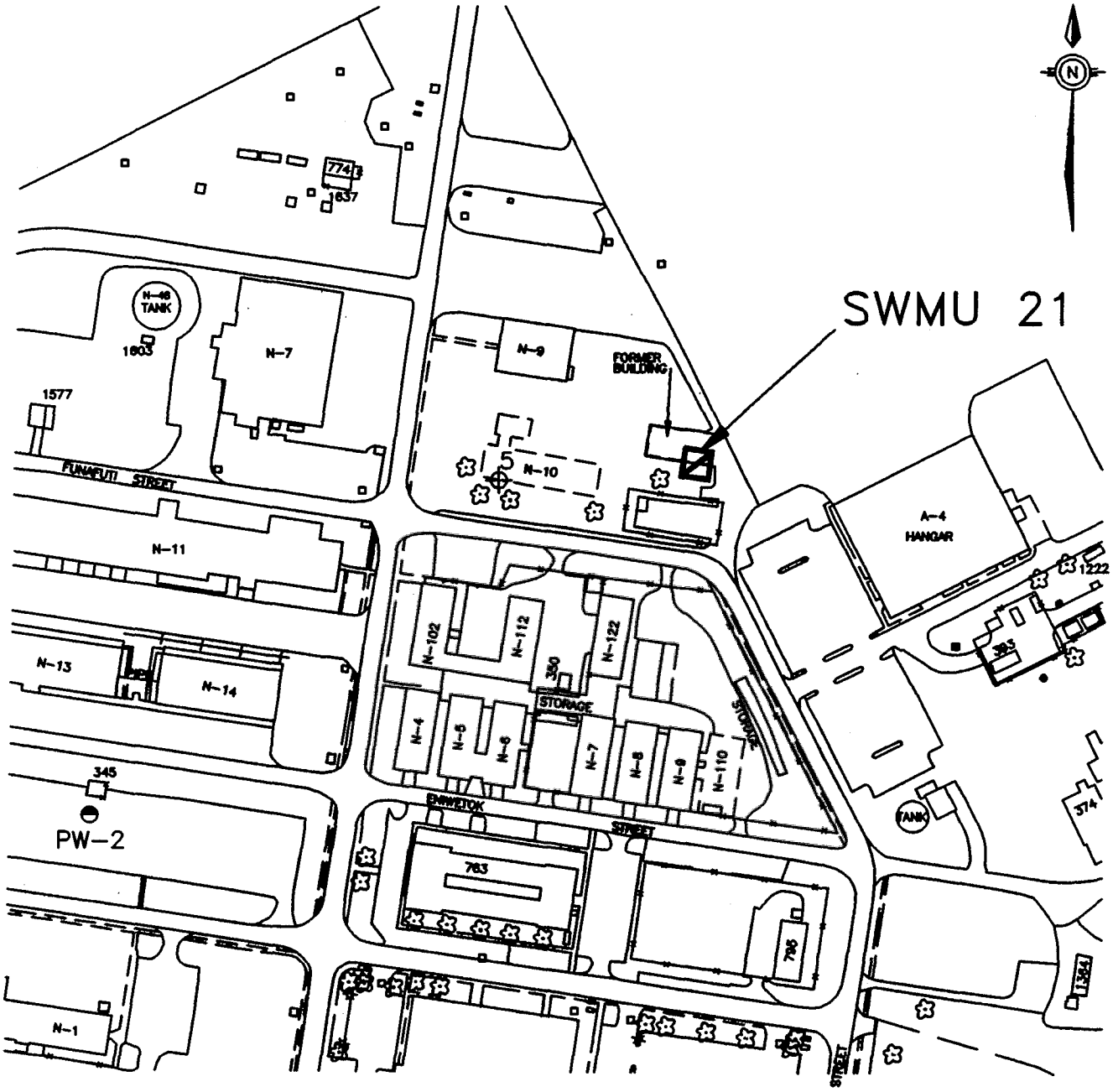
Section 7 of this report outlines the proposed RFI activities, which include advancing and sampling four soil borings, and converting each boring to a groundwater monitoring well. One monitoring well will be installed in the upper fluvial deposits, and three monitoring wells in the lower fluvial deposits. The results of the RFI will be presented in an RFI report.

1.0 INTRODUCTION

As part of the U.S. Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) program, the following Confirmatory Sampling Investigation Report (CSI) has been prepared for Solid Waste Management Unit (SWMU) 21, the N-10 Underground Waste Tank, on the Northside of Naval Support Activity (NSA) Memphis in Millington, Tennessee. Figures 1-1 and 1-2 provide a vicinity map and aerial photograph of SWMU 21, respectively.

As a result of the Base Closure and Realignment Act of 1990, a portion of NSA Memphis, which includes SWMU 21, will be closed and prepared for transfer to the City of Millington. Eight SWMU assemblies (i.e., groups) have been defined for the NSA Memphis RCRA Corrective Action Program. Four of these assemblies (A, B, C, and D) are on closing portions of the base and have been categorized and ranked according to their Base Realignment and Closure (BRAC) status. SWMU 21 is in Assembly C, which is composed of five SWMUs requiring CSIs to confirm whether a release of contaminants has occurred and, if so, whether RCRA Facility Investigation (RFI) characterization will be required. The remaining four assemblies (E, F, G, and H) are on portions of the base that will remain open. The investigation, undertaken by EnSafe/Allen & Hoshall (E/A&H), adhered to the requirements of the Hazardous and Solid Waste Amendments portion (HSWA-TN002) of RCRA Permit No. TN2-170-022-600 and applicable regulations.

The *Assembly C Site Investigation Plans* proposed two phases of investigation for the CSI at SWMU 21. The first phase consisted of a soil and groundwater investigation using Direct Push Technology (DPT) equipment, which confirmed a release of contaminants at the site. Based on the results of the first phase, the second phase, RFI characterization, is required to define the nature and extent of contamination at SWMU 21. This report summarizes the activities conducted during the first phase of the CSI and outlines the proposed RFI activities.



LEGEND

5 ⌖ USGS STRATIGRAPHIC TEST HOLE

PW-2 ◓ PRODUCTION WELL

200 0 200

SCALE FEET

RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

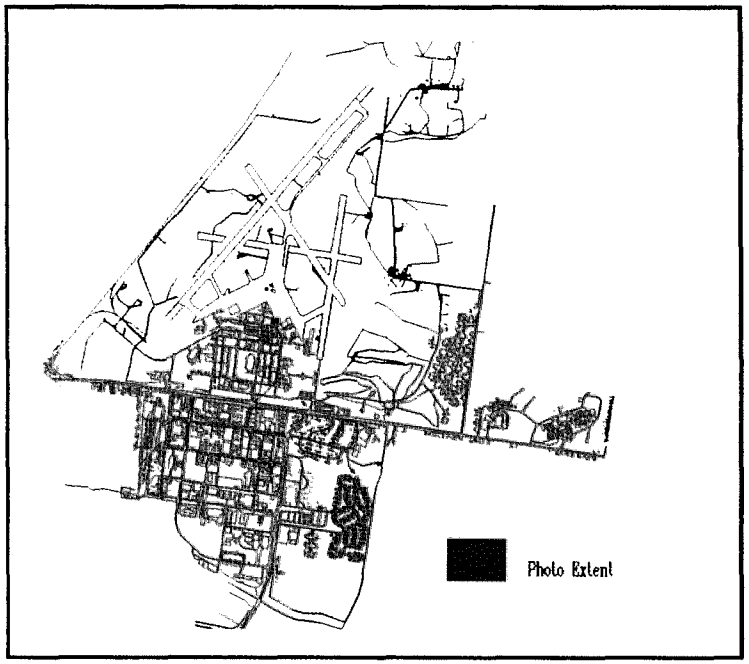
FIGURE 1-1
VICINITY MAP
BUILDING N-10
UNDERGROUND WASTE TANK
SWMU 21

DWG DATE: 10/27/95 | DWG NAME: 94RVM21

SWMU 21
BOUNDARY

Photograph Scale

0 75 150 Ft.



RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TENNESSEE

FIGURE 1-2
DIGITAL ORTHOPHOTOGRAPH
N-10 UNDERGROUND WASTE TANK
SWMU 21

2.0 SITE DESCRIPTION AND HISTORICAL INFORMATION

2.1 Site Description

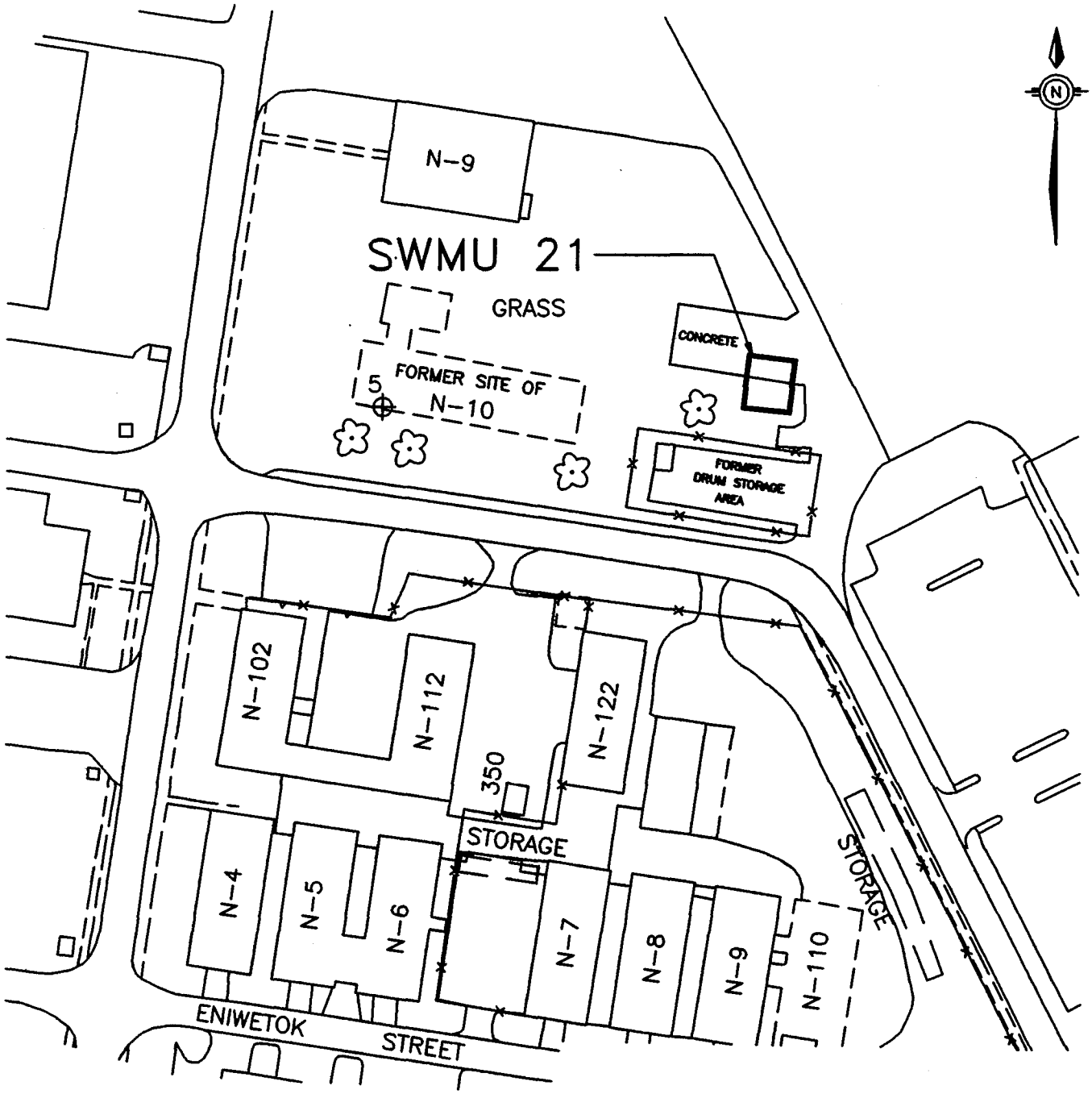
SWMU 21 is the former site of a steel, 3,000-gallon waste oil and hydraulic fluid underground storage tank (UST). The site is approximately 200 feet southeast of Building N-9, 80 feet east of former Building N-10 (demolished in 1990), and 250 feet west-northwest of the A-4 Hangar (Building 798) in the central quadrant of the NSA Memphis Northside. Figure 2-1 provides a site map of SWMU 21.

This area has been disturbed by past UST removal activities but is generally level and covered with grass. A rectangular concrete pad, approximately 85 feet long and 40 feet wide, is adjacent to and immediately north of the former UST area (Figure 1-1). According to NSA Memphis Public Works Department personnel, this concrete pad is the foundation of a former building, purpose unknown. The building was reportedly demolished in the early 1960s after a small plane crashed into it and caught fire. A concrete runway apron is immediately to the northeast, and a fenced-in, inactive drum storage area is immediately to the south.

Surface water at the site drains southwest into the SWMU 4 storm sewer and drainage ditch, which is approximately 1,000 feet south of SWMU 21. SWMU 4 ultimately empties into North Fork Creek, which runs along the activity's western boundary.

2.2 Historical Site Operations

The UST, installed in 1943, collected waste oil and hydraulic fluid from an automobile repair and aircraft maintenance shop which has since been demolished. No records were identified which describe the design features of the former building or UST. The UST was removed in November 1991.



LEGEND

⊕ USGS STRATIGRAPHIC TEST HOLE

100 0 100

SCALE FEET

RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 2-1
SITE MAP
BUILDING N-10
UNDERGROUND WASTE TANK
SWMU 21

DWG DATE: 10/27/95 | DWG NAME: 94SM21

3.0 PRELIMINARY INVESTIGATIONS

Other than the limited sampling conducted during the UST removal, no known site investigations were performed prior to the CSI. The following paragraph summarizes the UST removal and soil sampling results. Appendix A contains a copy of the *Underground Storage Tank Closure Report* (SOUTHNAVFACENGCOM, 1992).

Prior to UST removal, its contents (identified as water and waste oil sludge) were pumped into 55-gallon drums and disposed. Three soil samples were initially collected from the excavation and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH). According to the UST closure report, no BTEX was detected; however, TPH was detected in two of the samples (184 parts per million [ppm] and 1,876 ppm), which prompted further excavation. After excavating an additional 2 vertical feet of soil from the floor of the excavation, four closure soil samples collected from the excavation's corners were analyzed for BTEX and TPH. No BTEX or TPH was detected in the closure samples.

4.0 FIELD INVESTIGATIONS AND METHODOLOGY

The CSI soil and groundwater sampling program was intended to confirm whether contaminants associated with past activities at SWMU 21, including the underground storage of waste oil and hydraulic fluid, were released. Specifically, the CSI objectives were as follows:

- Determine the extent of surface soil contamination.
- Determine the potential for subsurface soil contamination by petroleum and nonpetroleum compounds in the loess.
- Determine the potential for groundwater contamination by petroleum and nonpetroleum compounds in the loess and fluvial deposits.

This section summarizes the soil and groundwater sampling tasks during the first phase of the CSI, which used DPT equipment. The field sampling activities followed the procedures outlined in the U.S. Environmental Protection Agency (USEPA) and Tennessee Department of Environment and Conservation (TDEC)-approved *Comprehensive RFI Work Plan* (E/A&H, 1994) and *Assembly C Site Investigation Plans* (E/A&H, 1995).

General sampling protocols and rationale for the DPT subsurface soil and groundwater investigation are organized and presented in Sections 4.1 and 4.2, respectively, of this CSI report. Specific sampling protocols (sample handling, field Quality Assurance/Quality Control [QA/QC], and decontamination) are presented in Section 4.3. Section 5 of this report discusses the site-specific geologic and hydrogeologic information generated during the investigation, and Section 6 presents the analytical results and discusses the nature and extent of soil and groundwater contamination at SWMU 21.

Analytical Parameters

Soil and groundwater samples were collected during the DPT investigation to determine the nature and extent of contamination by volatile organic compounds (VOCs) at SWMU 21. Each sample was transported to Hydrologic, Inc.'s onsite mobile laboratory for the immediate analysis of VOCs by USEPA Method 8021. Approximately 25% of the samples were split for QA/QC purposes (duplicates) during the screening survey. They were shipped to the National Environmental Testing (NET) laboratory in Bedford, Massachusetts, for VOC analysis by Solid Waste 846 Method 8240. Soil and groundwater samples submitted to Hydrologic's onsite laboratory were analyzed using Level II-equivalent Data Quality Objectives (DQOs). Ninety-five percent of the soil and groundwater samples submitted to NET were analyzed using Level III-equivalent DQOs and 5% using Level IV-equivalent DQOs. Validata Chemical Services, Inc. of Norcross, Georgia validated the analytical results of the NET confirmation samples. Attachment 1 of Volume II contains the validation report, which indicates that the overall data quality of the analytical work is satisfactory.

Direct Push Technology Methods

On May 23, 24, and 30, 1995, E/A&H conducted a DPT survey at SWMU 21 to obtain subsurface soil and groundwater samples for VOC analyses. Subsurface Technologies, Inc. (SST), of Orlando, Florida, provided and operated the DPT equipment.

The DPT investigation was conducted with truck-mounted, hydraulically operated probes which collected subsurface information. The piezocone system, which consists of an electronic cone penetrometer, was used to obtain lithologic information by estimating and plotting point-stress, sleeve friction, and pore pressure as it was advanced from ground surface, through the loess, and into the upper fluvial deposits. The geocone sampler, which is a split-spoon sampler with a push plug on the leading end, was advanced and retracted to retrieve relatively undisturbed subsurface soil samples from specific depths at various locations throughout the SWMU. The GS-1 groundwater sampler obtained groundwater samples from specific depths in the loess and

upper fluvial deposits, with and without an applied vacuum, and generated hydraulic conductivity information. DPT sampling methods were detailed in Section 4.4.4.3 of the *Comprehensive RFI Work Plan*.

4.1 Subsurface Soil Investigation

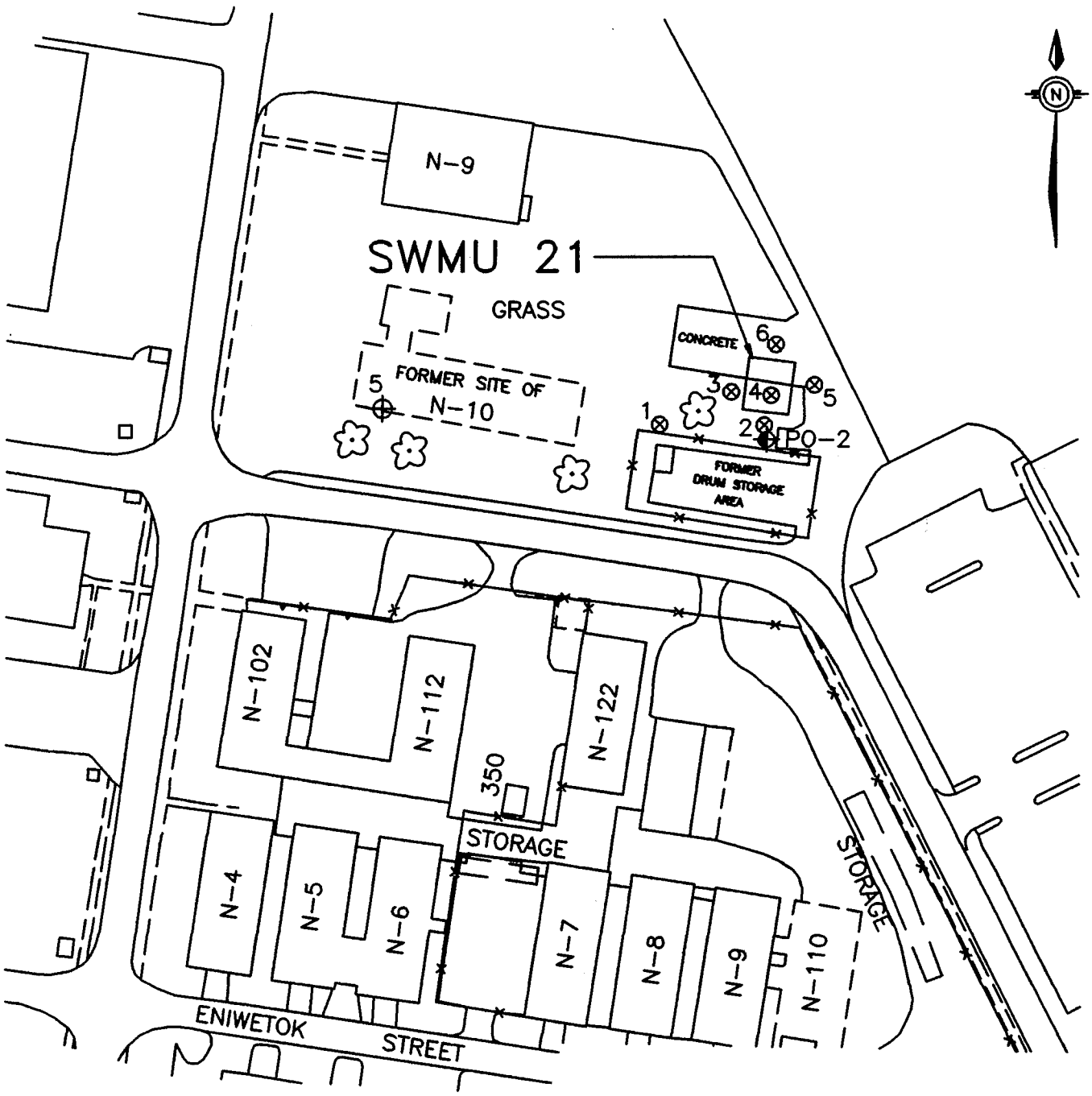
The DPT investigation assessed the nature and extent of contamination in subsurface soil above shallow groundwater in the loess. Six DPT sampling locations were proposed in the *Assembly C Site Investigation Plans*. As outlined in the work plan, one subsurface soil sample collected from the 9- to 10-foot interval below land surface (bls) from each proposed sampling point was submitted to Hydrologic for onsite VOC analysis by Hydrologic. Figure 4-1 shows the sample locations.

4.1.1 Subsurface Soil Sampling Rationale

Before collecting subsurface soil and groundwater samples, SST performed one piezocone sounding (PO-2) just south of the former UST area to develop a tentative lithologic profile. Figure 2-1 shows the piezocone location, and Appendix B contains the piezocone file information and plot. Based on anticipated lithology generated by the piezocone plot and previous investigations at other NSA Memphis Northside SWMUs, groundwater in the loess was anticipated to be between 16 and 18 feet bls and groundwater in the fluvial deposits between 35 and 40 feet. The following sections provide details regarding the subsurface soil sampling procedures.

4.1.2 Subsurface Soil Sample Collection Methods

An E/A&H geologist logged and processed the subsurface soil samples for field screening and submittal to the analytical laboratory. SST collected the samples with the DPT rig using a 2-foot long, 2-inch outside diameter, split-spoon geocone sampler. Upon retrieval, the sampler was opened, and the soil immediately screened for VOCs using an HNu (model GP 101, with a 10.2 eV lamp) photoionization detector (PID).



LEGEND

3 ⊗ DPT SAMPLE LOCATION

PO-2 ⊕ PIEZOCONE LOCATION

5 ⊕ USGS STRATIGRAPHIC TEST HOLE

100 0 100

SCALE FEET

RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 4-1
DPT SAMPLE LOCATONS
BUILDING N-10
UNDERGROUND WASTE TANK
SWMU 21

DWG DATE: 10/27/95 | DWG NAME: 94RDS21

A representative soil sample was collected and placed in a jar for onsite VOC analysis. Twenty-five percent of the soil samples were split for offsite laboratory analysis. A description of each soil sample; the field screening results; and sample location, designation, and time collected were recorded in the field logbook. Subsurface soil samples were collected as outlined in the *Assembly C Site Investigation Plans* from the 9- to 10-foot interval.

4.2 DPT Groundwater Investigation

The DPT groundwater investigation focused on two water-bearing zones: the near-surface loess (the most likely zone containing contaminants associated with UST waste oil and hydraulic fluid storage) and the underlying fluvial deposits (which are a preferential zone of groundwater flow and a potential route for contaminant transport). The water-bearing zones at NSA Memphis are described in Section 5, Geology and Hydrogeology.

4.2.1 Groundwater Sampling Rationale

As described in Section 4.1.1, one DPT piezocone was advanced at SWMU 21 to determine the depth of potential water-bearing zones in the loess and fluvial deposits. Based on the piezocone results and observations made while installing nearby monitoring wells, depth to groundwater in the loess was anticipated to between 16 and 18 feet bls and depth to groundwater in the fluvial deposits approximately 35 to 40 feet bls.

Where possible, a groundwater sample was collected from the loess. Loess groundwater samples were collected at every location except Location 6. Fluvial deposits groundwater samples were obtained at every sampling location (except Location 1) at depths ranging from 35 to 48 feet bls.

4.2.2 DPT Groundwater Sample Collection Methods

Groundwater samples were collected during the DPT investigation using the GS-1 groundwater sampler. The SST technician advanced the GS-1 to approximately 18 feet at each sampling

location to collect a groundwater sample from the loess and to sampler refusal (between 35 and 48 feet bls) to obtain a groundwater sample from the fluvial deposits. The volume of groundwater entering the GS-1 was monitored on the on-board computer screen. When approximately 300 milliliters of groundwater had entered the sampler, the GS-1 was retracted. Groundwater samples were collected directly from the sampler by inserting a new piece of Teflon tubing into the bottom port of the GS-1 and decanting the groundwater directly into the sample vials to minimize the loss of VOCs.

When the first attempt to collect a loess or fluvial deposits groundwater sample failed, a vacuum was applied to the sampling device. Groundwater samples were collected from the loess and fluvial deposits at each sampling location except for Location 1 (no fluvial deposits groundwater sample was collected) and Location 6 (no loess water sample was collected). At Location 1, sampler refusal was at 32 feet. In an attempt to find a water-bearing zone at Location 1, the sampler was raised in 1-foot increments every 15 minutes up to 24 feet bls; however, no water entered the sampler. At Location 6, the sampler was advanced to 17 feet bls. A vacuum was applied, and no water entered the sampler. The sampler was raised in 1-foot increments every 15 minutes up to 12 feet bls; however, no water entered the sampler. In certain instances (when time permitted), SST left the GS-1 sampler in the ground overnight to collect a groundwater sample.

4.3 Sampling Protocol

All sampling activities adhered to the approved *Comprehensive RFI Work Plan* (E/A&H, 1994) and the *Assembly C Site Investigation Plans* (E/A&H, 1995). Sample handling was minimized. When transferring material from the sampling device to containers, the operation was conducted expediently, in as clean an environment as possible. A new pair of disposable gloves was donned before collecting each subsurface soil and groundwater sample. Empty containers were kept packaged until used, at which time they were immediately chilled and isolated in coolers.

Subsurface soil samples for VOC analysis were containerized immediately upon collection to minimize the loss of VOCs. Groundwater samples were obtained directly from the GS-1 groundwater sampler.

4.3.1 QA/QC Samples

During the DPT investigation, QA/QC samples were collected to test the level of reproducibility attainable in the sampling and analytical processes. QA/QC samples were analyzed for VOCs, as were the associated environmental samples. Soil and groundwater *duplicate* samples, collected at a frequency of 25% during the DPT investigation, were submitted to the offsite laboratory (NET) for confirmation analysis. In addition, the Hydrologic chemist sent one fluvial deposits groundwater split sample to their Frankfort, Kentucky, laboratory for confirmation analysis. The analytical results of the duplicate samples are discussed in Section 6, Nature and Extent of Contamination.

4.3.2 Sample Processing and Chain-of-Custody Procedure

Sample containers requiring chemical preservation (i.e., hydrochloric acid for aqueous samples) were pre-preserved by the testing laboratory and shipped to E/A&H in sealed packages. Sample containers were labeled with the sample identification number, date, sampler's name, and requested analytical parameter, then placed in a cooler immediately following collection. Each sample was logged in the sample logbook. Samples for onsite laboratory analysis were transported by the E/A&H geologist directly to the onsite lab. The Hydrologic chemist recorded each sample in a sample logbook immediately upon receipt.

Samples for offsite laboratory analysis were prepared for shipment by wrapping each container in bubble wrap, placing it in a resealable plastic bag, and packing it on ice inside a sturdy cooler. Cooler lids were secured with packing tape and sealed with signed custody seals. Packaged samples were then shipped overnight via FedEx priority service for next morning delivery. The offsite laboratory was notified the day of shipment of the number of samples

submitted. All sample shipments were reported to have arrived at NET in good condition and at the appropriate temperatures.

To ensure the integrity of the sample transfer process, a strict chain-of-custody procedure was implemented. This procedure was initiated in the field for each sampling event and conducted through custody transfer to the analytical laboratory. A chain-of-custody form was completed for each batch of samples, itemizing sample numbers, containerization, preservatives, analyses requested, date and time of sampling, and FedEx shipping number. Custody transfers were recorded by signature, date, and time of relinquishment, and receipt of custody by the parties involved.

4.3.3 Sample Labeling

All samples collected in the field were labeled with an alphanumeric code that identifies the site, sample type, and sample location. The first three digits identify the site location, and the fourth digit identifies the sample matrix. The last six digits identify the sample location and interval. For example, the sample label "021G001017" designates a SWMU 21 groundwater sample collected from Location 1 at a depth of 17 feet. *(Note: An exception to the labeling scheme occurred at Location 2, the sample interval is indicated by "01", "02", and "03", indicating the first [loess soil], second [loess groundwater], and third [fluvial deposits groundwater] intervals sampled).*

4.4 Grouting Procedures

SST filled each DPT boring with neat cement grout following sample collection.

4.5 Decontamination Procedures

SST's downhole field equipment was decontaminated in accordance with guidelines set forth in the *Assembly C Site Investigation Plans*. All downhole and sampling equipment was decontaminated before and after each use at either the central decontamination pad set up at the N-7 aircraft wash rack or at the decontamination pad east of SWMU 40 across First Avenue.

Rinse water generated from decontamination activities, stored in a 1,200-gallon holding tank at the central decontamination pad, was discharged to the sanitary sewer system after a VOC scan and approval from the City of Millington's wastewater consultant, Fisher & Arnold, Inc.

Decontamination procedures for downhole equipment consisted of the following steps:

- High-pressure wash with a hot mixture of soap and water
- Rinse with potable water
- Rinse with deionized organic-free water
- Rinse twice with pesticide-grade isopropyl alcohol
- Rinse with deionized organic-free water
- Wrap with aluminum foil or plastic

A new pair of disposable latex gloves was donned before handling decontaminated sampling equipment. Subsurface soil samples were collected directly from the split-spoon sampler and groundwater samples directly from the GS-1 groundwater sampler; therefore, no investigation-derived waste (IDW) was generated from these sampling activities.

5.0 GEOLOGY AND HYDROGEOLOGY

5.1 Regional Geology and Hydrogeology

The general hydrogeology of the Memphis area is discussed in detail in Section 2.11 and a conceptual model of the hydrogeology at the NSA is presented in Section 2.12 of the *Comprehensive RFI Work Plan* (E/A&H, 1994). Updated information is available in the *Hydrogeology of Post-Wilcox Group Stratigraphic Units in the Area of the Naval Air Station Memphis, Near Millington, Tennessee* (Kingsbury and Carmichael, 1995). On the basis of this updated information, the hydrogeology of NSA Memphis is re-summarized below.

The two stratigraphic units investigated during the RFIs at NSA Memphis are the loess/alluvial deposits of Pleistocene and Holocene age and the underlying fluvial deposits of Pleistocene to Pliocene age. The loess — eolian deposits consisting of silt, silty clay, clay, and minor amounts of sand — is the principal unit occurring at land surface throughout the NSA Memphis Northside. Alluvium, which is restricted to stream valleys, includes alluviated or reworked loess. The loess is typically 0 to 65 feet in the Memphis area; at NSA Memphis it ranges from 15 to 45 feet in thickness. Water-bearing zones are present in the loess primarily in the upper part of this unit; however, yields are low and water quality analyses performed during the water use survey portion of previous UST investigations indicate that loess groundwater does not meet many primary and secondary drinking water standards. Previous investigations at NSA Memphis have found depth to water in the loess varying between 5 and 15 feet bls and vertical hydraulic conductivities to range from 10^{-6} to 10^{-8} centimeter per second (cm/sec). Although the loess may be considered an aquitard on the basis of the relatively low hydraulic conductivities, this shallowest water-bearing zone is present within this interval. Groundwater flow in the loess is primarily downward, although locally some groundwater in the loess may discharge to nearby streams, drainage ditches, and other surface-water bodies.

The fluvial deposits underlie the loess in upland areas and consist of sand, gravel, and some clay, with thin layers of ferruginous sandstone and conglomerate at the base. This unit ranges

in thickness from 0 to 100 feet in the Memphis area; on the Northside of NSA Memphis it ranges from 10 to 35 feet in thickness and represents the most significant component of the surficial aquifer. Many shallow domestic wells in the Memphis rural areas are completed in the fluvial deposits. Relative groundwater elevations between wells completed in the loess/alluvium and fluvial deposits indicate semiconfined to confined conditions in the fluvial deposits. Typically a downward vertical gradient exists between water in the loess and the fluvial deposits. Sediments in the fluvial deposits generally coarsen with depth, and typically, the upper portion consists of a mixture of very fine sand with varying degrees of silt and clay and becomes increasingly less silty with depth, grading into a fine to medium sand near the middle of the unit. Grain sizes typically coarsen below this interval, grading into a gravelly sand near the fluvial deposits basal section.

The fluvial deposits are underlain by the Cockfield Formation, a part of the Jackson-upper Claiborne confining unit, which is a heterogeneous formation consisting of very fine silty sand interbedded with clay and silt lenses or clay with interbedded fine sand lenses. The more-permeable characteristics of the fluvial deposits, compared to the relatively impermeable properties of the overlying loess/alluvium and the underlying Jackson-upper Claiborne confining unit, result in the fluvial deposits being the preferential zone of groundwater flow and the route for contaminant transport in NSA Memphis's subsurface.

5.2 Site-Specific Geology and Hydrogeology

The following sections provide site-specific geologic and hydrogeologic information obtained from stratigraphic test borings, previous investigations, and the SWMU 21 DPT investigation.

5.2.1 Stratigraphic Test Borings

In 1994, the U.S. Geological Survey (USGS) drilled and sampled stratigraphic test hole 5, approximately 220 feet west of SWMU 21. Figures 1-1 and 2-1 show the location of stratigraphic test hole 5, which was drilled into the Cook Mountain Formation to better

understand the site geology before monitoring-well installations. Cuttings from the test hole were visually logged by a field geologist during drilling, and the test hole was geophysically logged to its total depth following completion. Stratigraphy and lithologies encountered in the test hole are as follows:

Loess:	Approximately 30 feet of wind-blown silt and clay deposits.
Fluvial Deposits:	Approximately 54 feet of sand and gravel.
Cockfield Formation:	Approximately 104 feet of alternating sand and clay with some lignite.
Cook Mountain Formation:	Characterized as a light olive-gray to greenish-gray dense clay. Defined as the upper confining unit between the surficial aquifers and the Memphis Aquifer. Because the stratigraphic test hole was only advanced 32 feet into the Cook Mountain Formation, the entire thickness is not known.

5.2.2 Previous Investigations

Subsurface soil information was obtained during the Assembly A RFI for SWMU 7, the Building N-126 Plating Shop Dry Well. SWMU 7 is approximately 900 feet west-northwest of SWMU 21. During the Assembly A investigation, nine monitoring-well clusters (designated 07MW01 through 07MW09) were installed at various locations around SWMU 7. 07MW02, 07MW03, and 07MW06 are the SWMU 7 monitoring well clusters closest to SWMU 21 (between 800 and 1,000 feet west and southwest). The general lithology encountered in the soil borings associated with these three clusters is as follows:

- Clayey silt, silty clay, and sandy clay from ground surface to between 25 and 34 feet bls (loess).

- Sand with gravel and silty clayey sand from between 25 and 34 feet bls to between 77 and 82 feet bls (fluvial deposits).

- Silty clayey sand, silty sand with clay lenses, clay with sand lenses, and lignite from between 77 and 82 feet bls to the termination depth of the boring (between 101 and 125 feet bls, Cockfield Formation).

Laboratory-measured vertical hydraulic conductivities for the subsurface soil samples associated with the SWMU 7 monitoring wells are as follows:

Well Cluster	**Associated Soil Sample ID**	**Sampling Depth (in feet)**	**Hydraulic Conductivity (in cm/sec)**
07MW01	07S000177	75 - 77 (lower fluvial deposits)	6.8×10^{-5}
	07S0001112	110 to 112 (Cockfield Formation)	4.1×10^{-8}
07MW03	07S0003117	115 to 117 (Cockfield Formation)	1.6×10^{-8}
07MW08	07S0008127	125 to 127 (Cockfield Formation)	8.7×10^{-7}
07MW09	07S000922	10 - 22 (loess)	9.5×10^{-7}

07MW01 is approximately 1,000 feet west of SWMU 21. Monitoring-well clusters 07MW03, 07MW08, and 07MW09 are 900 feet west, 1,250 feet west-southwest, and 1,250 feet west of SWMU 21, respectively. The boring logs and hydraulic-conductivity data sheets for SWMU 7 are provided in Attachment 2 of Volume II.

Based on the topography, the information in the conceptual model of the NSA Memphis hydrogeology (Section 2.12 of the *Comprehensive RFI Work Plan*), recent data collected during Assembly A SWMU RFIs, and communication with USGS representatives, groundwater in the fluvial deposits flows locally toward the north-northeast. Groundwater flow in the loess is

primarily downward, although locally, some groundwater in the loess may discharge to nearby streams, ditches, and other surface water bodies.

5.2.3 DPT Piezocone Sounding

As outlined in Section 4.1.1 of this document, one piezocone sounding (designated PO-2, refer to Figure 4-1) was performed at SWMU 21 to obtain information about the lithology and potential water-bearing zones before collecting samples. E/A&H used the information generated from the piezocone sounding to select groundwater sampling intervals for the DPT investigation. Appendix B provides the piezocone log and plot for SWMU 21. As shown on the piezocone log, three potential water-bearing zones are present: one from 16 to 18 feet bls, one from 27 to 28 feet bls, and one from 35 to 40 feet bls (the termination depth of the piezocone sounding). These zones are described on the lithologic log as a silty fine sand and fine sand, and readily identifiable on the associated plot by the higher point stress.

5.2.4 DPT Hydrocone Plots

During the DPT investigations, the GS-1 groundwater sampler obtained groundwater samples from specific depths in the loess and upper fluvial deposits. The sampling device, which included a transducer attached to an on-board computer system via an umbilical cable, recorded data regarding the fill rate, hydrostatic pressure, and gas pressure. The computer estimated horizontal permeability by applying the time and rate-of-filling data to the standard Bouwer and Rice rate-of-rise permeability models. Horizontal permeabilities for the loess measured from 1.10×10^{-5} to 5.34×10^{-4} cm/sec. Horizontal permeabilities for the fluvial deposits measured from 1.01×10^{-6} to 1.21×10^{-5} cm/sec. As noted earlier, Appendix B provides the GS-1 sample plots and horizontal permeability measurements for the groundwater samples collected during the DPT investigation.

6.0 NATURE AND EXTENT OF CONTAMINATION

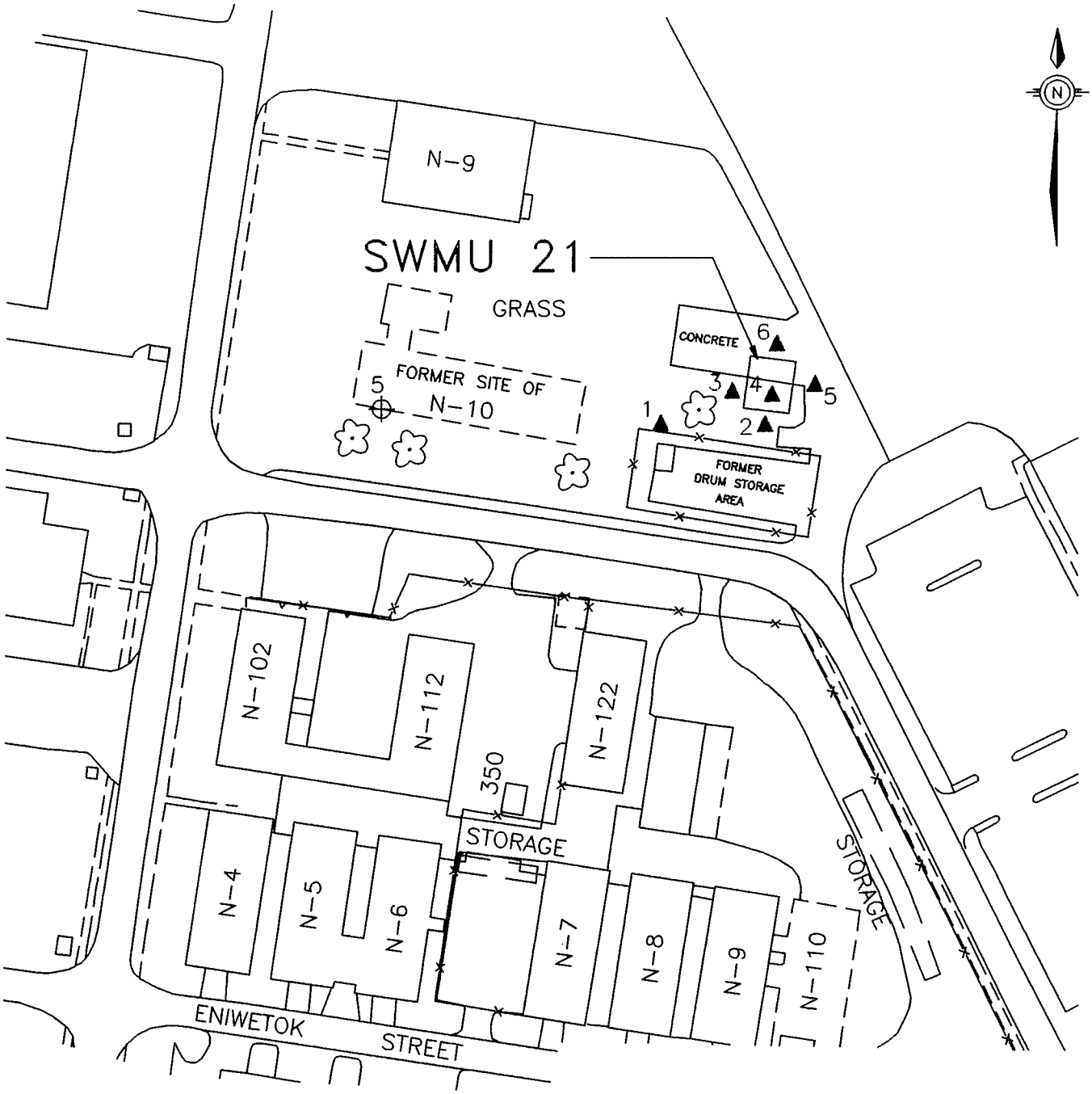
The following sections provide the analytical results for subsurface soil and groundwater samples collected during the DPT investigation. Hydrologic's onsite laboratory analyzed the DPT soil and groundwater samples for VOCs. Twenty-five percent of the soil and groundwater samples were split and submitted to NET for confirmation analysis. Appendix C provides the laboratory data.

As a reference for organic concentrations detected in subsurface soil samples, the contaminant concentrations are compared with the risk-based concentrations (RBCs) for residential and industrial soil (USEPA Region III Risk-Based Concentration Table, January to June 1995). VOC concentrations in groundwater are compared to the RBC for tap water (USEPA January to June 1995) and the maximum contaminant level (MCL) for drinking water (USEPA Drinking Water Regulations and Health Advisories, May 1994). The following sections discuss the analytical results by media.

6.1 Subsurface Soil Sample Results — DPT Investigation

E/A&H collected a subsurface soil sample from the 9- to 10-foot interval at each of the six DPT locations. Each sample was screened for organic vapors with a PID; field screening results and visual observations were recorded in the field logbook. Two of the samples were split and submitted to the offsite laboratory for confirmation analysis.

The only VOCs detected in subsurface soil samples from the 9 to 10-foot interval were at Location 2 (1 part per billion [ppb] methylene chloride) and Location 3 (6 ppb acetone). The measured concentrations are below the RBCs for residential soil. These compounds were detected only in samples submitted for offsite (NET) laboratory analysis. Methylene chloride and acetone are common laboratory artifacts. Figure 6-1 shows the DPT soil sampling locations.



LEGEND

▲ CONTAMINANT CONCENTRATION NON-DETECT OR LESS THAN RESIDENTIAL RISK-BASED CONCENTRATION FOR SOIL.

5 ⊕ USGS STRATIGRAPHIC TEST HOLE

100 0 100

SCALE FEET

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INVESTIGATION
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MILLINGTON, TN

FIGURE 6-1
VOCs IN SOIL (9-10 FEET BLS)
BUILDING N-10
UNDERGROUND WASTE TANK
SWMU 21

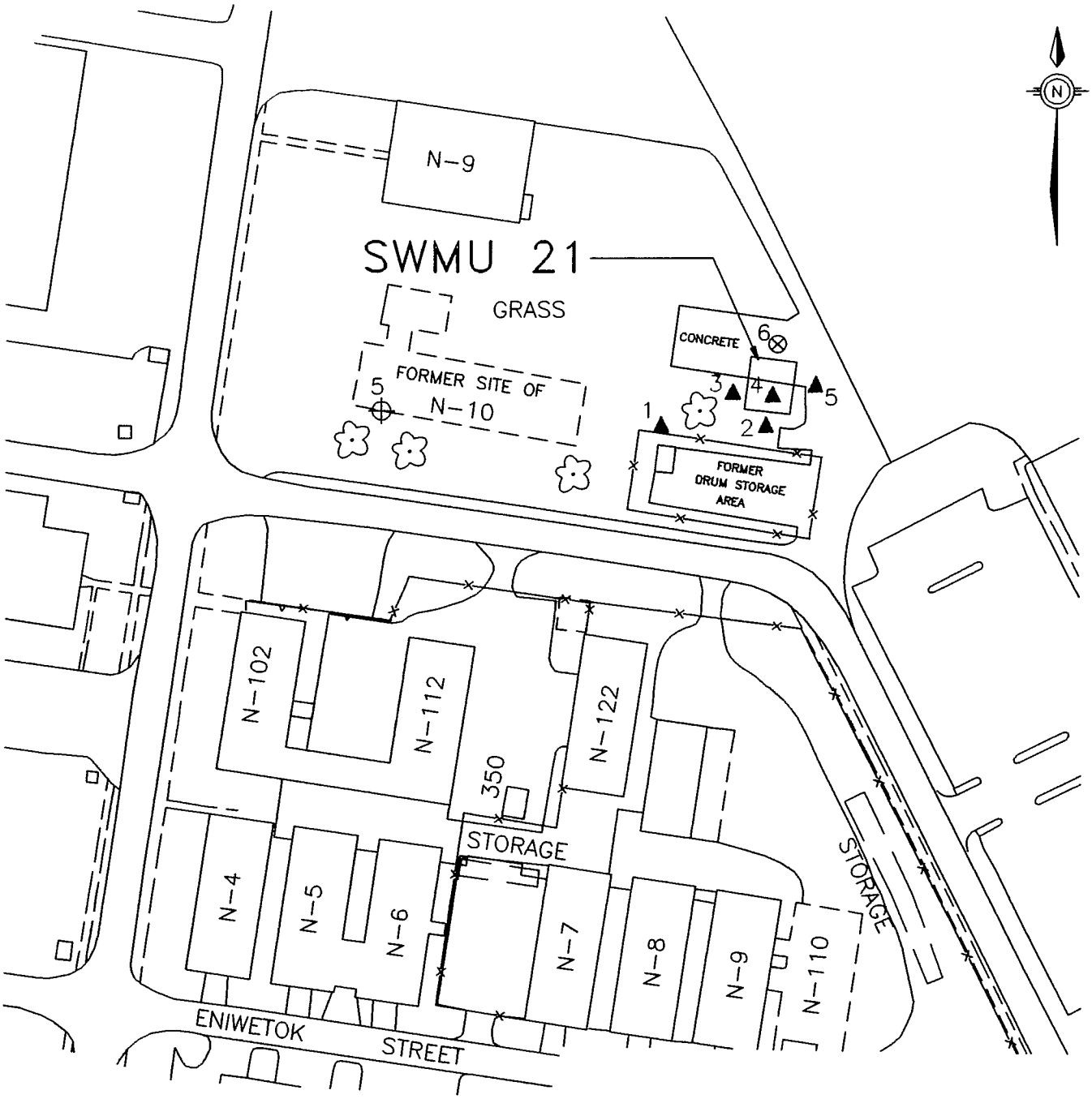
DWG DATE: 10/27/95 | DWG NAME: 94VSS21

6.2 Groundwater Sample Results — DPT Investigation

E/A&H collected groundwater samples from the loess and fluvial deposits at each location except for Location 1 (no fluvial deposits groundwater sample could be collected) and Location 6 (no loess groundwater sample could be collected). Twenty-five percent of the groundwater samples were split (two from the loess and one from the fluvial deposits) and submitted to the offsite laboratory for confirmation analysis.

The following VOCs were detected in loess groundwater: acetone (24 to 36 ppb) and methylene chloride (1 ppb). These compounds, common laboratory artifacts, were not detected by the onsite laboratory and did not exceed the RBC for tap water or the MCL for drinking water. Figure 6-2 shows the loess groundwater sampling locations. Table 6-1 summarizes the detected VOC concentrations.

The following VOCs were detected in fluvial deposits groundwater: benzene, carbon tetrachloride, dichlorofluoromethane, methylene chloride, and acetone. Benzene was detected at Location 2 (11.6 ppb), exceeding both the RBC for tap water (0.31 ppb) and the MCL for drinking water (5 ppb). The carbon tetrachloride concentrations at Locations 2, 4, and 6 ranged from 15.2 ppb to 163 ppb, exceeding both the RBC (0.16 ppb) and the MCL (5 ppb). The carbon tetrachloride concentration at Location 5 (4.8 ppb) exceeds the RBC but not the MCL. Dichlorofluoromethane (Freon; a possible laboratory artifact) was detected at Locations 5 (5.4 ppb) and 6 (6.5 ppb); however, no RBC or MCL exists for this compound. Methylene chloride (1 ppb) and acetone (29 ppb) were detected at Location 3; however, these common laboratory artifacts did not exceed RBCs or MCLs. Figure 6-3 shows the locations of fluvial groundwater samples where concentrations exceeded the RBCs for tap water, and Table 6-1 summarizes the analytical data.



LEGEND

▲ CONTAMINANT CONCENTRATION NON-DETECT OR LESS THAN RESIDENTIAL RISK-BASED CONCENTRATION FOR SOIL.

5 ⊕ USGS STRATIGRAPHIC TEST HOLE

6 ⊗ NO LOESS GROUNDWATER SAMPLE COULD BE COLLECTED FROM THIS LOCATION

100 0 100

SCALE FEET

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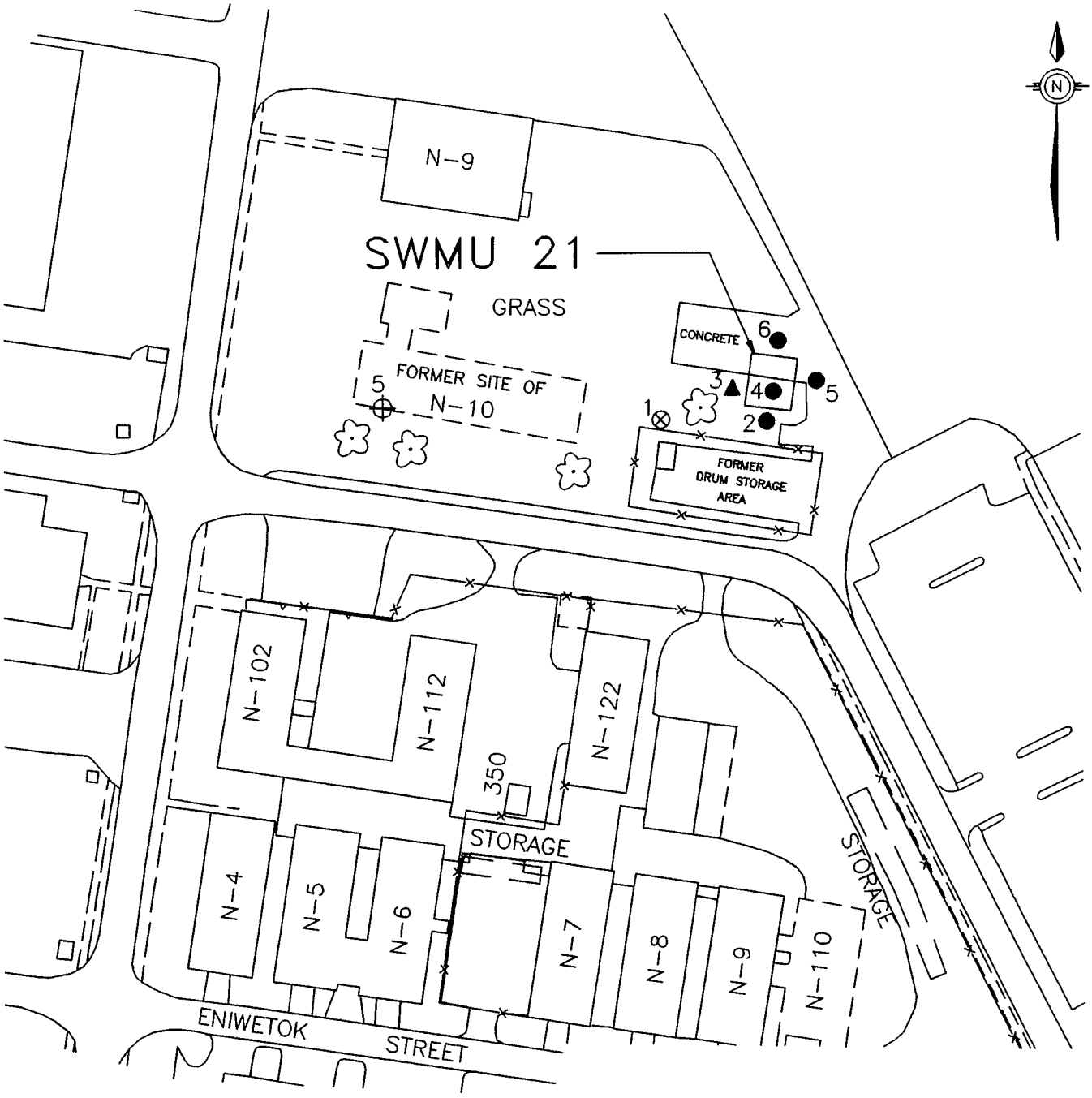
MILLINGTON, TN

FIGURE 6-2
VOCs IN LOESS GROUNDWATER
BUILDING N-10
UNDERGROUND WASTE TANK
SWMU 21

DWG DATE: 10/27/95 | DWG NAME: 94VLG21



100 0 100

SCALE FEET

LEGEND

▲ CONTAMINANT CONCENTRATION NON-DETECT OR LESS THAN RISK-BASED CONCENTRATION FOR TAP WATER.

● CONTAMINANT CONCENTRATION GREATER THAN RISK-BASED CONCENTRATION FOR TAP WATER.

5 ⊕ USGS STRATIGRAPHIC TEST HOLE

1 ⊗ NO FLUVIAL GROUNDWATER SAMPLE COULD BE COLLECTED FROM THIS LOCATION

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FIGURE 6-3
VOCs IN FLUVIAL DEPOSITS GROUNDWATER
BUILDING N-10
UNDERGROUND WASTE TANK
SWMU 21

DWG DATE: 10/27/95 | DWG NAME: 94FDG21

Table 6-1
Detected Concentrations of VOCs in Loess and Fluvial Deposits Groundwater
SWMU 21 — Building N-10 Underground Waste Tank
(data in parts per billion)

Parameter	Sample Location and Lithologic Unit	Sample ID	Field Lab[a] Result	Offsite (Hydrologic[b]) Lab Result	Offsite (NET[c]) Lab Result	RBC[d] - Tap Water	MCL[e]
Carbon Tetrachloride	2 (Fluvial)	021G000203	**163**	**116**	N/A[f]	0.16	5
	4 (Fluvial)	021G004040	**81**	N/A	N/A		
	5 (Fluvial)	021G005040	*4.8*	N/A	N/A		
	6 (Fluvial)	021G006041	**15.2**	N/A	N/A		
Benzene	2 (Fluvial)	021G000203	ND[g]	**11.6**	N/A	0.36	5
Dichlorofluoromethane[h]	5 (Fluvial)	021G005040	5.4	N/A	N/A	None	None
	6 (Fluvial)	021G006041	6.5	N/A	N/A		
Acetone[h]	1 (Loess)	021G001017	ND	ND	36	3,700	None
	2 (Loess)	021G000202	ND	N/A	24		
	3 (Fluvial)	021G003048	ND	ND	29		
Methylene chloride[h]	1 (Loess)	021G001017	ND	N/A	1J	4.1	None
	2 (Loess)	021G000202	ND	N/A	1J		
	3 (Fluvial)	021G003048	ND	N/A	1J		

Notes:

[a] = Hydrologic, Inc.'s mobile onsite laboratory analyzed the samples for VOCs by Method 8021.
[b] = NET's Bedford, Massachusetts, laboratory analyzed the samples for VOCs by Method 8240. Approximately 25% of the samples submitted to the onsite laboratory were split and submitted to NET for confirmation analysis.
[c] = Hydrologic, Inc.'s Frankfort, Kentucky laboratory analyzed this sample for VOCs by Method 8240 to confirm results from the onsite laboratory.
[d] = Risk-Based Concentrations for tap water obtained from the USEPA Region III Risk-Based Concentrations Table, January - June 1995.
[e] = Maximum Contaminant Level for drinking water obtained from the USEPA Drinking Water Regulations and Health Advisories, May 1994.
[f] = N/A denotes sample was not analyzed for VOCs by this laboratory.
[g] = ND denotes no VOCs were detected in this sample, or that data validation determined that the VOC was not present in the sample.
[h] = Dichlorofluoromethane (Freon), acetone, and methylene chloride are common laboratory artifacts.

BOLD indicates analyte exceeds the RBC for tap water **and** the MCL for drinking water. *Italics* indicates analyte exceeds the RBC, but not the MCL.

7.0 PROPOSED RCRA FACILITY INVESTIGATION

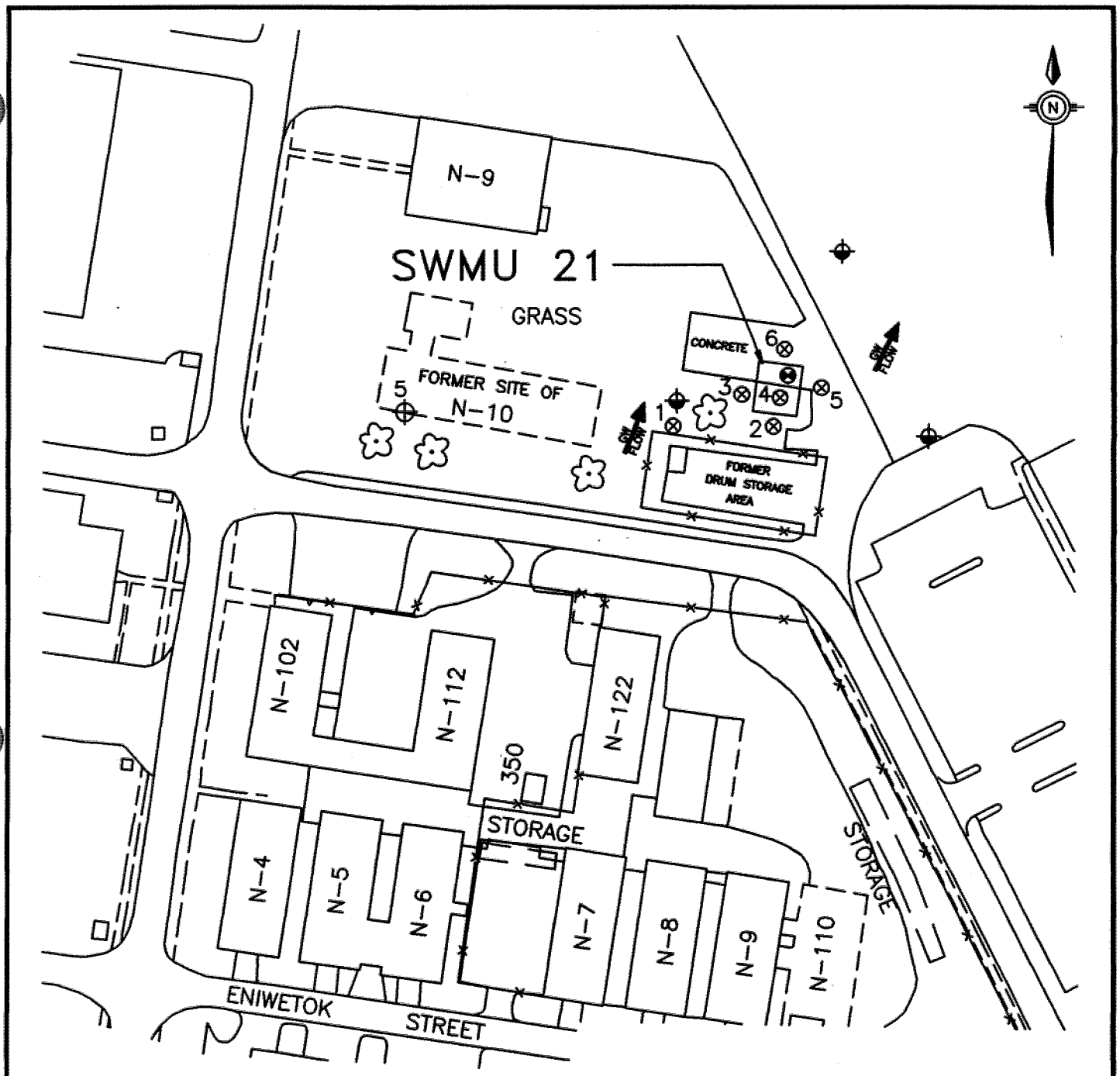
Based on the results of the DPT investigation at SWMU 21, RFI characterization is recommended. The proposed sampling rationale, sampling protocol, and reporting requirements are summarized in the following sections.

7.1 RFI Work Plan Rationale

To date, no surface soil samples have been collected from SWMU 21 for risk characterization. To obtain the necessary information to prepare a risk assessment for the SWMU, surface soil samples must be collected and analyzed to determine if a risk exists to human health and the environment. Although analysis of subsurface soil and loess groundwater samples at SWMU 21 did not identify any VOC contamination associated with the former waste oil/hydraulic fluid UST, fluvial deposits groundwater samples collected during the DPT survey exceeded the RBCs and MCLs for benzene and carbon tetrachloride. The nature and extent of carbon tetrachloride in fluvial deposits groundwater must be determined to complete the RFI's requirements. Presently, the source of the carbon tetrachloride is unknown and, as discussed in Section 5, the fluvial deposits are the preferential zone of groundwater flow contaminant transport at NSA Memphis.

7.2 Soil Boring and Monitoring Well Installations

The DPT investigation identified VOCs in fluvial deposits groundwater at concentrations above RBCs at four sampling locations and above MCLs at three sampling locations. As discussed in the June 6, 1995 BRAC Cleanup Team meeting, soil borings and monitoring wells will be installed at SWMU 21 to define the nature and extent of groundwater contamination in the fluvial deposits. Four monitoring wells are proposed: one screened in the upper fluvial deposits and three screened in the lower fluvial deposits. Figure 7-1 shows the proposed soil boring and monitoring well locations. Two of the well locations are positioned to intercept the anticipated groundwater flow direction from SWMU 21 (north-northeast, refer to Section 5 of this report).



LEGEND

- 3 ⊗ FORMER DPT SAMPLE LOCATION (CSI)
- ● PROPOSED UPPER FLUVIAL DEPOSITS MONITORING WELL
- 5 ⊕ PROPOSED LOWER FLUVIAL DEPOSITS MONITORING WELL
- ⊕ USGS STRATIGRAPHIC TEST HOLE
- ↑ ANTICIPATED GROUNDWATER FLOW DIRECTION

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FIGURE 7-1
PROPOSED RFI SAMPLING LOCATONS
BUILDING N-10
UNDERGROUND WASTE TANK
SWMU 21

DWG DATE: 10/27/95 | DWG NAME: 94RSL21

7.2.1 Soil Borings

Soil borings will be advanced and sampled before installing monitoring wells. Each soil boring will be continuously sampled for lithologic description and organic vapor field screening, with information recorded in the field logbook. Samples for laboratory analysis will be collected at three intervals from each boring location. Surface and subsurface soil samples will be collected from the following intervals:

- Surface (0 to 1 foot bls)
- From just above the soil/water interface (anticipated to be between 14 and 16 feet bls)
- From an intermediate interval between the surface and the first water encountered (suggested sampling interval 9 to 10 feet bls to be consistent with the subsurface soil sampling interval during the DPT investigation)

The surface soil samples will be used to prepare a risk assessment, which will be included in the RFI report. The intermediate subsurface soil sampling interval may be selected based on organic vapor readings, if detected (no organic vapors were detected during the DPT investigation) or by field judgment as described in Section 4.44 of the *Comprehensive RFI Work Plan*. All soil samples collected during this phase will be submitted for full-scan analysis (FSA). Section 7.4 summarizes the sampling and analytical requirements for the soil borings.

7.2.2 Monitoring Wells

Four monitoring wells will be installed during the RFI. One monitoring well will be installed in the upper fluvial deposits at a depth between 35 and 45 feet, and three in the lower fluvial deposits between 65 and 75 feet deep. The monitoring wells will be constructed of 2-inch polyvinyl chloride with 10-foot screens. The wells will be installed in accordance with Section 4.5 of the *Comprehensive RFI Work Plan* using Rotasonic Drilling techniques.

Groundwater samples will be collected as described in Section 4.6 of the *Comprehensive RFI Work Plan*. All groundwater samples collected from the monitoring wells will be submitted for FSA. Section 7.4 discusses the RFI sampling and analytical requirements.

Field personnel may deviate from the proposed sampling strategy should field conditions or organic vapor field screening readings suggest that additional or different intervals may be successfully sampled or yield more useful information. Deviations will be documented in the field logbook and the RFI report. The area of investigation then may be expanded or concentrated, based on the results of the initial data.

7.3 Expansion of Investigation

If laboratory data indicate the presence of soil or groundwater contamination in the proposed sample locations, additional sampling locations may be required to fully define the nature and extent of contamination, particularly in the determined downgradient groundwater flow direction. Measured contaminant concentrations in soil and groundwater, coupled with groundwater-flow directions and characteristics, will be used to determine the locations of additional soil borings and/or monitoring wells, if the investigation is expanded. The soil and groundwater investigation will proceed until the nature and extent of contamination have been adequately defined and/or risk assessment modeling results indicate that downgradient concentrations are below action levels at potential receptor sites.

7.4 Analytical Requirements

Soil and groundwater samples will be collected during the RFI at SWMU 21 for laboratory analysis. Sampling and analytical requirements are summarized in Table 7-1. Soil samples collected during the supplemental DPT investigation will be analyzed in the field with a portable gas chromatograph at Level II-equivalent DQO. Ninety-five percent of the samples submitted for offsite laboratory analysis will be analyzed with Level III-equivalent DQO, and Level IV-equivalent DQO will be used for the remaining 5%.

7.6 Sample Custody

Sample custody will adhere to Section 4.12.5 of the *Comprehensive RFI Work Plan*.

7.7 Quality Assurance/Quality Control

QA/QC procedures to be followed during the investigation will adhere to the Quality Assurance Plan presented in Section 4.14 of the *Comprehensive RFI Work Plan*.

7.8 Decontamination Procedures

Decontamination procedures will adhere to Section 4.11 of the *Comprehensive RFI Work Plan*.

7.9 Investigation-Derived Waste

IDW will be handled as specified in Section 4.13 of the *Comprehensive RFI Work Plan*. E/A&H is currently preparing a detailed Investigation-Derived Waste Management Plan for NSA Memphis. This plan, which will be completed prior to the RFI, provides additional guidance for handling IDW generated during the SWMU 21 RFI.

7.10 Health and Safety Plan

The site-specific Health and Safety Plan for SWMU 21 is included in the *Assembly C Site Investigation Plans*. The *Comprehensive Health and Safety Plan* is included in Section 7 of the *Comprehensive RFI Work Plan*.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information gathered during this investigation, the following conclusions and recommendations have been reached.

- No VOCs (except for the common laboratory artifacts methylene chloride and acetone) were detected in subsurface soil samples collected from the six DPT locations at SWMU 21.

- No VOCs (except for the common laboratory artifacts methylene chloride and acetone) were detected in loess groundwater at SWMU 21.

- The following VOCs were detected in fluvial deposits groundwater at concentrations exceeding RBCs for tap water and MCLs for drinking water: benzene (11.6 ppb; RBC = 0.31 ppb and MCL = 5 ppb) and carbon tetrachloride (4.8 ppb to 163 ppb; RBC = 0.16 ppb and MCL = 5 ppb). Dichlorofluoromethane, methylene chloride, and acetone were also detected at concentrations below RBCs and MCLs (where applicable), but these contaminants are likely laboratory artifacts.

- RFI characterization of SWMU 21 is required due to the RBCs and MCLs exceeded in fluvial deposits groundwater. The proposed RFI consists of the following activities:

  — E/A&H will install and sample four groundwater monitoring wells at SWMU 21. One well, placed in the center of the area of VOC contamination identified during the DPT survey, will be screened in the upper fluvial deposits (approximately 35 to 45 feet bls). Three wells will be screened in the lower fluvial deposits (between 65 and 75 feet bls). Groundwater samples will be submitted to an offsite laboratory (NET) for FSA.

— The soil borings associated with the wells will be continuously sampled for lithologic description and field screening, with the results recorded in the field logbook. Soil samples will be collected from 0 to 1 foot bls for use in preparing a risk assessment, from just above the soil/water interface in the loess (from 14 to 16 feet bls), and from an intermediate interval between the surface and the first water encountered (suggested sampling interval 9 to 10 feet bls). The samples will be submitted for FSA.

- The results of the RFI will be compiled in an RFI report for submittal to the Navy, TDEC, and USEPA.

9.0 REFERENCES

Bouwer, Herman, and R.C. Rice (June 1976). *A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells.* Water Resources Research, Vol. 12, No. 3, pp. 423-428.

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Kingsbury, James A. and John K. Carmichael (1995). *Hydrogeology of Post-Wilcox Group Stratigraphic Units In the Area of Naval Air Station Memphis, Near Millington, Tennessee.* U.S. Geological Survey Water-Resources Investigations Report 95-4011.

Southern Division Naval Facilities Engineering Command (1992). *Underground Storage Tank Closure Report, Naval Air Station Memphis, Millington, TN.* SOUTHNAVFACENGCOM: Charleston, South Carolina.

United States Geological Survey (1995). Oral and written communication with Mr. Jack Carmichael. USGS: Nashville, Tennessee.

Appendix A

Underground Storage Tank Closure Report

Contract N62467-90-C-0683
Underground Storage Tank Closure Report
(SD-84)

Naval Air Station Memphis
Millington, Tn

February 17, 1992

I hereby certify that the Closure Report shown and marked in this submittal is that proposed to be incorporated into Contract Number N62467-90-C-0683, is in compliance with the Contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by [signature] Date 2/18/92

RECEIVED
FEB 19 1992
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Table of Contents

1.0 Introduction

2.0 Description of Work

3.0 Sampling

4.0 Laboratory Analysis

5.0 Disposal of Materials

6.0 Warranties and Limitations

Appendices

A. Map of Sample Locations, Chain of Custody Form, and Analytical Results for Initial Excavation

B. Map of Sample Locations, Chain of Custody Form and Analytical Results for Final Excavation

C. Chain of Custody Form, and Analytical Results for Rainwater in Excavation

D. Chain of Custody Form, and Analytical Results for Clean and Contaminated Stockpiles

1.0 Introduction

The purpose of this report is to provide documentation that the underground storage tank listed below at the Naval Air Station was properly removed and closed as required by the applicable Tennessee state regulations and the Navy's contract specifications.

Navy Tank No.: Tank System N-10

Location:	Adjacent to Building N-10
Description:	5,000 gal. steel tank
Contents:	Water with petroleum sheen
Removal date:	November 26, 1991

2.0 Description of Work Performed

Soil that was removed to expose the tank was field checked with an HNU photoionization detector (PID). Soil was segregated into a contaminated and a potentially clean stockpile based on the PID measurements. All soil that was removed was placed on polyethylene sheeting to protect the environment from contamination until test results were obtained.

When work began on tank N-10, the contents were found to be waste oil. A Tornado drum vacuum was used to pump the contents into three H-17 DOT barrels. The explosive gas level was then checked with a combustible gas indicator (CGI). The tank gasses were purged with 150 pounds of dry ice (carbon dioxide), then the explosive gas levels were checked again with the CGI. A hole was cut in the tank with pneumatic nibblers and the sidewalls were scraped with an aluminum squeegee. The sludge was pumped into DOT barrels with the drum pump.

The excavation of the tank was then finished and the tank was found to be a 3,000 gallon tank instead of a 5,000 gallon tank. The tank was lifted out of the excavation and hauled to the laydown area. Sampling and analysis of the pit floor revealed that the excavation was still contaminated. Permission was granted to excavate an additional two feet due to the smaller tank size and the contamination found. The floor of the excavation was sampled and analyzed again and found to be clean.

After excavation, rainwater entered the pit. The water was sampled, analyzed and found to be clean. The Government gave permission to pump the water into a nearby drainage ditch. Government permission was also given to backfill the excavation with flowable fill (lean concrete). The excavation was filled to one foot below grade and 14 cubic yards of topsoil were used to finish the earthwork.

3.0 Sampling

Soil was continually screened with an HNU photoionization detector (PID) with a 10.2 eV lamp. The soils were segregated into clean and contaminated stockpiles as necessary. Every 60 yards of material from the clean and contaminated stockpiles were sampled for laboratory analysis as directed by the Navy. Four samples were submitted for analysis to confirm readings from our PID instrument. Samples were collected by Brian Cavins and Tony Potter of National Salvage and Service. Copies of the chain of custody forms are included with the analytical results in Appendix A.

After tank removal, in-situ materials were sampled from the excavation floor and from 2 feet below the excavation floor at the north and south ends. Rainwater was sampled and analyzed prior to disposal and final excavation. Final samples were collected from the four corners of the excavation floor.

Samples were collected in glass sample jars with Teflon lined lids. Samples were collected using sterile gloves which were disposed of between samples. Bottles were labeled in the field and a chain of custody form was submitted with each shipment. Samples were shipped in coolers and iced to 4 degrees Celsius.

4.0 Analysis

All samples were shipped to Specialized Assays Environmental in Nashville Tennessee, a Navy approved and certified laboratory. Samples were analyzed using approved EPA methods. Initial excavation stockpiles and in-situ materials were analyzed for BTEX and TPH. Rainwater in the excavation was analyzed for TPH only. Final stockpiled materials were analyzed for BTEX, TPH, TCLP metals, and ignitability. Final in-situ materials from the excavation floor were analyzed for BTEX and TPH. The analytical results are presented in the following table.

SAMPLE	BTEX (PPM)				TPH (PPM)		TCLP (PPM)			
	BENZENE	TOLUENE	ETHEL BENZENE	XYLENE	LO BOIL	HI BOIL	LEAD	BENZENE	LO BOIL	HI BOIL
Initial Excavation										
#5	ND*	ND	ND	ND	<5.0	184				
#6	ND	ND	ND	ND	<5.0	1876				
#7	ND	ND	ND	ND	<5.0	<5.0				
Final Excavation										
#1	ND	ND	ND	ND	<5.0	<5.0				
#2	ND	ND	ND	ND	<5.0	<5.0				
#3	ND	ND	ND	ND	<5.0	<5.0				
#4	ND	ND	ND	ND	<5.0	<5.0				
Excavation Water					<0.05	<0.05				
Contaminated Stockpile 1-60 Yds	ND	ND	ND	ND	<5.0	345	<0.5	<0.1	<0.1	<0.1
Clean Stockpile 1-60 Yds	ND	ND	ND	ND	<5.0	10.6	<0.5	<0.1	<0.1	<0.1
61-120 Yds	ND	ND	ND	ND	<5.0	31.9	<0.5	<0.1	<0.1	<0.1

* ND - Not Detected

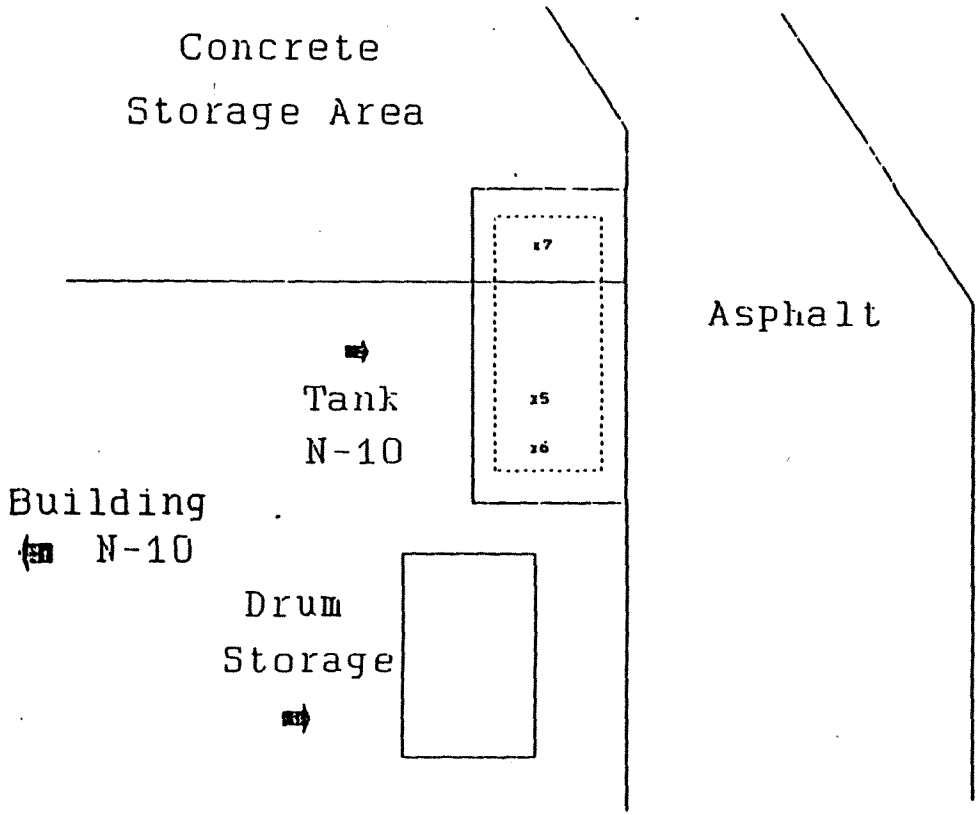
5.0 Disposal of Materials

Contaminated soils are stockpiled in the laydown area. The Government has instructed us to dispose of it with the N-94 contaminated soils. Because of the smaller size of Tank N-10 the Government granted approval to temporarily store the excavated tank at the laydown area until it can be disposed of with another shipment. Manifests for the tank will be included with manifests for the rest of the shipment. The three drums of waste oil found in N-10 was taken to the N-94 tank area and will be disposed of with the N-94 materials in accordance with Government instructions. Manifests for the waste will be included with the N-94 manifests.

6.0 Warranties and Limitations

This report certifies that the storage tank was closed in accordance with federal and state regulations and Millington Naval Air Station's contract specifications. No certification is given that all environmental contaminants have been removed from the site because of the limitations of the type of representative sampling that was required and performed for this kind of work.

Naval Air Station Memphis
Map of Sample Locations for Initial Excavation
Tank N-10 Area



*Not to Scale

Date 2-17-92

Remove Underground Storage Tanks Basewide
Contract N62467-90-C-0683

Appendix B

DPT Piezocone and Hydrocone Plots

PIEZOCONE SOUNDING LOG

SOUNDING #: 21-P02 CLIENT: ENSAFE DATE: 05-23-1995
JOB NAME OR #: NASM094 LOCATION: SWMU21 ST2 DEPTH OF GROUNDWATER: 18 F

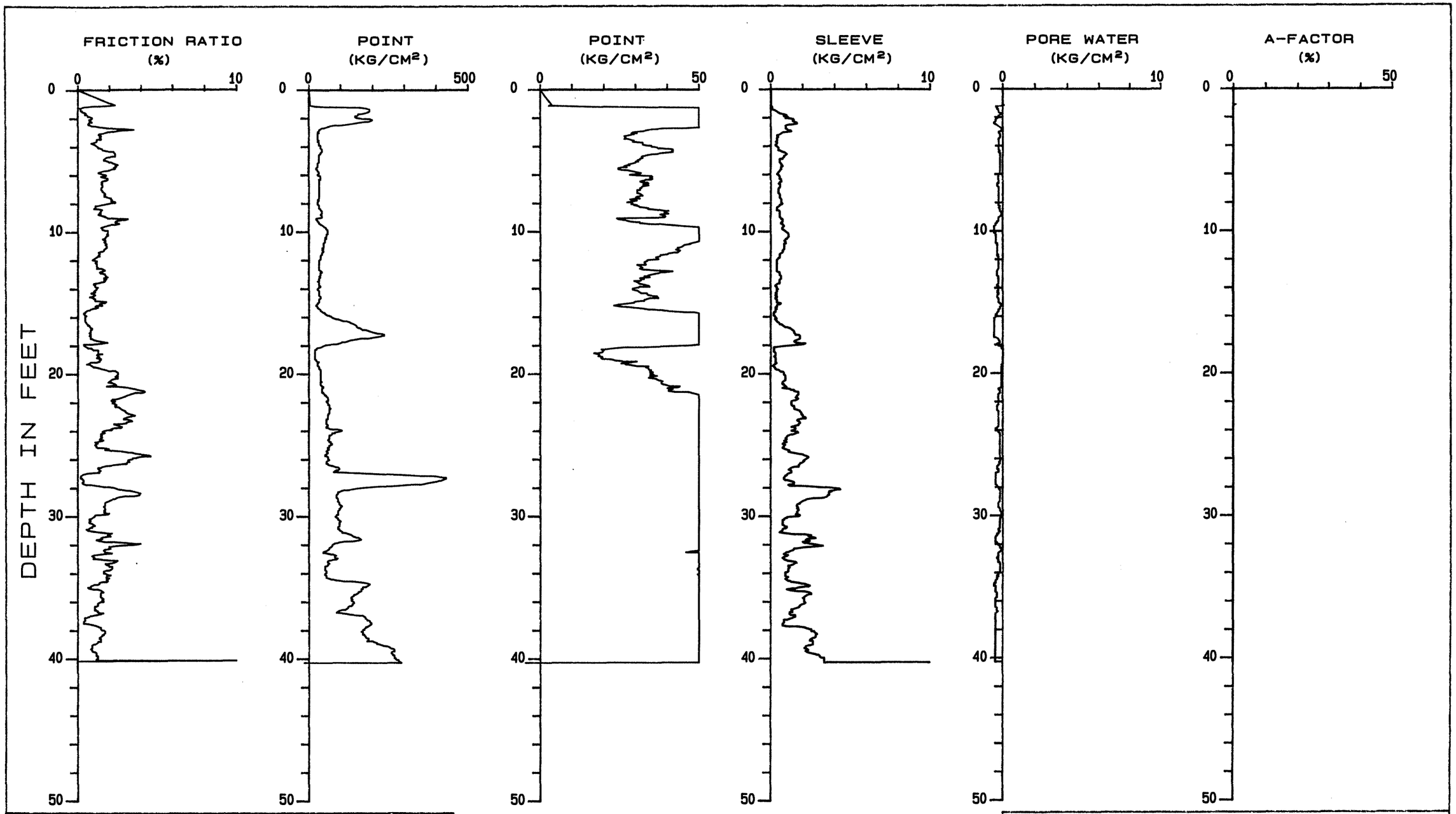
Depth	PP	PT	SL	FR	Soil Type	N	VES	FA	RD	YM	USS	SEN	CM	OCR
2.00	-0.27	151.52	1.06	0.70	Fine Sand	30	0.05	>45	100+	333	---	---	909	---
3.00	-0.11	28.86	1.25	4.33	Silty Clay	19	0.10	---	---	384	1.9	1.4	58	>10
4.00	-0.30	34.82	0.32	0.91	Silty to Clayey F.S.	12	0.15	45	64	77	---	---	209	---
5.00	-0.23	30.35	0.56	1.83	Clayey Fine Sand	12	0.20	---	---	402	2.0	3.3	61	>10
6.00	-0.18	28.06	0.39	1.39	Clayey Fine Sand	11	0.24	---	---	371	1.9	4.3	56	>10
7.00	-0.29	31.19	0.50	1.59	Clayey Fine Sand	12	0.29	---	---	412	2.1	3.8	62	>10
8.00	-0.24	29.25	0.64	2.20	Clayey Fine Sand	12	0.34	---	---	385	1.9	2.7	59	>10
9.00	-0.15	39.20	0.56	1.42	Silty to Clayey F.S.	13	0.39	41	54	86	---	---	235	---
10.00	-0.54	57.48	0.87	1.51	Silty to Clayey F.S.	19	0.44	42	63	126	---	---	345	---
11.00	-0.39	45.03	0.86	1.90	Clayey Fine Sand	18	0.49	---	---	594	3.0	3.2	90	>10
12.00	-0.30	33.75	0.40	1.19	Silty to Clayey F.S.	11	0.54	38	45	74	---	---	203	---
13.00	-0.33	35.24	0.58	1.64	Clayey Fine Sand	14	0.59	---	---	462	2.3	3.7	70	>10
14.00	-0.31	29.30	0.37	1.25	Silty to Clayey F.S.	10	0.63	36	38	64	---	---	176	---
15.00	-0.29	29.36	0.34	1.17	Silty to Clayey F.S.	10	0.68	36	37	65	---	---	176	---
16.00	-0.44	72.88	0.26	0.36	Silty Fine Sand	18	0.73	40	62	160	---	---	437	---
17.00	-0.54	195.54	1.42	0.73	Fine Sand	39	0.79	>45	90	430	---	---	1173	---
18.00	-0.36	47.33	1.49	3.14	Clayey Fine Sand	19	0.84	---	---	620	3.1	1.9	95	>10
19.00	-0.01	22.82	0.23	1.02	Clayey Fine Sand	9	0.87	---	---	293	1.5	5.9	46	
21.00	-0.10	40.14	0.73	1.81	Clayey Fine Sand	16	0.93	---	---	523	2.6	3.3	80	>10
22.00	-0.28	58.97	1.23	2.09	Silty to Clayey F.S.	20	0.96	38	52	130	---	---	354	---
23.00	-0.29	57.94	2.02	3.49	Sandy Clay	29	0.99	---	---	759	3.8	1.7	116	>10
24.00	-0.47	99.84	1.31	1.31	Silty Fine Sand	25	1.02	40	67	220	---	---	599	---
25.00	-0.21	64.46	0.87	1.34	Silty to Clayey F.S.	21	1.05	38	54	142	---	---	387	---
26.00	-0.17	62.20	2.17	3.48	Sandy Clay	31	1.07	---	---	815	4.1	1.7	124	>10
27.00	-0.47	224.31	1.10	0.49	Fine Sand	45	1.11	44	89	493	---	---	1346	---
28.00	-0.31	156.81	3.68	2.35	Silty to Clayey F.S.	52	1.14	42	78	345	---	---	941	---
29.00	-0.19	94.23	1.92	2.04	Silty to Clayey F.S.	31	1.17	39	63	207	---	---	565	---
30.00	-0.05	83.27	1.75	2.10	Silty to Clayey F.S.	28	1.20	38	59	183	---	---	500	---
31.00	-0.23	99.31	0.69	0.70	Silty Fine Sand	25	1.23	39	64	218	---	---	596	---
32.00	-0.26	74.42	2.92	3.93	Sandy Clay	37	1.26	---	---	976	4.9	1.5	149	>10
33.00	-0.33	87.33	0.82	0.94	Silty Fine Sand	22	1.29	38	59	192	---	---	524	---
34.00	-0.23	51.44	0.89	1.72	Silty to Clayey F.S.	17	1.32	35	44	113	---	---	309	---
35.00	-0.46	166.71	1.72	1.03	Fine Sand	33	1.35	42	77	367	---	---	1000	---
36.00	-0.44	138.88	2.13	1.53	Silty Fine Sand	35	1.38	41	72	306	---	---	833	---
37.00	-0.46	171.70	1.57	0.92	Fine Sand	34	1.42	42	78	378	---	---	1030	---
38.00	-0.47	167.34	2.58	1.54	Silty Fine Sand	42	1.45	41	76	368	---	---	1004	---
39.00	-0.43	228.64	2.60	1.14	Fine Sand	46	1.48	43	85	503	---	---	1372	---
40.00	-0.47	272.25	3.40	1.25	Fine Sand	54	1.51	43	90	599	---	---	1634	---

PP - Pore Pressure (Kg/cm2)
PT - Point Bearing (Kg/cm2)
SL - Sleeve Friction (Kg/cm2)
FR - Friction Ratio (%)
GWD - Ground Water Depth

N - Equivalent SPT Blow Count (bpf)
VES - Vertical Effective Stress (Kg/cm2)
FA - Friction Angle (Degress)
RD - Relative Density (+ or - 5%)
YM - Youngs Modulus

USS - Undrained Sheer Strength
SEN - Sensitivity
CM - Constrained Modulus
OCR - Estimated Over Consolidation Ratio

The above data was computed utilizing SST's in-house correlations and guidelines published in 'Guidelines for Use and Interpretation of the Electronic Cone Penetration Test', Robertson and Campanella, September, 1989.



SOUNDING #: 21-P02

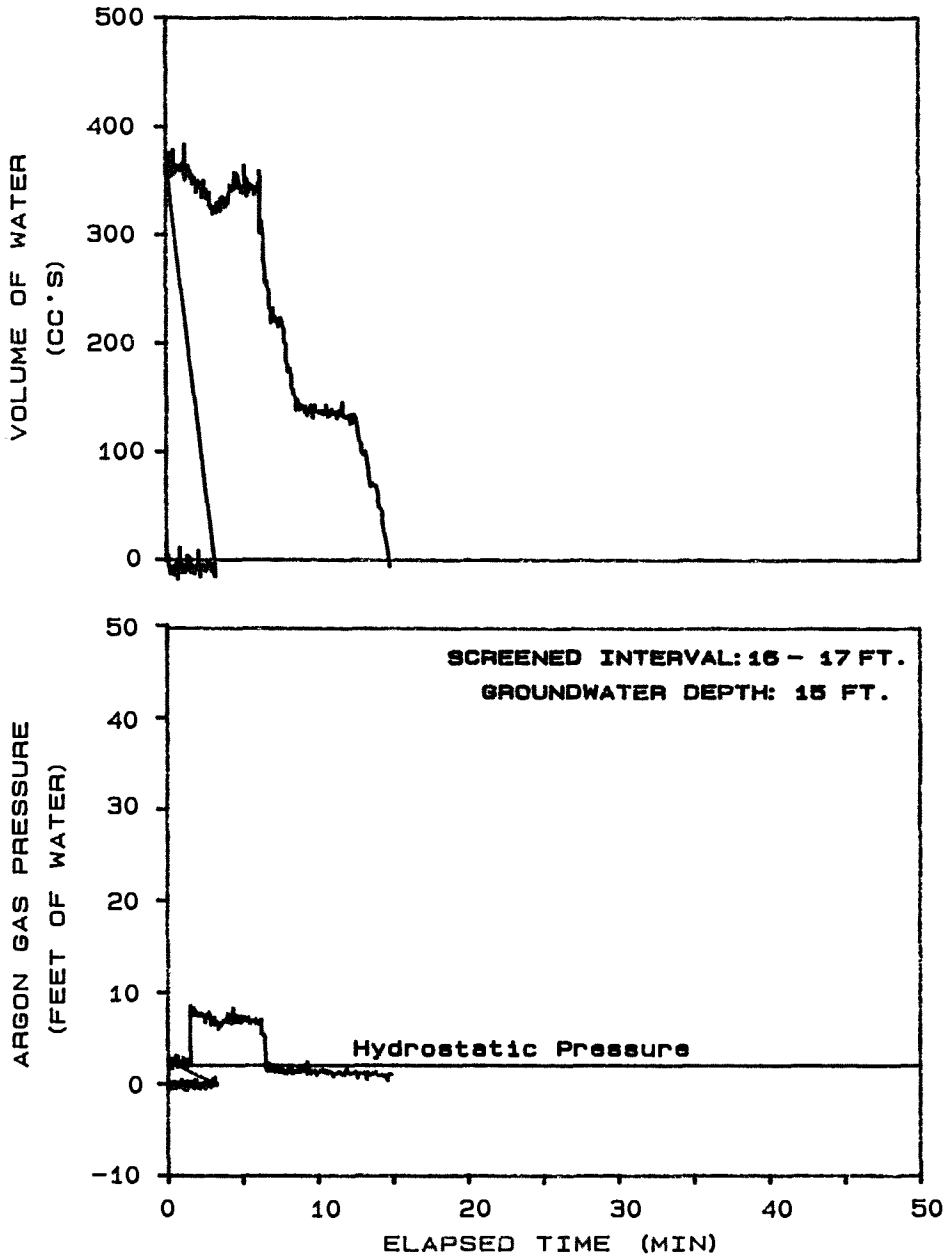
DATE: 05-23-1995 LOCATION: SWMU21 ST2

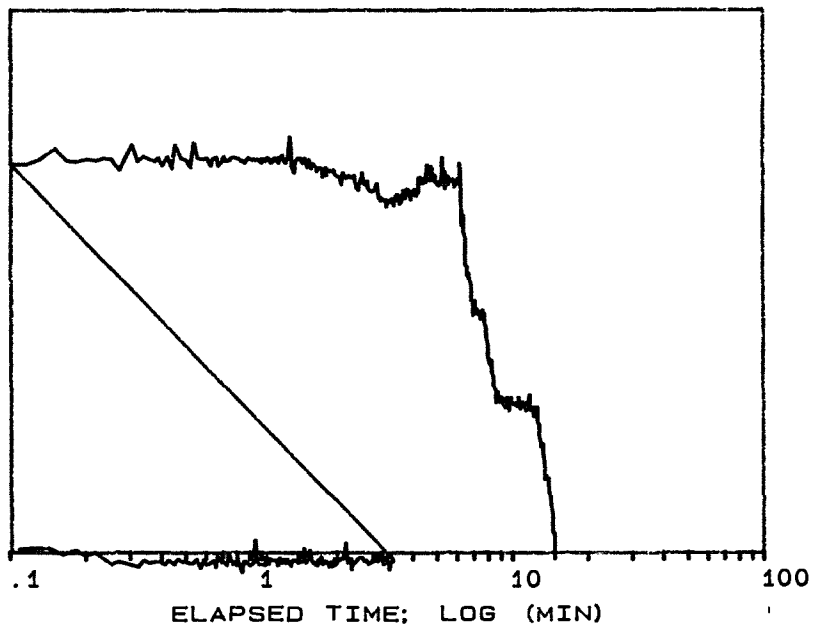
JOB: NASM094 CLIENT: ENSAFE

PIEZOCONE SOUNDING LOG

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

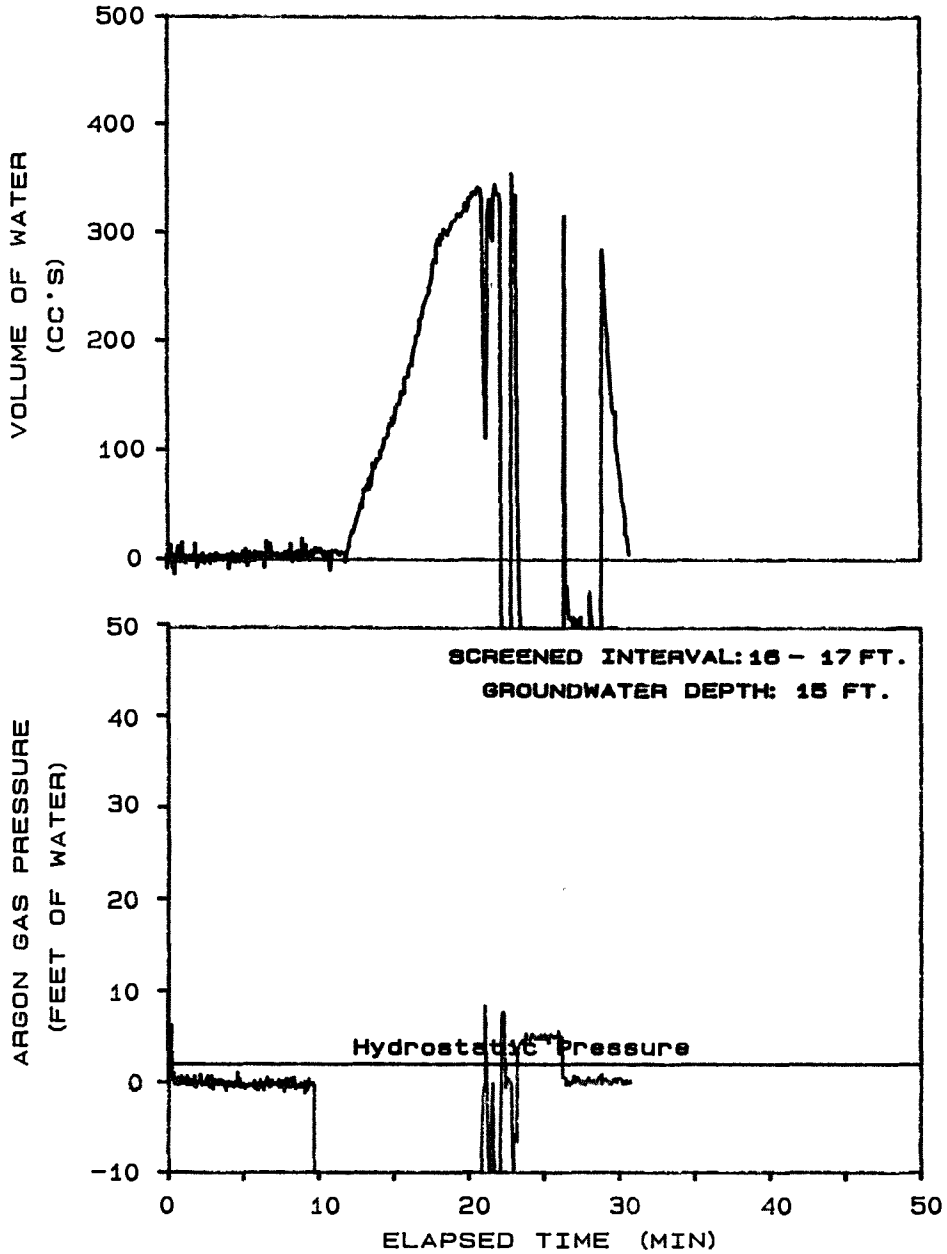
SAMPLE #: 21GH0117

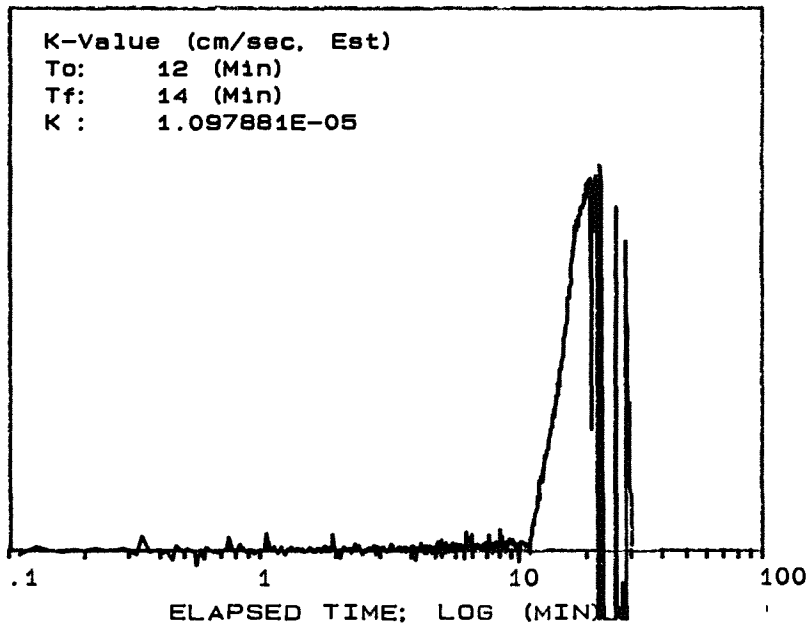
CLIENT: ENSAFE JOB: NASM094

DATE: 5-24-95 LOCATION: SWMU21 ST1

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

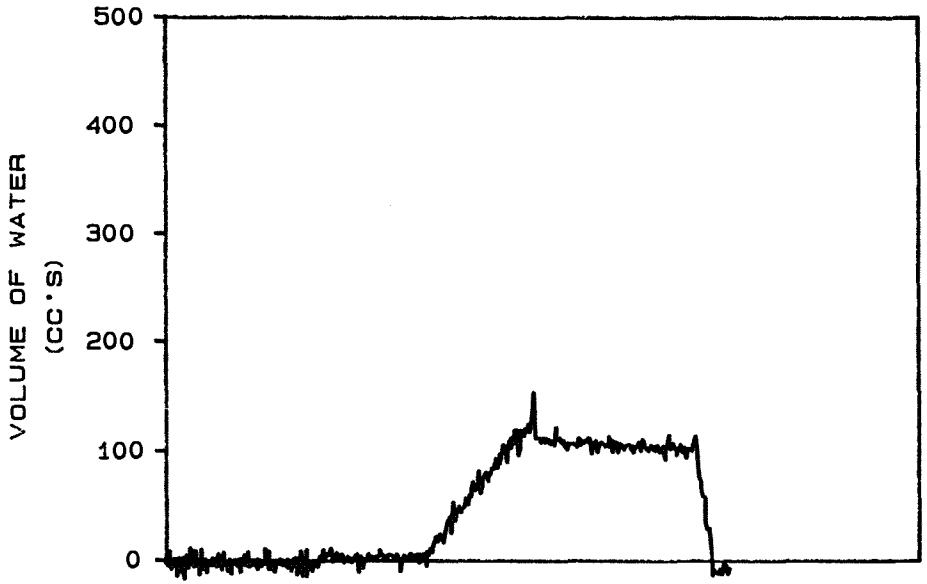
SAMPLE #: 21GH0217

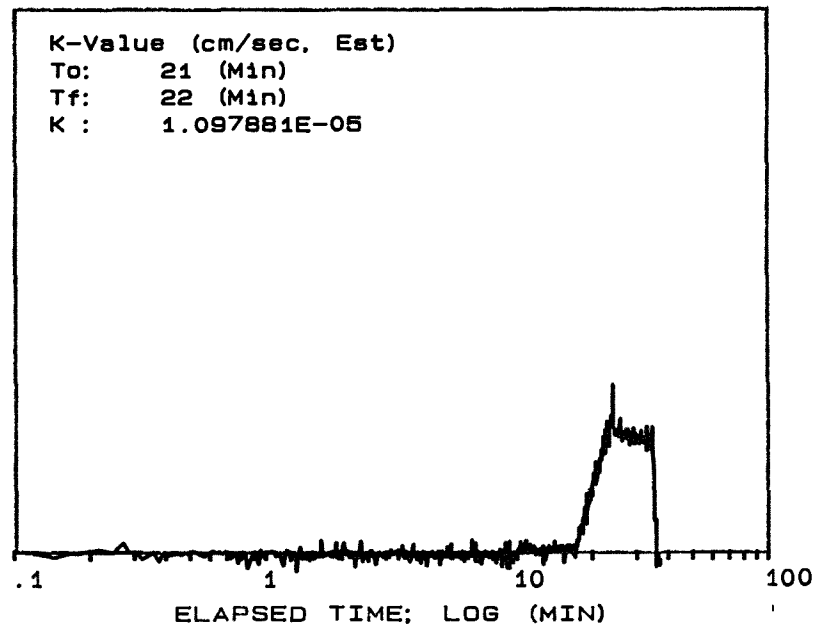
CLIENT: ENSAFE JOB: NASM094

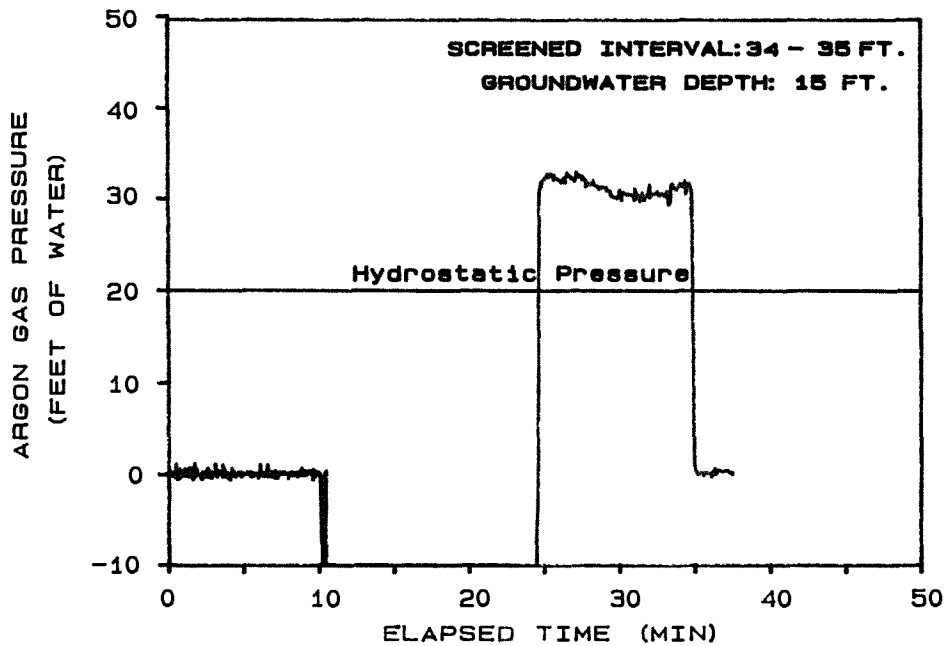
DATE: 05-23-1995 LOCATION: SWMU21 ST2

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

SAMPLE #: 21GH0235

CLIENT: ENSAFE JOB: NASM094

DATE: 05-23-1995 LOCATION: SWMU21 ST2

PERFORMED BY:

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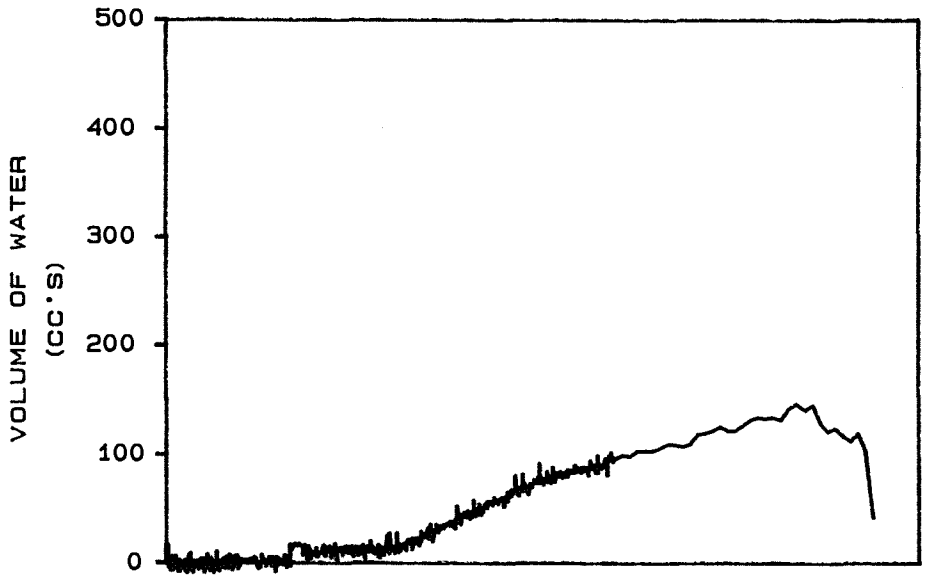
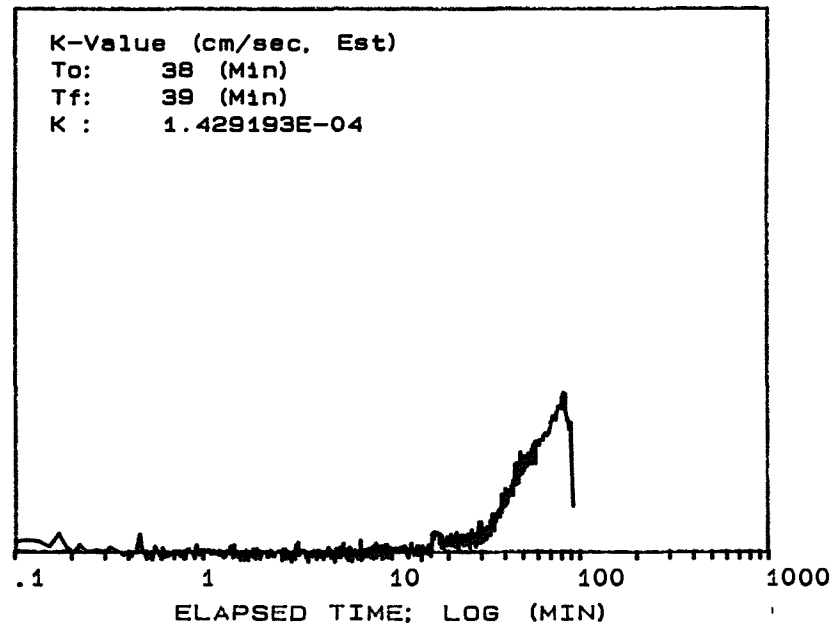
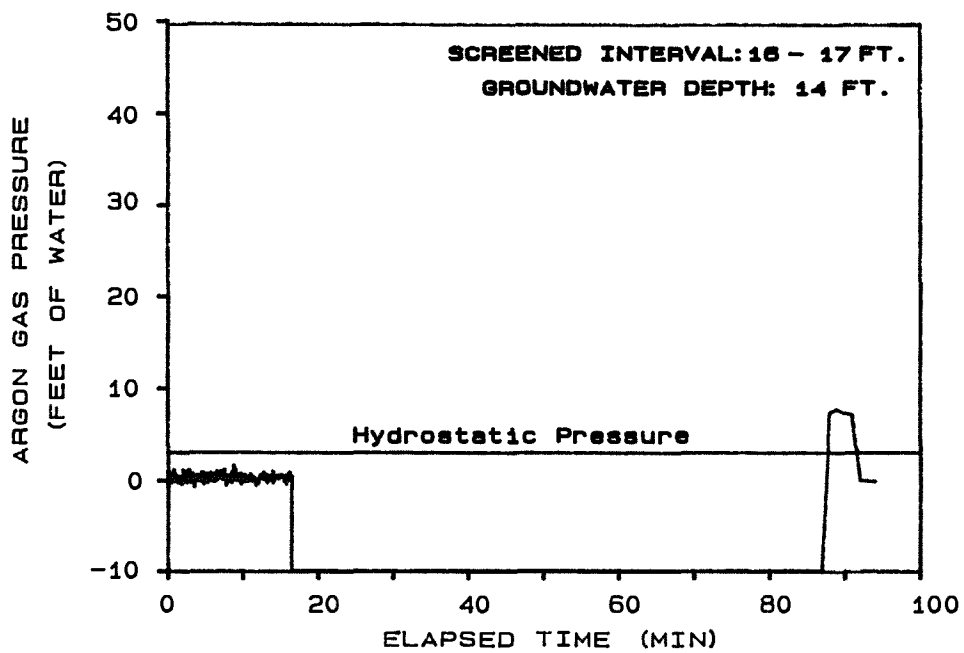






GS-1 SAMPLE PLOT

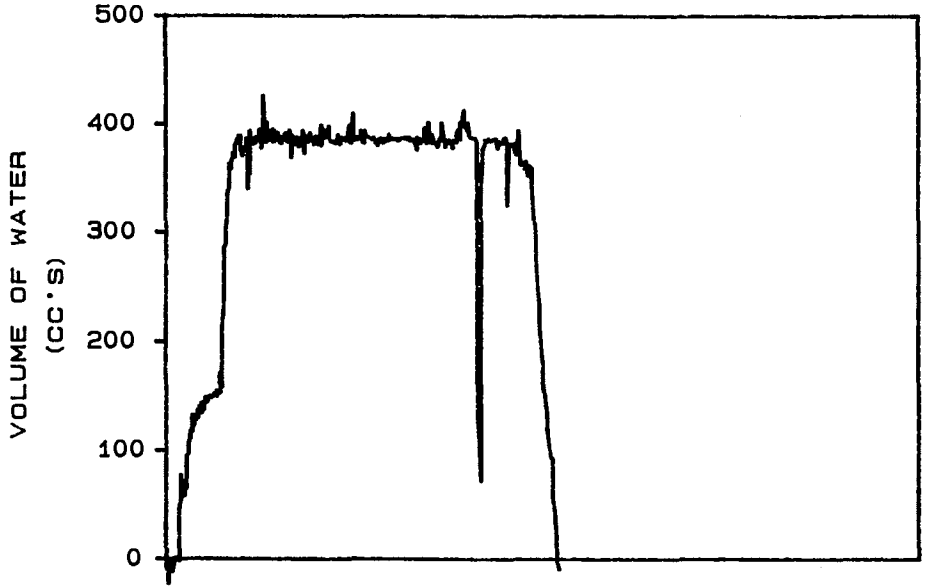
SAMPLE #: 21GH0317

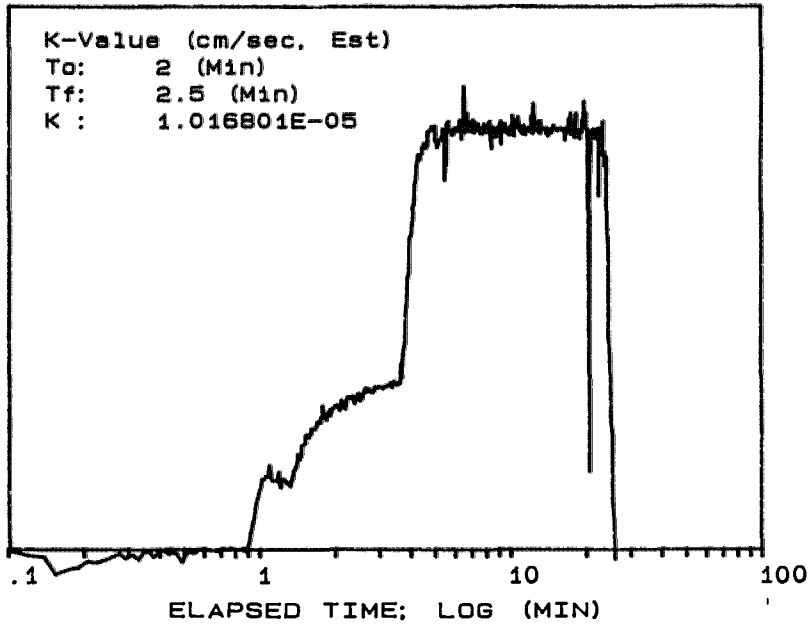
CLIENT: ENSAFE JOB: NASM094

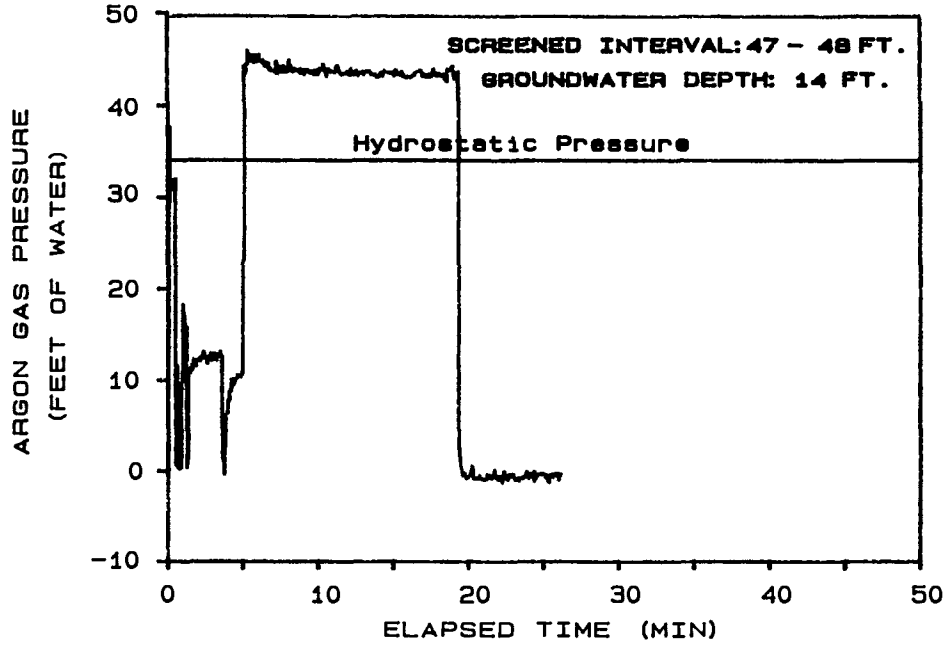
DATE: 05-24-1995 LOCATION: SWMU21 ST3

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

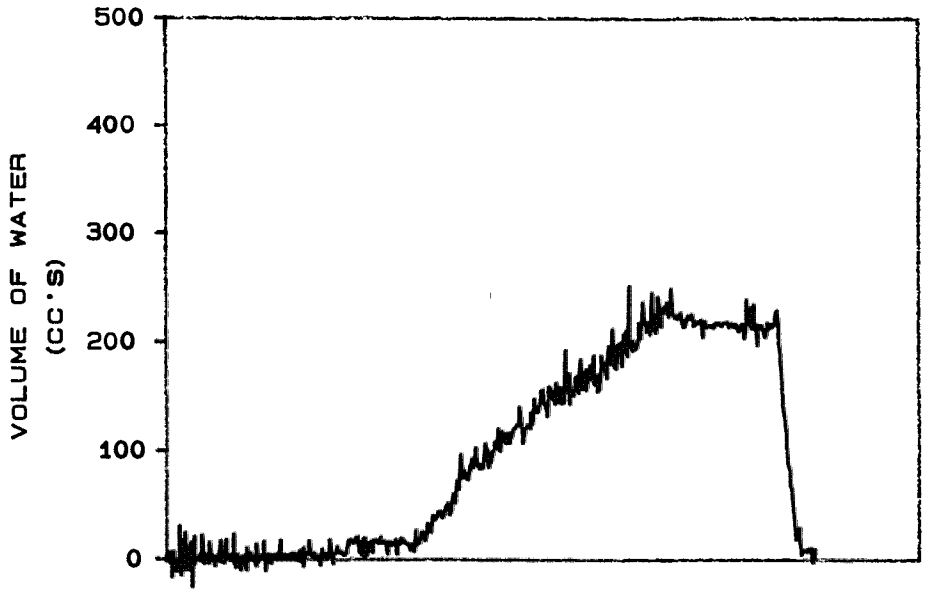
SAMPLE #: 21GH0348

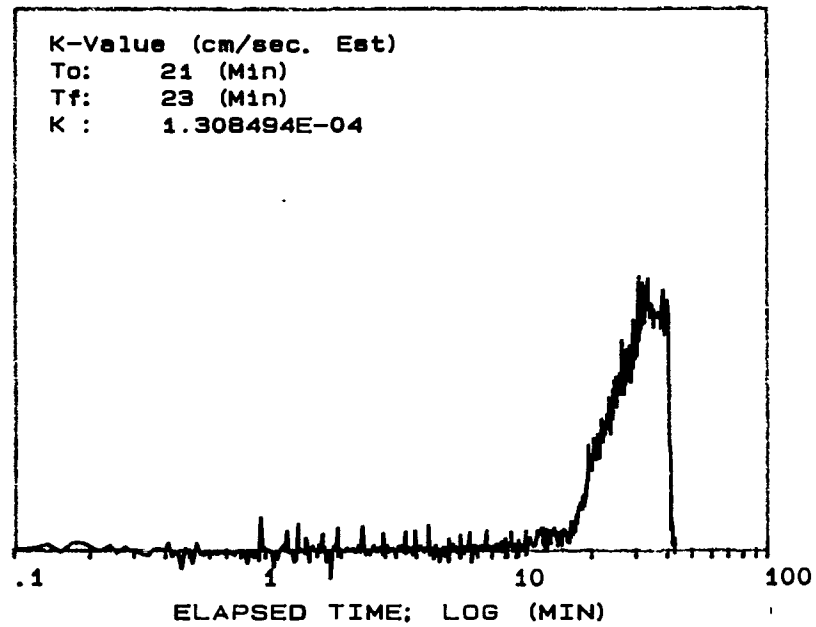
CLIENT: ENSAFE JOB: NASM094

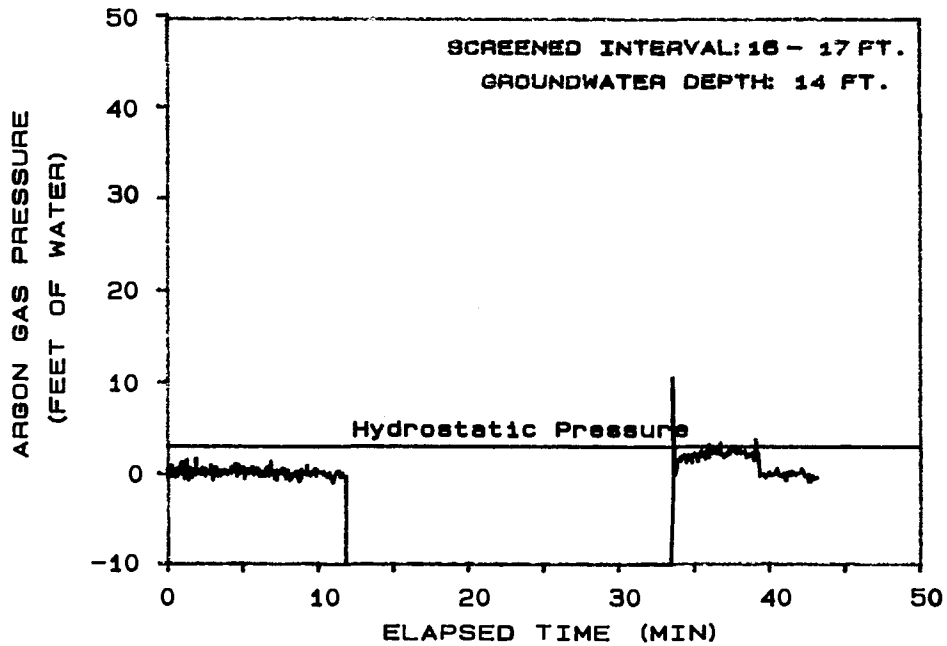
DATE: 05-24-1995 LOCATION: SWMU21 ST3

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

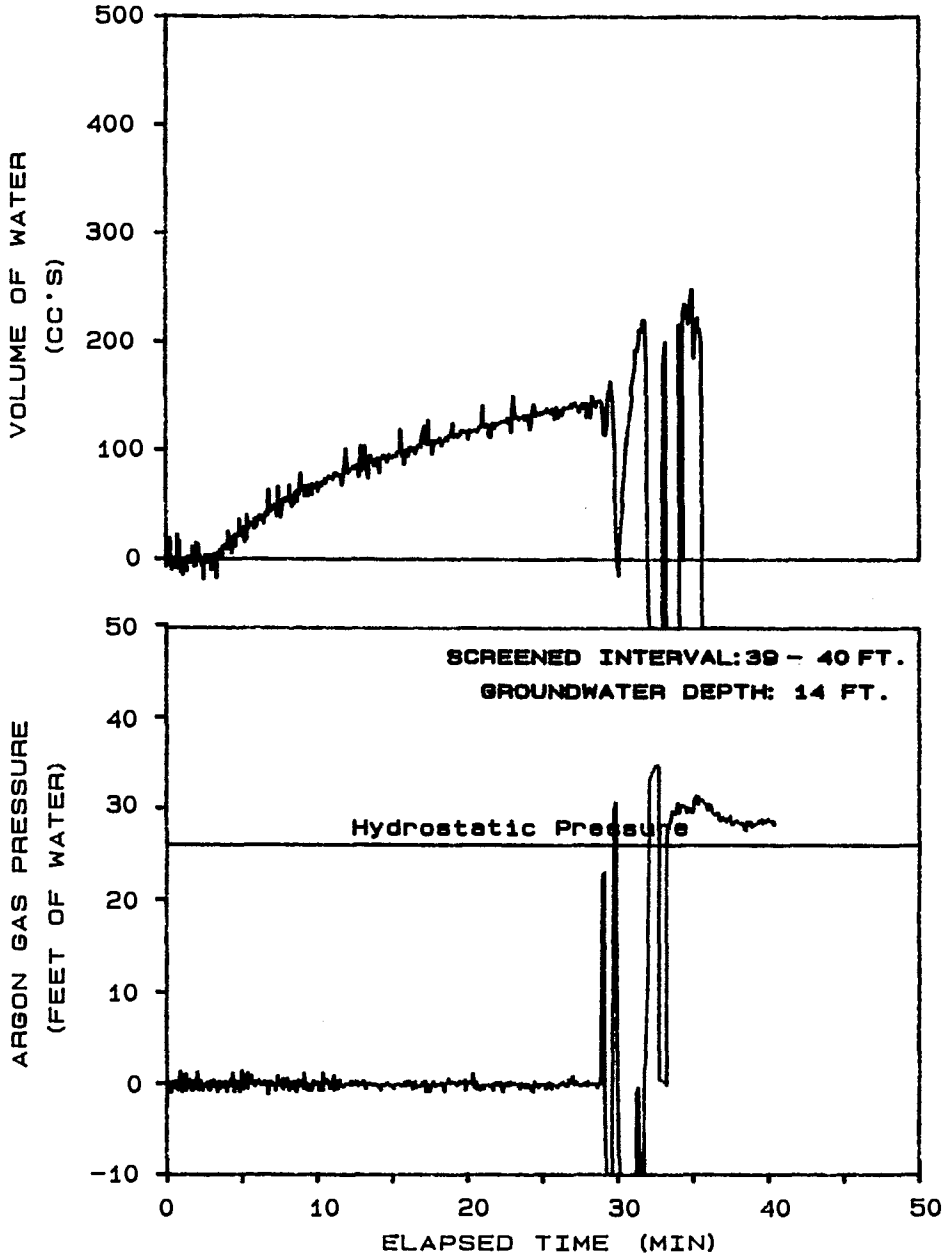
SAMPLE #: 21GH0417

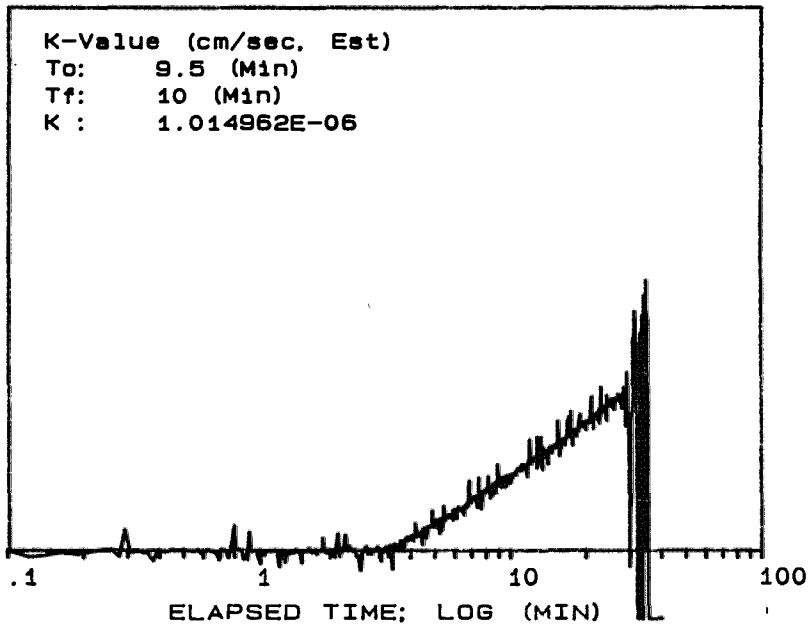
CLIENT: ENSAFE JOB: NASM094

DATE: 05-24-1995 LOCATION: SWMU21 ST4

PERFORMED BY:

SUBSURFACE TECHNOLOGY





GS-1 SAMPLE PLOT

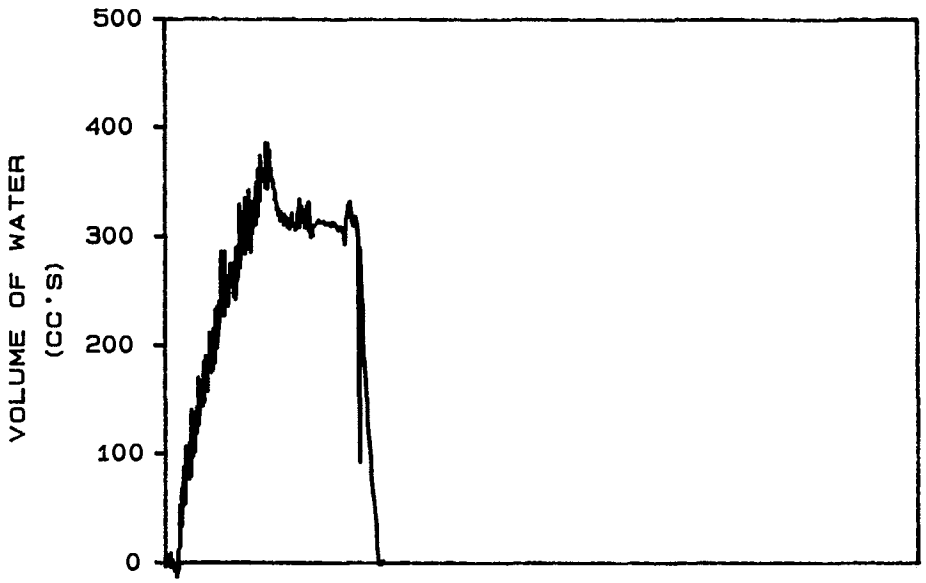
SAMPLE #: 21GH0440

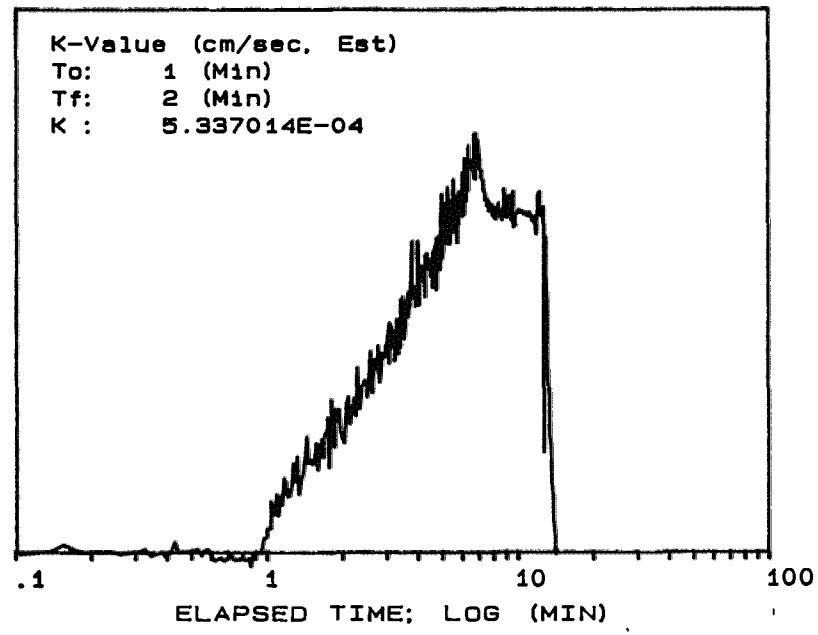
CLIENT: ENSAFE JOB: NASM094

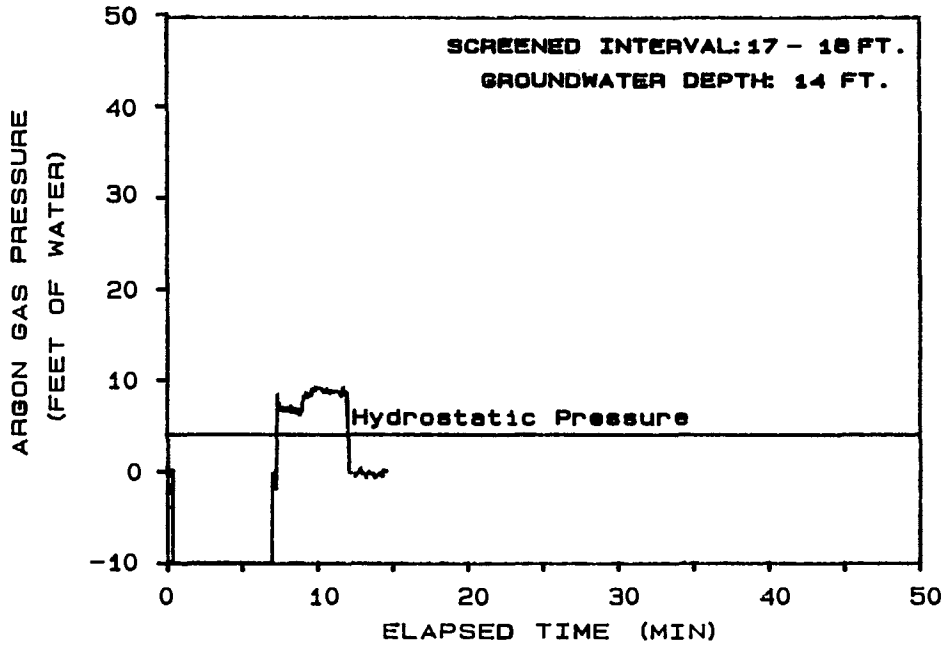
DATE: 05-24-1995 LOCATION: SWMU21 ST4

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

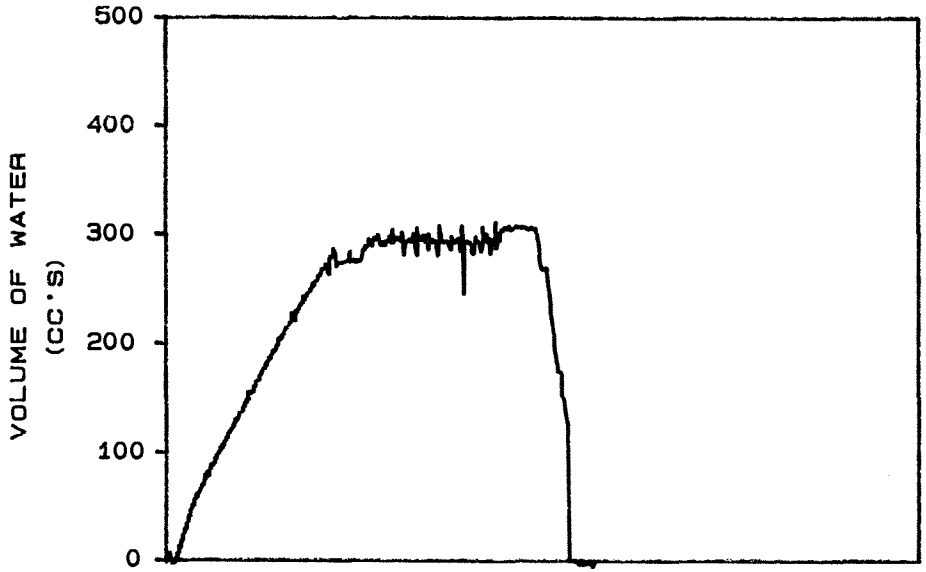
SAMPLE #: 21GH0518

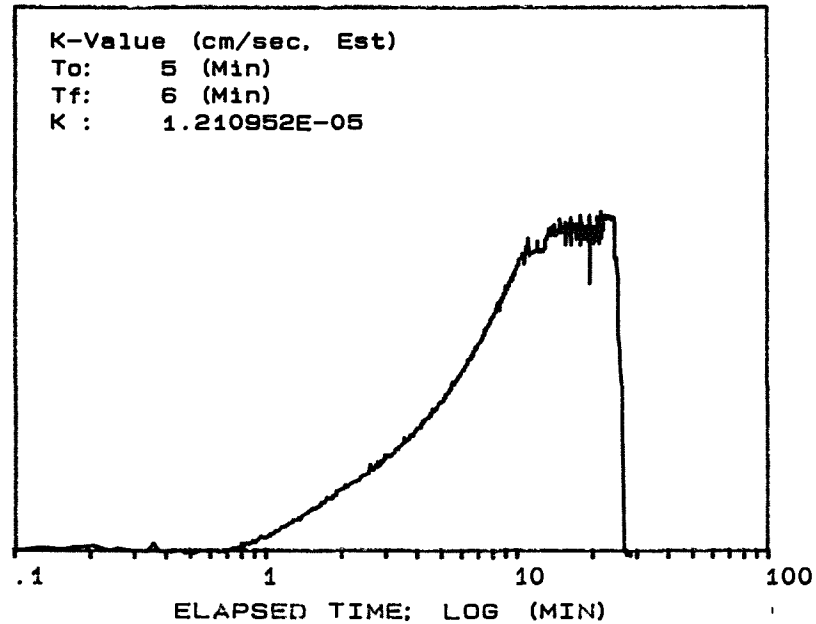
CLIENT: ENSAFE JOB: NASM094

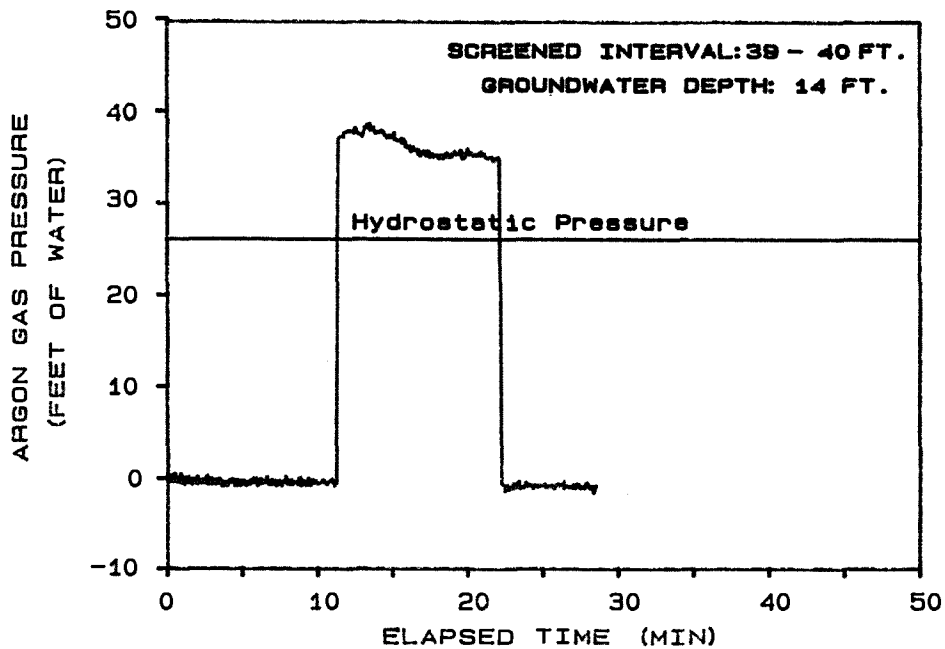
DATE: 05-30-1995 LOCATION: SWMU21 ST5

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

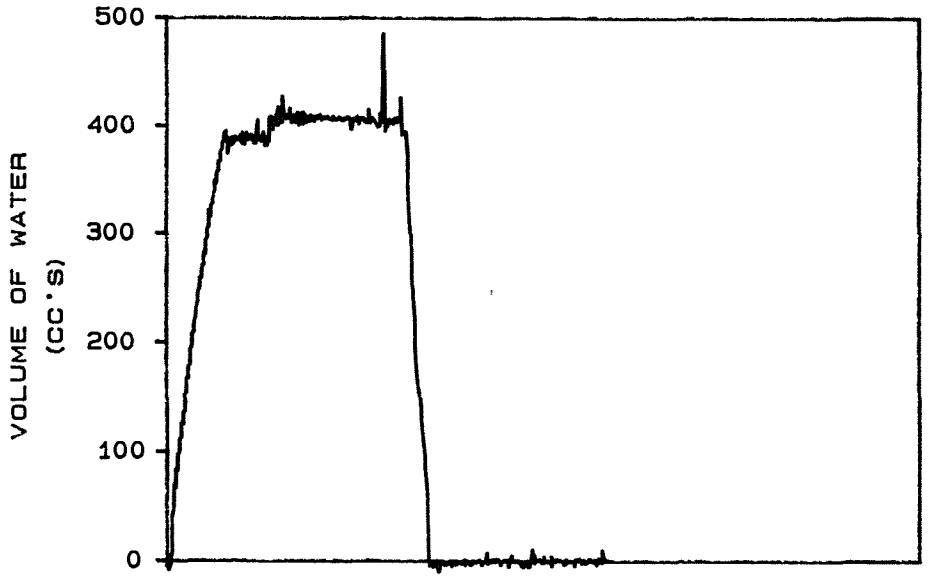
SAMPLE #: 21GH0540

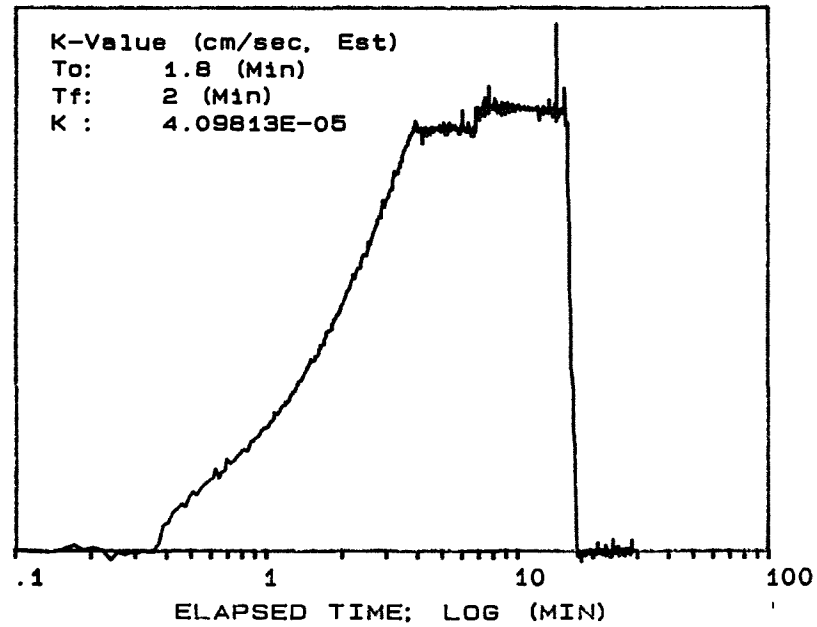
CLIENT: ENASFE JOB: NASM094

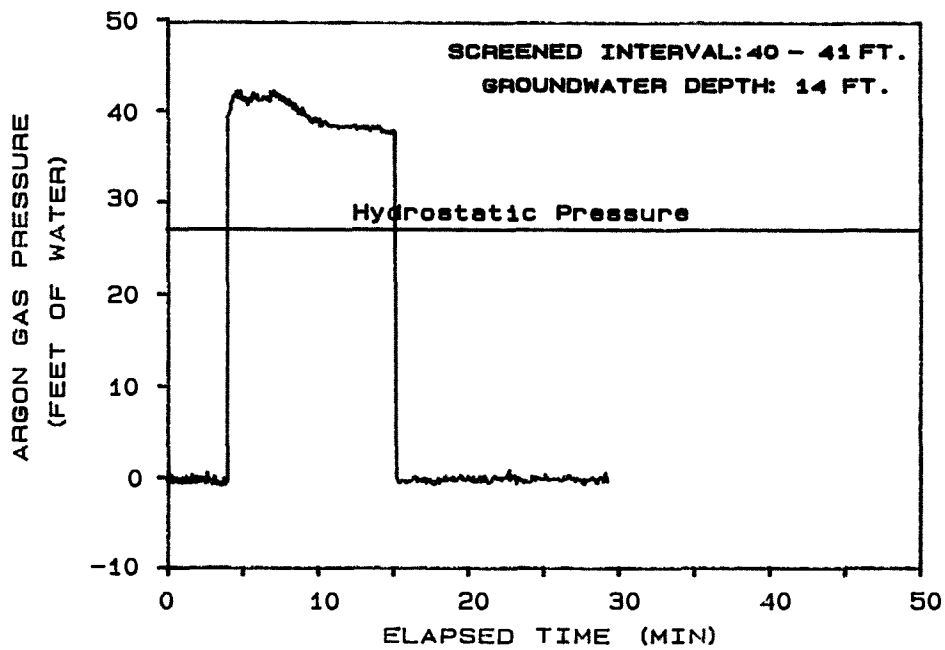
DATE: 05-30-1995 LOCATION: SWMU21 ST5

PERFORMED BY:

SUBSURFACE TECHNOLOGY







GS-1 SAMPLE PLOT

SAMPLE #: 21GH0641

CLIENT: ENSAFE JOB: NASM094

DATE: 05-30-1995 LOCATION: SWMU21 ST6

PERFORMED BY:

SUBSURFACE TECHNOLOGY

Appendix C

Analytical Data

FORMAT: *XXXX* \ 1 2 3 4 5 6 7 8 9 0

XXXX \	- OPTIONAL project prefix
1 2 3	- SITE where sample collected
4	- MATRIX / QC code
5 6 7 8	- SAMPLING LOCATION
9 0	- DEPTH, INTERVAL, SERIAL #

All spaces MUST be filled and no extra characters included.
Use zeroes as space-fillers. Indicate MS/MSDs on COCs.

MATRIX/QC CODES:
S - soil (surface, borings, and trenches)
C - soil duplicate sample
M - sediment (settled, fluid-borne solid)
N - sediment duplicate
G - groundwater
H - groundwater duplicate sample
W - surface water
R - surface water duplicate sample
U - sludge
Y - sludge duplicate
A - air
Z - liquid waste (including IDW drums)
V - solid waste (including IDW drums)

T - trip blank
E - equipment rinsate blank
D - DI system blank
P - potable water blank
F - field blank
L - filter blank
B - EPA blind spike sample
2 - cement blank
3 - drilling mud
4 - grout blank
5 - bentonite blank
6 - sand blank

NAS MEMPHIS
NAS MEMPHIS, RFI, ASSEMBLY C
SWMU 21 - Primary Samples

VOA											
	SAMPLE ID ------->	021-C-0002-01		021-H-0002-02		021-H-0010-17		021-C-0030-10		021-H-0030-48	
	ORIGINAL ID ----->	021C000201		021H000202		021H001017		021C003010		021H003048	
	LAB SAMPLE ID --->	123958		123960		124320		124319		124321	
	ID FROM REPORT -->	021C000201		021H000202		021H001017		021C003010		021H003048	
	SAMPLE DATE ----->	05/23/95		05/23/95		05/26/95		05/26/95		05/26/95	
	DATE ANALYZED --->	05/26/95		05/27/95		06/02/95		06/01/95		06/01/95	
	MATRIX ---------->	Soil		Water		Water		Soil		Water	
	UNITS ---------->	UG/KG		UG/L		UG/L		UG/KG		UG/L	
CAS #	Parameter	1411	VAL	1411	VAL	1411	VAL	1411	VAL	1411	VAL
74-87-3	Chloromethane	12.	U	10.	U	10.	U	12.	U	10.	U
74-83-9	Bromomethane	12.	U	10.	U	10.	U	12.	UJ	10.	UJ
75-01-4	Vinyl chloride	12.	U	10.	U	10.	U	12.	U	10.	U
75-00-3	Chloroethane	12.	U	10.	U	10.	U	12.	UJ	10.	U
75-09-2	Methylene chloride	1.	J	1.	J	1.	J	12.	U	1.	J
67-64-1	Acetone	12.	U	24.		36.		6.	J	29.	
75-15-0	Carbon disulfide	12.	U	10.	U	10.	U	12.	U	10.	U
75-35-4	1,1-Dichloroethene	12.	U	10.	U	10.	U	12.	U	10.	U
75-34-3	1,1-Dichloroethane	12.	U	10.	U	10.	U	12.	U	10.	U
540-59-0	1,2-Dichloroethene (total)	12.	U	10.	U	10.	U	12.	U	10.	U
67-66-3	Chloroform	12.	U	10.	U	10.	U	12.	U	10.	U
107-06-2	1,2-Dichloroethane	12.	U	10.	U	10.	U	12.	U	10.	U
78-93-3	2-Butanone (MEK)	12.	U	10.	U	10.	U	12.	U	10.	UJ
71-55-6	1,1,1-Trichloroethane	12.	U	10.	U	10.	U	12.	U	10.	U
56-23-5	Carbon tetrachloride	12.	U	10.	U	10.	U	12.	U	10.	U
75-27-4	Bromodichloromethane	12.	U	10.	U	10.	U	12.	U	10.	U
78-87-5	1,2-Dichloropropane	12.	U	10.	U	10.	U	12.	U	10.	U
10061-01-5	cis-1,3-Dichloropropene	12.	U	10.	U	10.	U	12.	U	10.	U
79-01-6	Trichloroethene	12.	U	10.	U	10.	U	12.	U	10.	U
124-48-1	Dibromochloromethane	12.	UJ	10.	U	10.	U	12.	U	10.	U
79-00-5	1,1,2-Trichloroethane	12.	UJ	10.	U	10.	U	12.	U	10.	U
71-43-2	Benzene	12.	U	10.	U	10.	U	12.	U	10.	U
10061-02-6	trans-1,3-Dichloropropene	12.	U	10.	U	10.	U	12.	U	10.	U
75-25-2	Bromoform	12.	U	10.	U	10.	U	12.	U	10.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	12.	U	10.	U	10.	U	12.	U	10.	U
591-78-6	2-Hexanone	12.	U	10.	U	10.	U	12.	U	10.	UJ
127-18-4	Tetrachloroethene	12.	U	10.	U	10.	U	12.	U	10.	U
79-34-5	1,1,2,2-Tetrachloroethane	12.	U	10.	U	10.	U	12.	U	10.	U
108-88-3	Toluene	12.	U	10.	U	10.	U	12.	U	10.	U
108-90-7	Chlorobenzene	12.	U	10.	U	10.	U	12.	U	10.	U
100-41-4	Ethylbenzene	12.	U	10.	U	10.	U	12.	U	10.	U
100-42-5	Styrene	12.	U	10.	U	10.	U	12.	U	10.	U
1330-20-7	Xylene (Total)	12.	U	10.	U	10.	U	12.	U	10.	U

*** Validation Complete ***

June 2, 1995

REPORTING:

Environmental & Safety
5724 Summer Trees Dr.
Memphis, TN 38134

Attention: B. Gallant

INVOICING:

Environmental & Safety
5724 Summer Trees Dr.
Memphis, TN 38134

PROJECT NUMBER: FL959183

DATE COMPLETED: June 2, 1995
DATE RECEIVED: May 25, 1995

PROJECT DESCRIPTION:

Mobile Lab--1 water sample analyzed for 8240.

Enclosed is the laboratory report for the project described above. If you have any questions or if we can be of further assistance, please feel free to contact Jamie Fore. We appreciate your business and look forward to serving you again soon.

Respectfully,

Benjamin Carl Esterle
Laboratory Director

COMPANY NAME: Environmental & Safety
COMPANY PROJECT NUMBER: Mobile Lab

HYDROLOGIC PROJECT NUMBER: FL959183
HYDROLOGIC SAMPLE NUMBER: 959183
HYDROLOGIC LAB I.D. #: N/A
SAMPLE IDENTIFICATION: #021G000203
DATE SAMPLED: 5/23/95
DATE EXTRACTED: N/A
DATE/TIME ANALYZED: 6/1/95

METHOD SW 846 8240

ANALYSIS	CAS NO.	SDL (ug/l)	RESULT (ug/l)
Acetone	67-64-1	100.0	BDL
Acrolein	107-02-8	50.0	BDL
Acrylonitrile	107-13-1	50.0	BDL
Benzene	**71-43-2**	**5.0**	**11.6**
Bromodichloromethane	75-27-4	5.0	BDL
Bromoform	75-25-2	5.0	BDL
Bromomethane	74-83-9	10.0	BDL
2-Butanone	78-93-3	100.0	BDL
Carbon Disulfide	75-15-0	5.0	BDL
Carbon Tetrachloride	**56-23-5**	**5.0**	**116**
Chlorobenzene	108-90-7	5.0	BDL
Chloroethane	75-00-3	10.0	BDL
2-Chloro Ethyl Vinyl Ether	110-75-8	10.0	BDL
Chloroform	67-66-3	5.0	BDL
Chloromethane	74-87-3	10.0	BDL
Dibromochloromethane	124-48-1	5.0	BDL
Dibromomethane	74-95-3	5.0	BDL
1,4-Dichloro-2-Butane		5.0	BDL
Dichlorodifluoromethane	75-71-8	10.0	BDL
1,2-Dichlorobenzene	95-50-1	5.0	BDL
1,3-Dichlorobenzene	541-73-1	5.0	BDL
1,4-Dichlorobenzene	106-46-7	5.0	BDL
1,1-Dichloroethane	75-34-3	5.0	BDL
1,2-Dichloroethane	107-06-2	5.0	BDL
1,1-Dichloroethene	75-35-4	5.0	BDL

COMPANY NAME: Environmental & Safety
COMPANY PROJECT NUMBER: Mobile Lab

HYDROLOGIC PROJECT NUMBER: FL959183
HYDROLOGIC SAMPLE NUMBER: 959183
SAMPLE IDENTIFICATION: #021G000203
DATE SAMPLED: 5/23/95

METHOD SW 846 8240

ANALYSIS	CAS NO.	SDL (ug/l)	RESULT (ug/l)
trans-1,2-Dichloroethene	156-60-5	5.0	BDL
1,2-Dichloropropane	78-87-5	5.0	BDL
cis-1,3-Dichloropropene	10061-01-5	5.0	BDL
trans-1,3-Dichloropropene	10061-02-6	5.0	BDL
Ethanol	64-17-5	100.0	BDL
Ethylbenzene	100-41-4	5.0	BDL
Ethyl Methacrylate	97-63-2	10.0	BDL
2-Hexanone	591-78-6	50.0	BDL
Iodomethane	74-88-4	10.0	BDL
Methylene Chloride	75-09-2	5.0	BDL
4-Methyl-2-Pentanone	108-10-1	50.0	BDL
Styrene	100-42-5	10.0	BDL
1,1,2,2-Tetrachloroethane	79-34-5	10.0	BDL
Tetrachloroethylene	127-18-4	10.0	BDL
Toluene	108-88-3	5.0	BDL
1,1,1-Trichloroethane	71-55-6	5.0	BDL
1,1,2-Trichloroethane	79-00-5	5.0	BDL
Trichloroethylene	79-01-6	5.0	BDL
Trichlorofluoromethane	75-69-4	5.0	BDL
Vinyl Chloride	75-01-4	10.0	BDL
Xylene (Total)	1330-20-7	5.0	BDL
Surrogate Recoveries:			
1,2-Dichloroethane-D4			102%
Toluene-D8			97%
Bromofluorobenzene			92%

BDL = Below Sample Detection Limit
SDL = Sample Detection Limit

COMMENTS: _____

H Y D R O L O G I C , I N C .

F1959183

COMPANY NAME Hydrologic Mobile Lab CONTACT NAME B Gallant TELEPHONE NO. ( ) 872-6047

Samplers: Print Name Signature

Project No:

SAMPLE ID	SAMPLE LOCATION	Composite	Grab	Date	Time	Sample Type: Water	Liquid	Oil	Solid	No. of Containers	ANALYSIS: 8240									REMARKS
021G000203						✓				1										

COMMENTS: CCl_4 @ 163 please confirm & Quantitate

Relinquished by: (Signature) Bruce T. Gallant			Received by: (Signature)	Date	Time
Relinquished by: (Signature)			Received by: (Signature)	Date	Time
Dispatched by: (Signature)	Date	Time	Received for Laboratory by: J. Ramsey	Date 5/25/91	Time 11:00
Method of Shipment:				Date	Time

149 Twilight Trail □ Frankfort, Kentucky 40601 □ 502/223-0[illegible] □ FAX 502/875-8016 □ Toll Free 1-800/728-2251

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021S001010 Date: 05/24/95 Dilution: 1
Lab File ID:NAS141.001 Blank: blk0524.001
Calibration Std.:vc0524.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	81.5	37.4	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	21	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021G001017 Date: 05/24/95 Dilution: 1
Lab File ID:NAS137.001 Blank: blk0524.001
Calibration Std.:vc0524.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	89.1	66.8	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	6	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021S000201 Date: 05/23/95 Dilution: 1
Lab File ID:NAS136.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	72.4	36.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	19	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:021G000202 Date: 05/23/95 Dilution: 1
Lab File ID:NAS134.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	78.3	48.9	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	7	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:021G000203 Date: 05/23/95 Dilution: 1
Lab File ID:NAS135.001 Blank: blk0523.001
Calibration Std.:vc0523a.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	80.3	47.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	6	10
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	163	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Memphis Naval Air Station

Sample Location:021S003010 Date: 05/24/95 Dilution: 1
Lab File ID:NAS140.001 Blank: blk0524.001
Calibration Std.:vc0524.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	70.1	31.3	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	20	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:021G003017 Date: 05/24/95 Dilution: 1
Lab File ID:NAS139.001 Blank: blk0524.001
Calibration Std.:vc0524.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	70.3	91.3	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021G003048 Date: 05/24/95 Dilution: 1
Lab File ID:NAS138.001 Blank: blk0524.001
Calibration Std.:vc0524.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	91.4	66	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:021S004010 Date: 05/24/95 Dilution: 1
Lab File ID:NAS142.001 Blank: blk0524.001
Calibration Std.:vc0524.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	80.4	37.5	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	19	15
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
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Sample Location:021G004017 Date: 05/25/95 Dilution: 1
Lab File ID:NAS144.001 Blank: blk0525.001
Calibration Std.:vc0525.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	100	74.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	5	16
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
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Sample Location:021g004040 Date: 05/25/95 Dilution: 1
Lab File ID:nas143.001 Blank: blk0525.001
Calibration Std.:vc0525.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	97.1	70	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	16
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	81.3	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021G005010 Date: 05/30/95 Dilution: 1
Lab File ID:NAS157.001 Blank: blk0530.001
Calibration Std.:vc0530.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	85.9	82.1	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	27	37
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021G005018 Date: 05/30/95 Dilution: 1
Lab File ID:NAS156.001 Blank: blk0530.001
Calibration Std.:vc0530.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	93.6	102.3	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	37
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021G005040 Date: 05/30/95 Dilution: 1
Lab File ID:NAS155.001 Blank: blk0530.001
Calibration Std.:vc0530.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	92.7	101.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	5.4	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	BDL	37
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	5.0	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021G006010 Date: 05/30/95 Dilution: 1
Lab File ID:NAS158.001 Blank: blk0530.001
Calibration Std.:vc0530.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	77.4	69.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	BDL	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	15	37
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	BDL	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

HydroLogic Mobile Laboratory
Analytical Results - Volatile Organic Compounds
Memphis Naval Air Station

Sample Location:021G006041 Date: 05/30/95 Dilution: 1
Lab File ID:NAS154.001 Blank: blk0530.001
Calibration Std.:vc0530.001

Compound	Concen. PID (ppb)	Concen. Hall (ppb)	Blank Concen.
Vinyl Chloride	BDL	BDL	
1,1-Dichloroethene	BDL	BDL	
t-1,2-Dichloroethene	BDL	BDL	
c-1,2-Dichloroethene	BDL	BDL	
1,1-Dichloropropene	BDL	BDL	
Benzene	BDL	n/a	
Trichloroethene	BDL	BDL	
c-1,3-Dichloropropene	BDL	BDL	
t-1,3-Dichloropropene	BDL	BDL	
Toluene	BDL	n/a	
Tetrachloroethene	BDL	BDL	
Chlorobenzene	BDL	BDL	
Ethylbenzene	BDL	n/a	
m,p-Xylenes	BDL	n/a	
Styrene	BDL	n/a	
o-Xylene	BDL	n/a	
BFB (surrogate)	97.2	98.7	
40,42	BDL	n/a	
n-Propylbenzene	BDL	n/a	
2-Chlorotoluene	BDL	BDL	
4-Chlorotoluene	BDL	BDL	
1,3,5-Trimethylbenzene	BDL	n/a	
t-Butylbenzene	BDL	n/a	
1,2,4-Trimethylbenzene	BDL	n/a	
s-butylbenzene/1,3-DCB	BDL	n/a	
1,4-Dichlorobenzene	BDL	BDL	
p-Isopropyltoluene	BDL	n/a	
1,2-Dichlorobenzene	BDL	BDL	
n-Butylbenzene	BDL	n/a	
1,2,4-Trichlorobenzene	BDL	BDL	
Naphthalene	BDL	n/a	
Hexachlorobutadiene	BDL	BDL	
1,2,3-Trichlorobenzene	BDL	BDL	
Dichlorofluoromethane	n/a	6.5	
Bromomethane	n/a	BDL	
Chloroethane	n/a	BDL	
Trichlorofluoromethane	n/a	BDL	
Methylenechloride	n/a	8	37
1,1-Dichloroethane	n/a	BDL	
Bromochloromethane	n/a	BDL	
Chloroform	n/a	BDL	
2,2-Dichloropropane	n/a	BDL	
1,2-Dichloroethane	n/a	BDL	
1,1,1-Trichloroethane	n/a	BDL	
Carbon Tetrachloride	n/a	15.2	
Dibromomethane	n/a	BDL	
1,2-Dichloropropane	n/a	BDL	
Trichloroethene	n/a	BDL	
Bromodichloromethane	n/a	BDL	
1,1,2-Trichloroethane	n/a	BDL	
1,3-Dichloropropene	n/a	BDL	
Dibromochloromethane	n/a	BDL	
1,2-dibromomethane	n/a	BDL	
1,1,1,2-Tetrachloroethane	n/a	BDL	
Bromoform	n/a	BDL	
41,43	n/a	BDL	
1,2-Dibromo-3-chloropropene	n/a	BDL	

ASSEMBLY C CSI REPORT
NAVAL SUPPORT ACTIVITY MEMPHIS
MILLINGTON, TENNESSEE

RCRA FACILITY INVESTIGATION
SWMU 26 — N-102 BATTERY ACID NEUTRALIZATION UNIT

CTO-094
Contract No. N62467-89-D-0318

Prepared for:

Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina

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(901) 383-9115

November 1, 1995

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LIST OF ACRONYMS AND ABBREVIATIONS

BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure
bls	below land surface
cm/sec	centimeters per second
CSI	Confirmatory Sampling Investigation
DPT	direct push technology
DQO	Data Quality Objectives
E/A&H	EnSafe/Allen & Hoshall
ND	not detected
NSA	Naval Support Activity (formerly Naval Air Station)
ppb	parts per billion
ppm	parts per million
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SIP	Site Investigation Plan
SOUTHNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SWMU	solid waste management unit
SST	Subsurface Technologies, Inc.
TDEC	Tennessee Department of Environment and Conservation
USGS	U.S. Geological Survey
UST	underground storage tank
VOCs	volatile organic compounds

EXECUTIVE SUMMARY

The *Assembly C Site Investigation Plans* proposed two phases of investigation for a Confirmatory Sampling Investigation (CSI) at Solid Waste Management Unit (SWMU) 26, the Building N-102 Battery Acid Neutralization Unit. The first phase consisted of a subsurface soil sampling investigation using GeoProbe equipment. Based on the results of the first phase, the second phase, consisting of installing and sampling soil borings and monitoring wells, is not required. This report summarizes the activities conducted during the CSI's first phase and resulting findings and conclusions.

During the first phase of the SWMU 26 CSI, soil samples collected from three sample stations were analyzed for six metals (arsenic, cadmium, lead, mercury, nickel, and zinc.) Detected concentrations of metals were less than two times background levels and/or risk-based concentrations for residential and industrial soil.

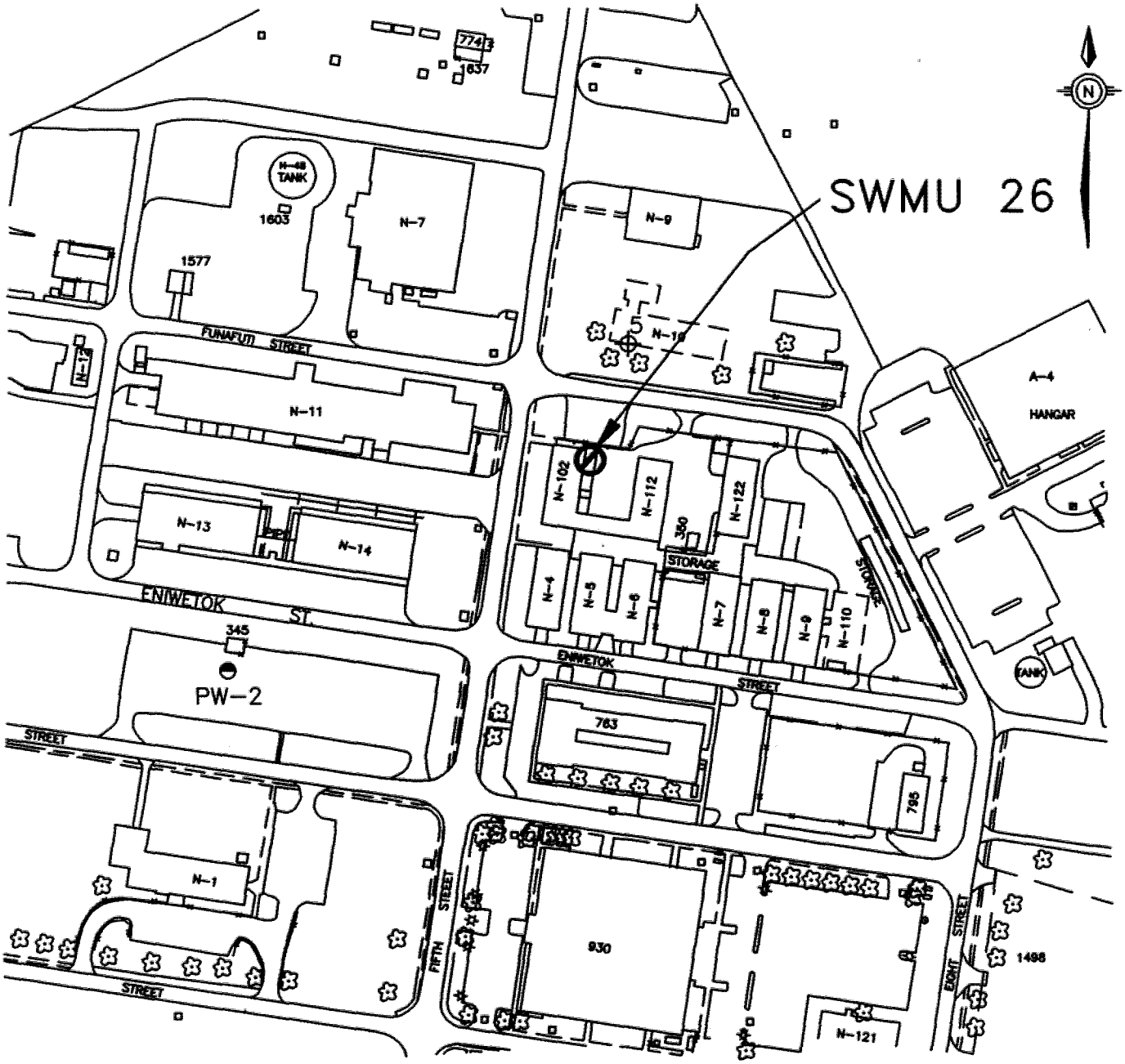
Based on the results of the first phase, no further action is recommended for SWMU 26, with the exception of surface-soil sampling to finalize the RCRA closure of the SWMU. One surface-soil sample will be collected in the grass next to the Battery Acid Neutralization Unit and analyzed for semivolatile organic compounds, chlorinated pesticides/polychlorinated biphenyls, and Appendix IX metals. Upon receipt of the analytical results, a Preliminary Risk Evaluation will be prepared, and the results will be submitted as an addendum to this CSI report.

1.0 INTRODUCTION

As part of the U.S. Navy Comprehensive Long-Term Environmental Action Navy program, the following Confirmatory Sampling Investigation (CSI) report has been prepared for Solid Waste Management Unit (SWMU) 26, the N-102 Battery Acid Neutralization Unit, on the Northside of Naval Support Activity (NSA) Memphis, Millington, Tennessee. Figures 1-1 and 1-2 provide a vicinity map and aerial photograph of SWMU 26, respectively.

As a result of the Base Closure and Realignment Act of 1990 (BRAC), a portion of NSA Memphis, which includes SWMU 26, will be closed and prepared for transfer to the City of Millington. Eight SWMU assemblies (i.e., groups) have been defined for the NSA Memphis RCRA Corrective Action Program. Four of these assemblies (A, B, C, and D) are on closing portions of the base and have been categorized and ranked according to their BRAC status. SWMU 26 is in Assembly C, which is composed of five SWMUs requiring CSIs to confirm whether a release of contaminants has occurred and, if so, whether RCRA Facility Investigation (RFI) characterization will be required. The remaining four assemblies (E, F, G, and H) are on portions of the base that will remain open. The investigation, undertaken by EnSafe/Allen & Hoshall (E/A&H), adhered to the requirements of the Hazardous and Solid Waste Amendments portion (HSWA-TN002) of RCRA Permit No. TN2-170-022-600 and applicable regulations.

The *Assembly C Site Investigation Plans* (E/A&H, 1995) proposed two phases of investigation for the CSI at SWMU 26. The first phase consisted of a subsurface soil investigation using a truck-mounted GeoProbe to collect the samples. Based on the results of the first phase, a second phase, consisting of installing soil borings and monitoring wells, is not required. This CSI report summarizes the activities conducted during the first phase of the CSI and provides conclusions, including a recommendation for no further action.



200 0 200

SCALE FEET

LEGEND

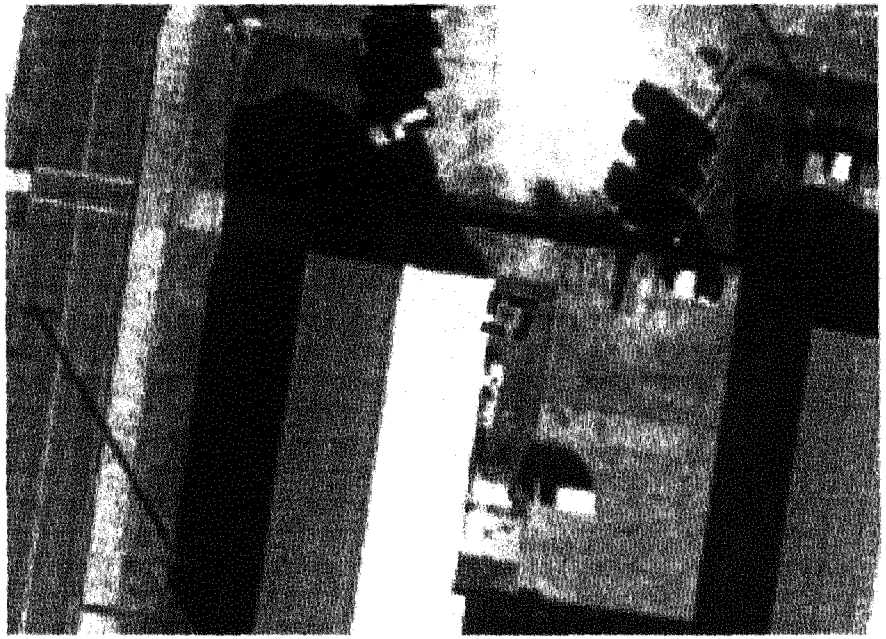
5 ⊕ USGS STRATIGRAPHIC TEST HOLE

PW-2 ◓ PRODUCTION WELL

RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 1-1
VICINITY MAP
BUILDING N-102
BATTERY ACID NEUTRALIZATION UNIT
SWMU 26

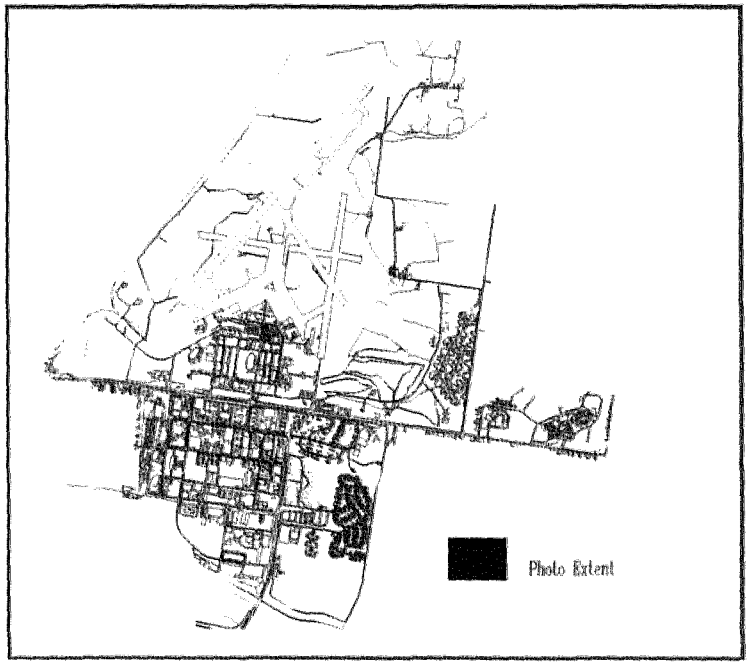
DWG DATE: 10/27/95 | DWG NAME: 94RVM26



SWMU 26
BOUNDARY

Photograph Scale

0 50 100 Ft.



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NSA MEMPHIS
MILLINGTON, TENNESSEE

FIGURE 1-2
DIGITAL ORTHOPHOTOGRAPH
N-102 BATTERY ACID NEUTRALIZATION UNIT
SWMU 26

2.0 SITE DESCRIPTION AND HISTORICAL INFORMATION

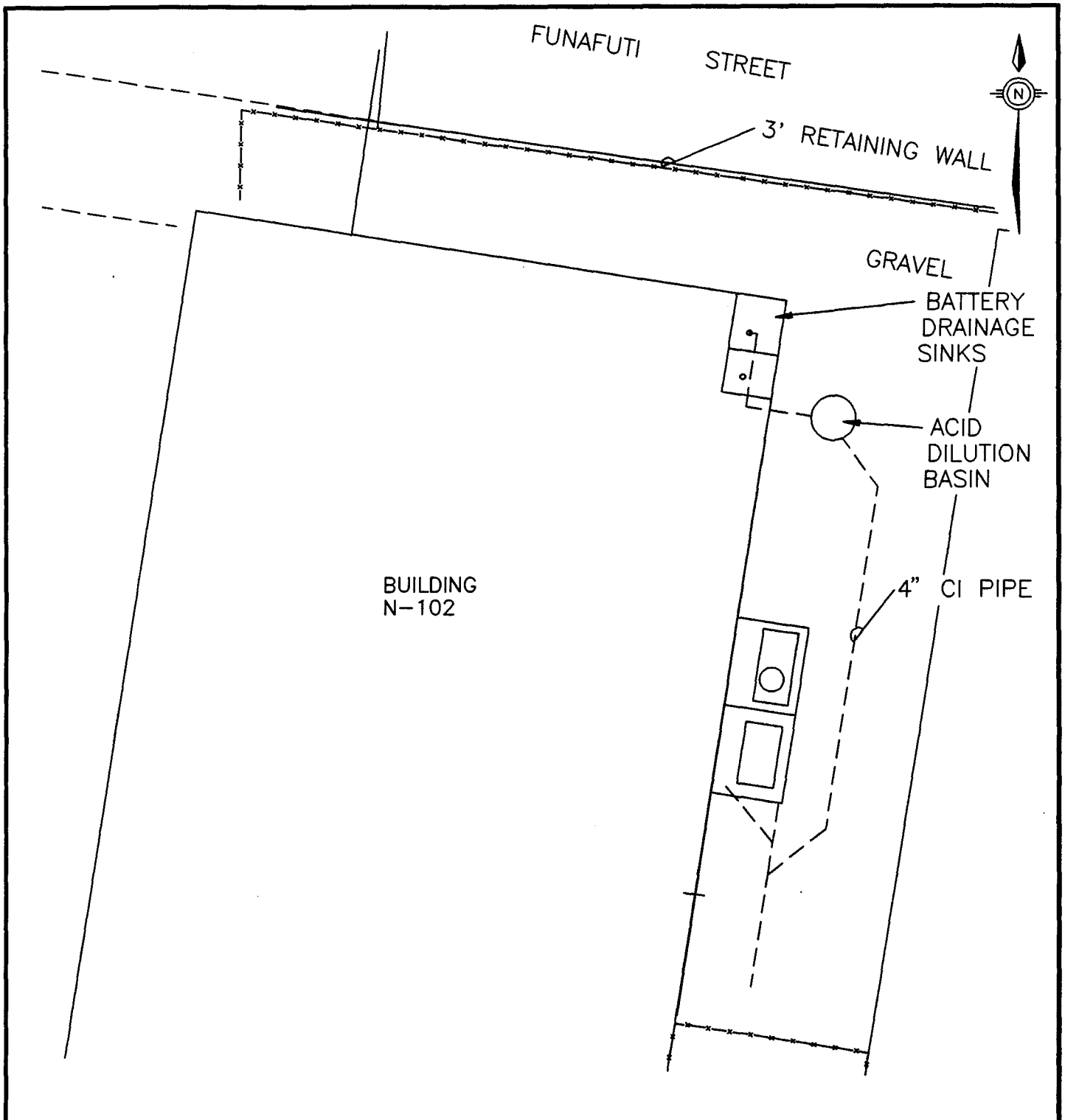
2.1 Site Description

SWMU 26 is the site of an inactive, subsurface acid neutralization unit that was installed in 1980 and used in conjunction with the Building N-102 Battery Shop, adjacent and immediately southwest of the SWMU. Building N-102 is on the southeast quadrant of Funafuti Street and Fifth Avenue on the Northside of NSA Memphis. Figure 2-1 provides a site map of SWMU 26.

The neutralization unit is in a grassy area between Building N-102 and a sidewalk which runs along the length of the building. The area between Buildings N-102 and the adjacent Building N-122 to the east is elevated and paved, with a retaining wall facing Funafuti Street to the north. The street is approximately 3 feet below the paved area. The neutralization unit, covered by a 6-inch thick concrete pad and a 3-foot diameter manhole on the surface, is constructed of two 3-foot high by 3-foot diameter reinforced concrete pipes set in a 6-inch thick concrete base pad. The site drains to the southwest into the SWMU 4 storm sewer and drainage ditch, which is approximately 1,000 feet south of SWMU 26 at its closest point. Water in SWMU 4 eventually empties into the North Fork Creek.

2.2 Historical Site Operations

The N-102 Battery Acid Neutralization Unit received drainage from a pair of lead sinks along the inside wall of the northeast corner of Building N-102. It was designed to neutralize drained battery acid and flush water prior to discharge into the sanitary sewer system. During its operation, the unit was pumped, and its crushed limestone (sodium carbonate) was replenished every six months to maintain the system's effectiveness. Figure 2-2 provides a construction schematic of the neutralization unit. The neutralization unit was bypassed in 1992, when the Naval Environmental Inspection Team indicated that it might qualify as a potential hazardous waste site.



LEGEND

- - - - - UNDERGROUND PIPING

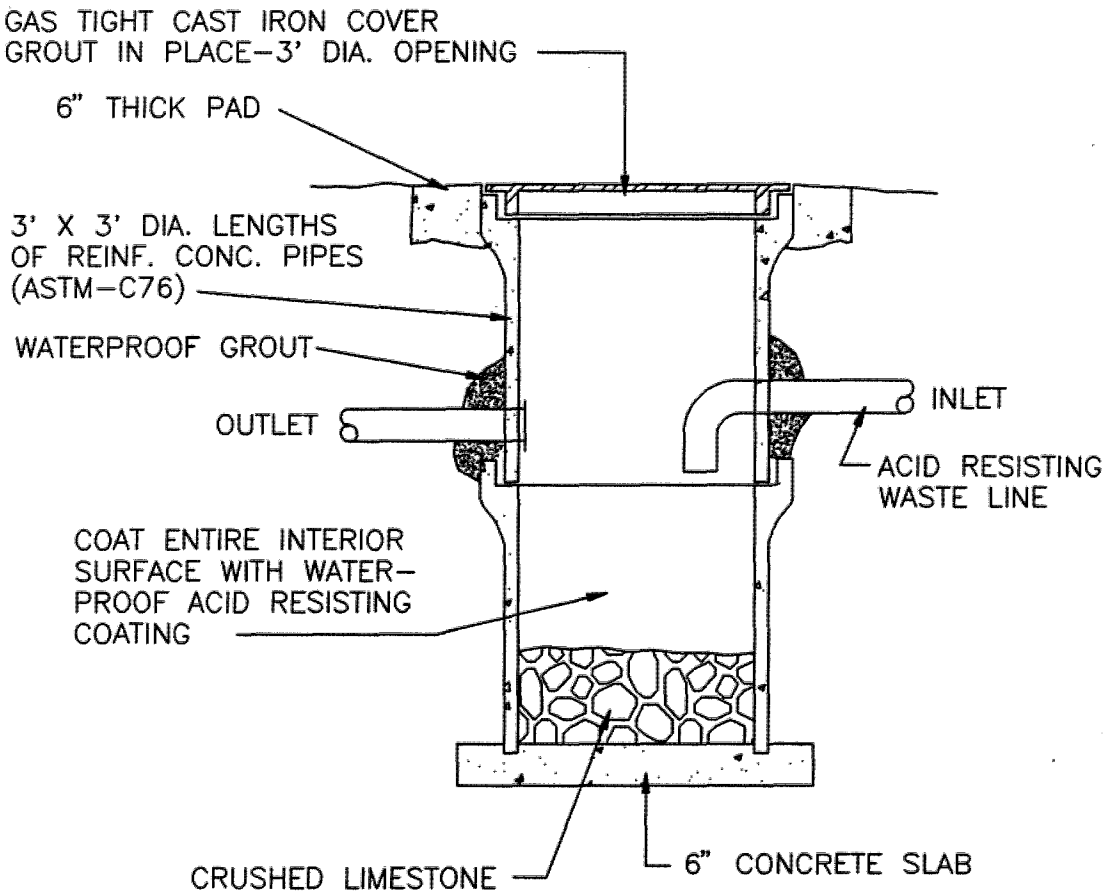
10 0 10

SCALE FEET

RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 2-1
SITE MAP
BUILDING N-102
BATTERY ACID NEUTRALIZATION UNIT
SWMU 26

DWG DATE: 10/10/95 | DWG NAME: 94SM26



SECTION

SCALE: NOT TO SCALE

RFI WORK PLAN
NSA MEMPHIS
MILLINGTON, TN

FIGURE 2–2
CONSTRUCTION DETAILS
BUILDING N–102
BATTERY ACID NEUTRALIZATION UNIT
SWMU 26

DWG DATE: 10/05/95 | DWG NAME: 94BAN26

3.0 PRELIMINARY INVESTIGATIONS

No adverse conditions were identified in a Visual Site Inspection (VSI) of the unit conducted in 1990 (ERC/EDGe, 1990). The neutralization unit was bypassed in 1992 when the Naval Environmental Inspection Team indicated that it might qualify as a potential hazardous waste site. A sample collected from its contents (liquid/solid) on June 29, 1992, was analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals, base-neutrals/acid extractables, and volatile organic compounds (VOCs). Results of the TCLP analyses indicate constituent concentrations within the tank were below regulatory levels for disposal as a hazardous waste. Appendix A contains a copy of the analytical report.

4.0 FIELD INVESTIGATIONS AND METHODOLOGY

The CSI soil and groundwater sampling program was intended to confirm the absence or presence of contaminants associated with past activities at SWMU 26. Specifically, the CSI objectives were:

- Determine the status and impact of the acid neutralization unit.
- Determine the potential for subsurface soil contamination in the loess.
- Determine the potential for groundwater contamination in the loess.

This section summarizes the soil sampling tasks during the first phase of the CSI, which was conducted using Geoprobe equipment. The field sampling activities followed the procedures outlined in the U.S. Environmental Protection Agency (USEPA)- and Tennessee Department of Environment and Conservation-approved *Comprehensive RFI Work Plan* (E/A&H, 1994) and *Assembly C Site Investigation Plans*. A description of the sample locations and the rationale for sampled intervals are presented in Sections 4.1 and 4.2, respectively, of this CSI report. Section 4.3 presents the specific sampling protocols (sample processing, labeling, and chain-of-custody documentation).

Analytical Parameters

Subsurface soil samples were collected during the Geoprobe investigation to determine the nature and extent of contamination by specific metals associated with battery acid neutralization at SWMU 26. Each sample was shipped to National Environmental Testing (NET) in Bedford, Massachusetts, for the analyses of arsenic, cadmium, lead, mercury, nickel, and zinc by USEPA Method 6010/7000 series using a Level III-equivalent Data Quality Objective (DQO) for 95% of the samples and a Level IV-equivalent DQO for the remaining 5% of the samples.

Validata Chemical Services, Inc. of Norcross, Georgia, validated the analytical results of the NET samples. Attachment 1 of Volume II contains the validation report, which indicates that the overall data quality of the analytical work is satisfactory.

Geoprobe Sampling Methods

E/A&H conducted a Geoprobe investigation at SWMU 26 to obtain subsurface soil samples for metals analyses. Tri-State Testing of Memphis, Tennessee, collected the subsurface soil samples using a truck-mounted hydraulically-driven, Geoprobe® soil sampling system. Samples were obtained by advancing a 1-inch diameter soil probe to the desired sampling depth. The 48-inch sampler, situated at the end of the probe, contained a "push point" which was retracted when the desired sampling interval was reached. The sampler was then advanced through the sampling interval. The soil sample was then retrieved from the borehole and the collected material removed from the sampler. The samples were collected in a stainless-steel sampler lined with an acetate sleeve, which minimized sample handling and maintained sample integrity.

4.1 GeoProbe Investigation

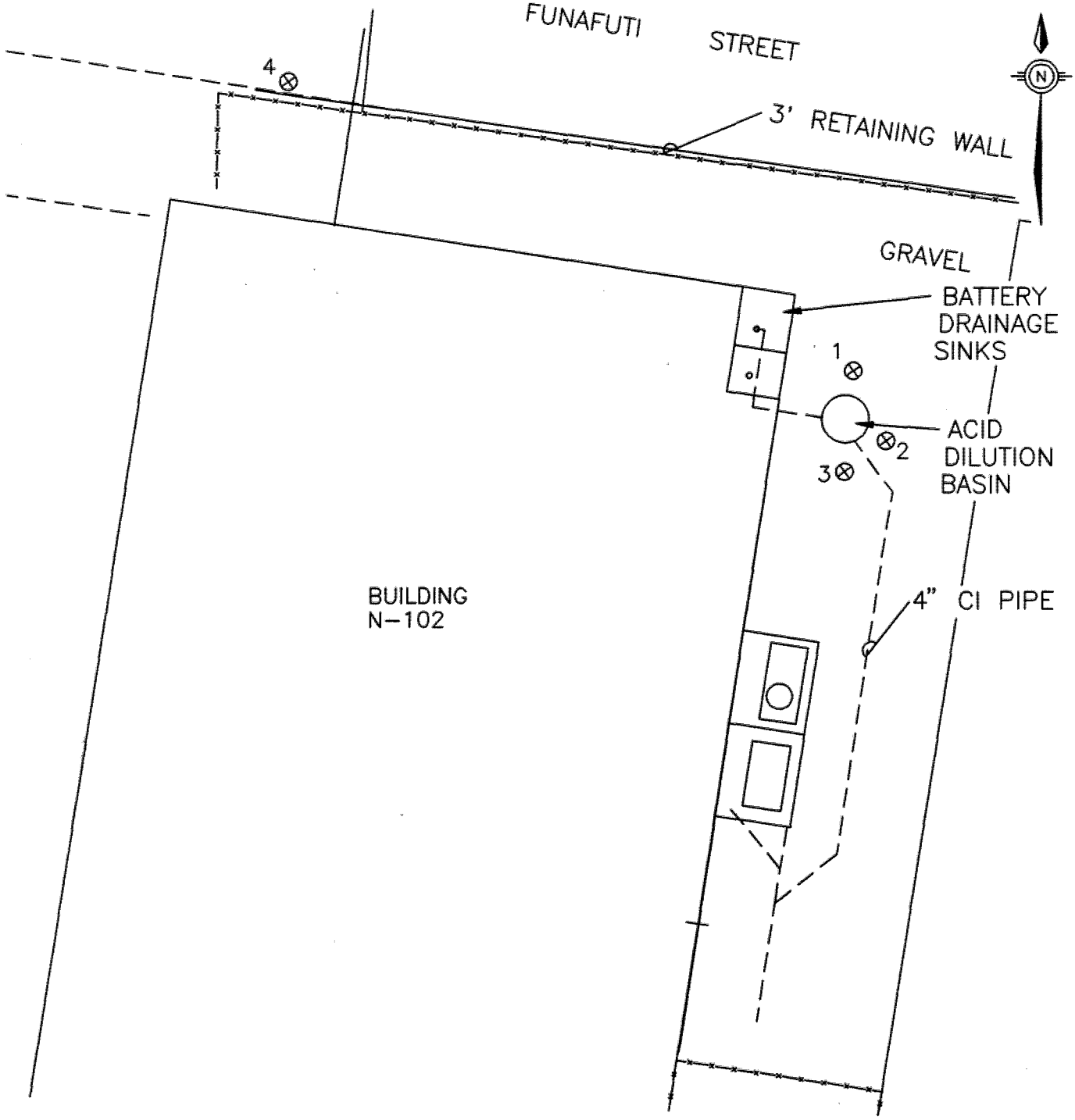
Four sampling locations were proposed in the *Assembly C Site Investigation Plans* to define the nature and extent of contamination, if any, associated with the N-102 Acid Neutralization Unit. Three of the locations surround the former neutralization tank, and the fourth is along Funafuti Street, in a presumed upgradient location. Figure 4-1 shows the Geoprobe sampling locations.

4.2 Sampling Rationale and Methods

The *Assembly C Site Investigation Plans* stated that the following samples would be collected from each Geoprobe location during the CSI:

1) One subsurface soil sample from the 3- to 4-foot interval just below the unit's piping,
2) One subsurface soil sample from the 6- to 7-foot interval, just below the base of the unit,
3) One soil <u>or</u> groundwater sample from the soil/water interface in the loess

To determine the actual intervals to be sampled, the first Geoprobe boring (Location 1) was sampled continuously to a depth of 18 feet below land surface (bls), where a sandy clay interval



LEGEND

3 ⊗ GEOPROBE SOIL SAMPLE LOCATION

10 0 10

SCALE FEET

RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 4-1
GEOPROBE SAMPLE LOCATIONS
BUILDING N-102
BATTERY ACID NEUTRALIZATION UNIT
SWMU 26

DWG DATE: 10/10/95 | DWG NAME: 94GSL26

was encountered (soil/water interface); however, no groundwater samples could be collected from the loess. Based on field observations, the following intervals were selected for CSI sampling:

1) One subsurface soil sample from the 3- to 4-foot interval just below the unit's piping,

2) One subsurface soil sample from the 4- to 8-foot interval to provide information surrounding and beneath the unit.

3) One subsurface soil sample from the 16- to 18-foot interval, corresponding to the soil/water interface in the loess

An exception to the above sampling strategy occurred at Location 4, where the deepest soil sampling interval was 13 to 15 feet due to a subsurface obstruction.

An E/A&H geologist logged and processed the soil samples for submittal to the analytical laboratories. Tri-State collected the soil samples with the GeoProbe rig using the 1-inch diameter soil probe lined with an acetate sleeve. Soil samples for metals analyses were homogenized in a stainless-steel bowl in accordance with Section 4.2.10 of the Region IV USEPA Standard Operating Procedures/Quality Assurance Manual and containerized as outlined in Section 4.4.4 of the *Comprehensive RFI Work Plan*. After containerization, all samples were immediately placed on ice for transport to the onsite and offsite laboratories.

4.3 Sampling Protocol

The sampling protocol adhered to the approved *Comprehensive RFI Work Plan* and the *Assembly C Site Investigation Plans*. Sample handling was minimized. When transferring material from the sampling device to containers, the operation was conducted expediently, in as clean an environment as possible. A new pair of disposable gloves was donned before collecting

each subsurface soil sample. Empty containers were kept packaged until used, at which time they were immediately chilled and isolated in coolers.

Sample Processing and Chain-of-Custody Procedure

Clean sample containers provided by the testing laboratory were shipped to E/A&H in sealed packages. Sample containers were labeled with the sample identification number, date, sampler's name, and requested analytical parameter, then placed in a cooler immediately following collection. Each sample was logged in the field logbook. Samples for offsite laboratory analysis were prepared for shipment by wrapping each container individually in bubble wrap, placing it in a resealable plastic bag, and packing it on ice inside a sturdy cooler. Cooler lids were secured with packing tape and sealed with signed custody seals. Packaged samples were then shipped overnight via FedEx priority service for next morning delivery. The offsite laboratory was notified the day of shipment of the number of samples submitted. All sample shipments were reported to have arrived at NET in good condition and at the appropriate temperatures.

To ensure the integrity of the sample transfer process, a strict chain-of-custody procedure was implemented. This procedure was initiated in the field for each sampling event and conducted through custody transfer to the analytical laboratory. A chain-of-custody form was completed for each batch of samples, itemizing sample numbers, containerization, preservatives, analyses requested, date and time of sampling, and FedEx shipping number. Custody transfers were recorded by signature, date, and time of relinquishment, and receipt of custody by the parties involved.

Sample Labeling

All samples collected in the field were labeled with a 10-digit alphanumeric code that identifies the site, sample type, sample location, and interval. The first three digits identify the site location, and the fourth digit identifies the sample matrix. The next four digits identify the

sampling location, and the last two digits are the deepest point of the sampling interval. For example, the sample label "026S000318" designates a SWMU 26 soil sample collected from Location 3 at a maximum depth of 18 feet.

4.4 Grouting Procedures

Tri-State filled each Geoprobe boring with neat cement grout following sample collection.

4.5 Decontamination Procedures

Tri-State decontaminated their downhole field equipment which did not come in contact with the samples (i.e., rods, split-spoons) with a non-phosphate detergent and a deionized water rinse. All downhole equipment and sampling tools which could potentially contact the collected samples was decontaminated before and after each use in accordance with guidelines set forth in the *Assembly C Site Investigation Plans*, which consisted of the following steps:

- Wash with a hot mixture of soap and water
- Rinse with potable water
- Rinse with deionized organic-free water
- Rinse twice with pesticide-grade isopropyl alcohol
- Rinse with deionized organic-free water
- Wrap with aluminum foil or plastic

A new pair of disposable latex gloves was donned before handling decontaminated sampling equipment. Since soil samples were collected directly from the acetate sleeves within the stainless-steel sampler, no investigation-derived waste was generated during the CSI.

5.0 GEOLOGY AND HYDROGEOLOGY

5.1 Regional Geology and Hydrogeology

The general hydrogeology of the Memphis area is discussed in detail in Section 2.11 and a conceptual model of the hydrogeology at the NSA is presented in Section 2.12 of the *Comprehensive RFI Work Plan* (E/A&H, 1994). Updated information is available in the *Hydrogeology of Post-Wilcox Group Stratigraphic Units in the Area of the Naval Air Station Memphis, Near Millington, Tennessee* (Kingsbury and Carmichael, 1995). On the basis of this updated information, the hydrogeology of NSA Memphis is re-summarized below.

The two stratigraphic units investigated during the RFIs at NSA Memphis are the loess/alluvial deposits of Pleistocene and Holocene age and the underlying fluvial deposits of Pleistocene to Pliocene age. The loess — eolian deposits consisting of silt, silty clay, clay, and minor amounts of sand — is the principal unit occurring at land surface throughout the NSA Memphis Northside. Alluvium, which is restricted to stream valleys, includes alluviated or reworked loess. The loess is typically 0 to 65 feet in the Memphis area; at NSA Memphis it ranges from 15 to 45 feet in thickness. Water-bearing zones are present in the loess primarily in the upper part of this unit; however, yields are low and water quality analyses performed during the water use survey portion of previous UST investigations indicate that loess groundwater does not meet many primary and secondary drinking water standards. Previous investigations at NSA Memphis have found depth to water in the loess varying between 5 and 15 feet bls and vertical hydraulic conductivities to range from 10^{-6} to 10^{-8} centimeter per second (cm/sec). Although the loess may be considered an aquitard on the basis of the relatively low hydraulic conductivities, this shallowest water-bearing zone is present within this interval. Groundwater flow in the loess is primarily downward, although locally some groundwater in the loess may discharge to nearby streams, drainage ditches, and other surface-water bodies.

The fluvial deposits underlie the loess in upland areas and consist of sand, gravel, and some clay, with thin layers of ferruginous sandstone and conglomerate at the base. This unit ranges

in thickness from 0 to 100 feet in the Memphis area; on the Northside of NSA Memphis it ranges from 10 to 35 feet in thickness and represents the most significant component of the surficial aquifer. Many shallow domestic wells in the Memphis rural areas are completed in the fluvial deposits. Relative groundwater elevations between wells completed in the loess/alluvium and fluvial deposits indicate semiconfined to confined conditions in the fluvial deposits. Typically a downward vertical gradient exists between water in the loess and the fluvial deposits. Sediments in the fluvial deposits generally coarsen with depth, and typically, the upper portion consists of a mixture of very fine sand with varying degrees of silt and clay and becomes increasingly less silty with depth, grading into a fine to medium sand near the middle of the unit. Grain sizes typically coarsen below this interval, grading into a gravelly sand near the fluvial deposits basal section.

The fluvial deposits are underlain by the Cockfield Formation, a part of the Jackson-upper Claiborne confining unit, which is a heterogeneous formation consisting of very fine silty sand interbedded with clay and silt lenses or clay with interbedded fine sand lenses. The more-permeable characteristics of the fluvial deposits, compared to the relatively impermeable properties of the overlying loess/alluvium and the underlying Jackson-upper Claiborne confining unit, result in the fluvial deposits being the preferential zone of groundwater flow and the route for contaminant transport in NSA Memphis's subsurface.

5.2 Site-Specific Geology and Hydrogeology

The following sections provide site-specific geologic and hydrogeologic information obtained from stratigraphic test borings, the Assembly A RFI investigation, and the SWMU 26 Geoprobe investigation.

Stratigraphic Test Borings

In 1994, the U.S. Geological Survey (USGS) drilled and sampled stratigraphic test hole 5, approximately 175 feet north-northeast of SWMU 26. Figure 1-1 shows the location of test

hole 5. This stratigraphic test hole was drilled 32 feet into the Cook Mountain Formation to better understand the site geology before monitoring-well installations. Cuttings from the test hole were visually logged by a field geologist during drilling, and the test hole was geophysically logged to its total depth following completion. Stratigraphy and lithologies encountered in the test hole are as follows:

Loess:	Approximately 30 feet of windblown silt and clay deposits.
Fluvial Deposits:	Approximately 54 feet of sand and gravel.
Cockfield Formation:	Approximately 104 feet of alternating sand and clay with some lignite.
Cook Mountain Formation:	Characterized as a light olive-gray to greenish-gray dense clay. Defined as the upper confining unit between the surficial aquifers and the Memphis Aquifer. Because the stratigraphic test hole was only advanced 32 feet into the Cook Mountain Formation, the entire thickness is not known.

Previous Investigations

Subsurface soil information was collected during the Assembly A RFI for SWMU 7, the Building N-126 Plating Shop Dry Well. SWMU 7 is approximately 900 feet west of SWMU 26. During the Assembly A investigation, nine monitoring-well clusters (designated 07MW01 through 07MW09) were installed at various locations around SWMU 7. 07MW02, 07MW03, and 07MW06 are the SWMU 7 monitoring well clusters closest to SWMU 26 (between 650 and 800 feet west and northwest). The general lithology encountered in the soil borings associated with these three clusters is as follows:

- Clayey silt, silty clay, and sandy clay from ground surface to between 25 and 34 feet bls (loess).

- Sand with gravel and silty clayey sand from between 25 and 34 feet bls to between 77 and 82 feet bls (fluvial deposits).

- Silty clayey sand, silty sand with clay lenses, clay with sand lenses, and lignite from between 77 and 82 feet to the termination depth of the boring (between 101 and 125 feet [Cockfield Formation]).

Laboratory-measured vertical hydraulic conductivities for the subsurface soil samples associated with the SWMU 7 monitoring wells are as follows:

Well Cluster	**Associated Soil Sample ID**	**Sampling Depth (in feet)**	**Conductivity (in cm/sec)**
07MW01	07S000177	75' to 77' (lower fluvial deposits)	6.8×10^{-5}
	07S0001112	110' to 112' (Cockfield Formation)	4.1×10^{-8}
07MW03	07S0003117	115' to 117' (Cockfield Formation)	1.6×10^{-8}
07MW08	07S0008127	125' to 127' (Cockfield Formation)	$8.7 \times {}^{10-7}$
07MW09	07S000922	10' to 22' (loess)	9.5×10^{-7}

Monitoring well cluster 07MW01 is approximately 750 feet west-northwest of SWMU 26. Monitoring-well clusters 07MW03, 07MW08, and 07MW09 are 600 feet west-northwest, 1,100 feet west, and 1,050 feet west-northwest of SWMU 26, respectively. The boring logs and hydraulic-conductivity data sheets for SWMU 7 are provided in Attachment 2 of Volume II.

Based on the topography, the information contained in the conceptual model of the NSA Memphis hydrogeology (Section 2.12 of the *Comprehensive RFI Work Plan*), recent data collected during investigations at Assembly A SWMUs, and communication with USGS representatives, groundwater in the fluvial deposits flows locally toward the

north-northeast. Groundwater flow in the loess is primarily downward, although locally, some groundwater in the loess may discharge to nearby streams, drainage ditches, and other surface water bodies.

SWMU 26 CSI

The deepest Geoprobe soil boring at SWMU 26 terminated at 18 feet bls. E/A&H geologist described the lithology encountered during the Geoprobe investigation as a brown clayey silt (loess). The water-bearing zone in the loess (18 feet bls) was visually classified as a sandy clay.

6.0 NATURE AND EXTENT OF CONTAMINATION

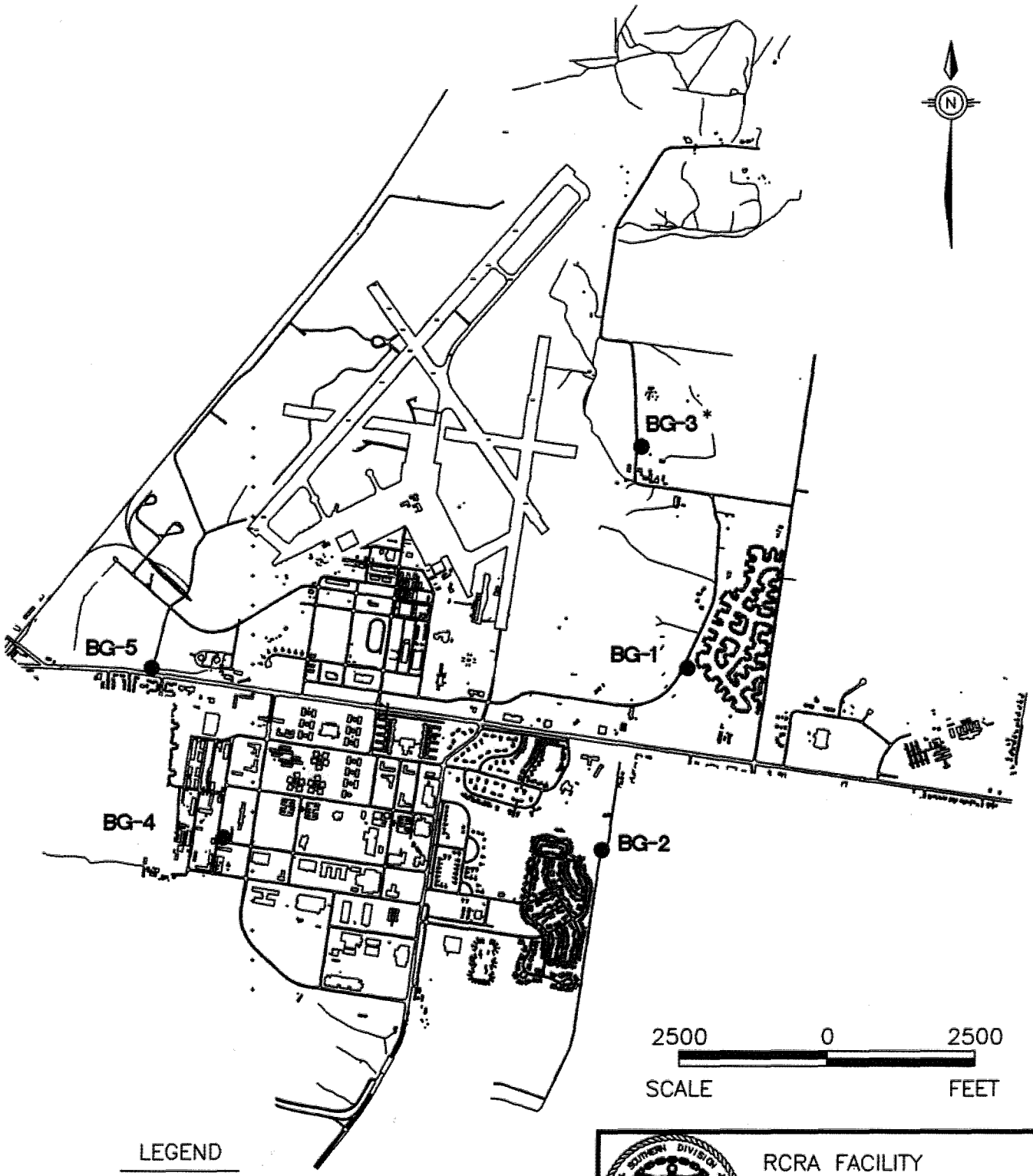
This section provides the analytical results for subsurface soil samples collected during the Geoprobe investigation. As outlined in Section 4, E/A&H collected subsurface soil samples from three intervals at each of the four Geoprobe boring locations shown on Figure 4-1. The samples were shipped to NET in Bedford, Massachusetts, for the analysis of arsenic, cadmium, lead, nickel, mercury and zinc. The analytical results were compared to background reference concentrations and to risk-based concentrations (RBCs) for residential and industrial soil (USEPA Region III, January to June 1995). The background reference concentrations were established as outlined in the following section.

6.1 Background Reference Concentrations

Five background locations were established at NSA Memphis to assess ambient soil and groundwater conditions across the base. Background data for soil consist of 12 samples collected from five borings, shown on Figure 6-1. A metals background reference was established to compare metals detected in soil to samples collected at SWMUs. The background reference concentrations (RCs) are the mean concentrations of analytes detected at all the background locations doubled. Two RCs were established for soil, one for surface soil (0 to 1 foot interval) for use in later risk evaluation and one for the remaining subsurface soil sample. Table 6-1 shows the RCs for the metals analyzed at SWMU 26.

6.2 Subsurface Soil Sample Results

Detected arsenic concentrations in subsurface soil range from 3.8 to 9.0 milligrams per kilogram (mg/kg, or parts per million), cadmium concentrations from 0.77 to 1.2 mg/kg, lead concentrations from 5.0 to 7.8 mg/kg, nickel concentrations from 11.1 to 19.9 mg/kg, and zinc concentrations from 15.1 to 42 mg/kg. No mercury was detected in any sample. As shown on Table 6-1 and Figure 6-2, all of the metals concentrations are well below the RCs and the RBCs for residential and industrial soil. Appendix B contains analytical data.



LEGEND

* SOIL BACKGROUND DATA ONLY

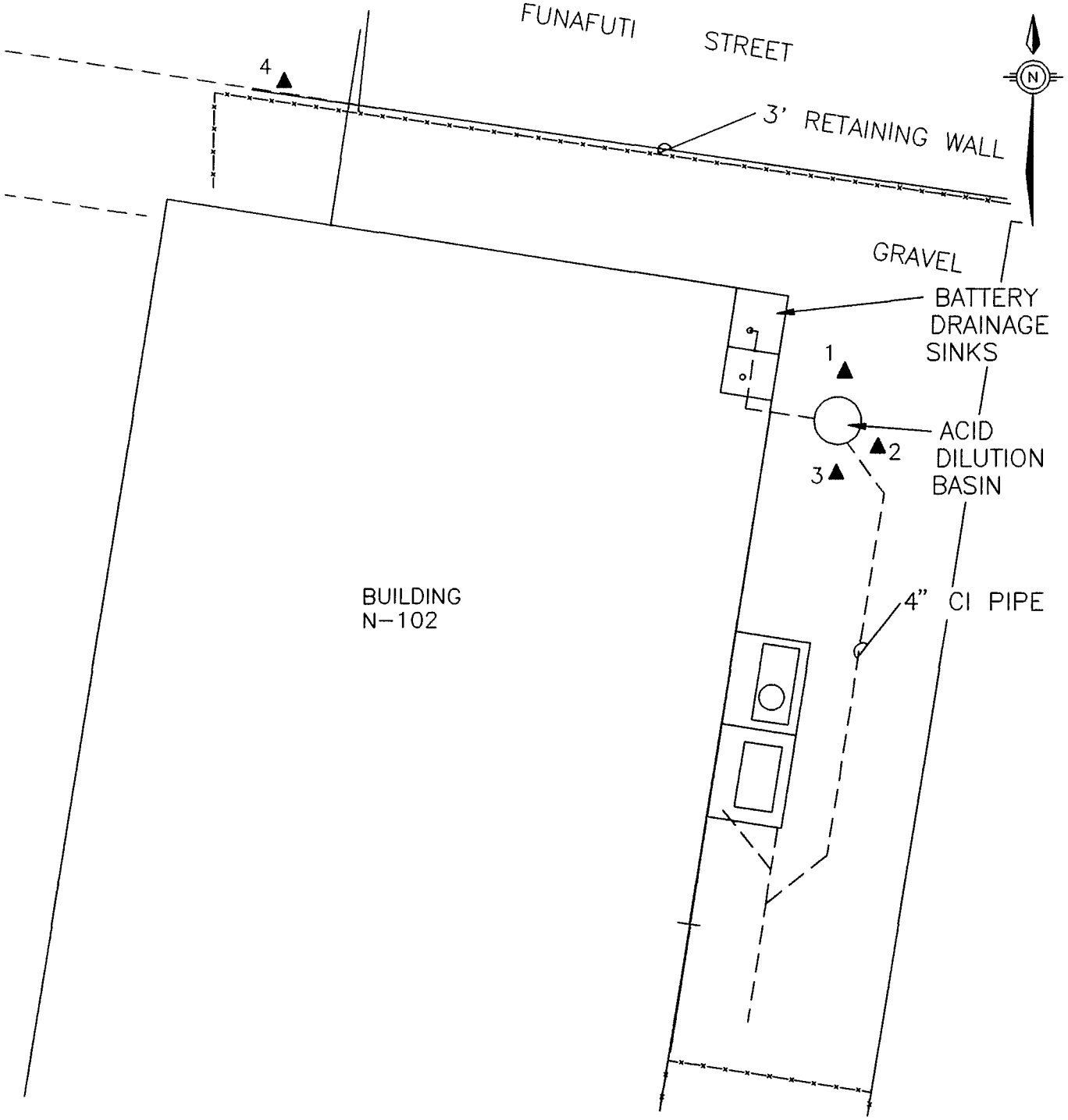
BG-2 BACKGROUND LOCATION 2

NOTE: SOIL DATA CONSIST OF ONE SURFACE & TWO SUBSURFACE SOIL SAMPLES. GROUNDWATER DATA CONSIST OF THREE SAMPLES; THE LOESS, UPPER FLUVIAL & LOWER FLUVIAL DEPOSITS.

RCRA FACILITY
INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 6-1
SOIL & GROUNDWATER
BACKGROUND LOCATIONS

DWG DATE: 10/05/95 | DWG NAME: 94SGBL



LEGEND

▲ CONTAMINANT CONCENTRATION LESS THAN RESIDENTIAL RISK-BASED CONCENTRATION OR 2X BACKGROUND CONCENTRATION.

10 0 10
SCALE FEET

RCRA FACILITY INVESTIGATION
NSA MEMPHIS
MILLINGTON, TN

FIGURE 6-2
SOIL SAMPLE RESULTS
BUILDING N-102
BATTERY ACID NEUTRALIZATION UNIT
SWMU 26

DWG DATE: 10/05/95 | DWG NAME: 94DSR26

Table 6-1
Concentrations of Metals Detected in Subsurface Soil
SWMU 26 — Building N-102 Battery Acid Neutralization Unit
(data in mg/kg)

Sample Location/ID

Analyte	1 (3' - 4') 026S000104	1 (4' - 8') 026S000108	1 (16' - 18') 026S000118	2 (3' - 4') 026S000204	2 (4' - 8') 026S000208	2 (16' - 18') 026S000218	RC (2 x Mean Background)	RBC[a] Residential	RBC[a] Industrial
Arsenic	ND[b]	5.1 J[c]	ND	9.0 J	3.8 J	ND	20.4	23	610
Cadmium	ND	ND	ND	ND	1.0 J	ND	6.8	39	10,000
Lead	6.3	7.6	5.0	7.8	6.1	5.8	25.1	None	None
Nickel	11.8J	15.9 J	13.5 J	18.8 J	16.8 J	14.5 J	59.8	1600	41,000
Zinc	29.2	32.3	17.7	42.0	31.6	15.1	111.8	23,000	610,000

Analyte	3 (3' - 4') 026S000304	3 (4' - 8') 026S000308	3 (16' - 18') 026S000318	4 (3' - 4') 026S000404	4 (4' - 8') 026S000408	4 (13' - 15') 026S000415	RC (2 x Mean Background)	RBC Residential	RBC Industrial
Arsenic	6.6 J	ND	ND	3.9 J	7.3 J	ND	20.4	23	610
Cadmium	0.97 J	0.96 J	0.77 J	0.78 J	1.2 J	ND	6.8	39	10,000
Lead	5.9	7.4	7.01	ND	5.2	6.5	25.1	None	None
Nickel	18.5 J	15.8 J	11.1 J	19.9 J	16.4 J	11.4 J	59.8	1600	41,000
Zinc	34.7	29.0	18.0	30.1	23.8	21.0	111.8	23,000	610,000

Notes:

[a] Risk-Based Concentrations for residential and industrial soil from the USEPA Region III Risk-Based Concentrations Table, January — June 1995.
[b] ND = Compound not detected.
[c] J = Estimated concentration.

7.0 PRELIMINARY RISK ASSESSMENT

No surface-soil samples were collected during the DPT investigation. To finalize the RCRA closure of SWMU 26, one surface-soil sample will be collected in the grass next to the acid neutralization unit. The sample will be shipped to an offsite laboratory under chain-of-custody documentation for the following analyses:

Analysis	*Method*
Semivolatile Organic Compounds	USEPA Method 8270
Chlorinated Pesticides/Polychlorinated Biphenyls	USEPA Method 8080
40 CFR Pt. 264 Appendix IX Metals	USEPA Method 6010/7000 Series

The sampling results will be used to prepare a Preliminary Risk Evaluation in accordance with the November 22, 1994, EPA Region IV memorandum "Guidance on Preliminary Risk Evaluation for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)." The Preliminary Risk Evaluation will be prepared and submitted as an addendum to this CSI Report.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Subsurface soil samples were collected from three intervals at three locations surrounding the N-102 Battery Acid Neutralization Unit and from one location next to the sanitary sewer line which runs along the south side of Funafuti Street. The samples were analyzed for the following metals: arsenic, cadmium, lead, nickel, mercury, and zinc. Detected metals concentrations in each subsurface soil sample were less than RBCs for residential and industrial soil and less than two times the background reference concentration for each compound.

Based on the results of the GeoProbe investigation at SWMU 26, no further action is recommended for this site, with the exception of surface soil sampling to finalize the RCRA closure of the SWMU. One surface soil sample will be collected in the grassy area next to the acid neutralization unit and analyzed for SVOCs, pesticides/polychlorinated biphenyls, and Appendix IX metals. Upon receipt of the sample results, a Preliminary Risk Evaluation will be prepared and the results submitted as an addendum to this CSI report.

9.0 REFERENCES

ERC Environmental and Energy Services Company/EDGe (April 1990). *Visual Site Inspection Report, NAS Memphis, Millington, TN.* ERC/EDGe: Nashville, Tennessee.

EnSafe/Allen & Hoshall (1995). *Assembly C Site Investigation Plans, Naval Air Station Memphis.* E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall (1994). *Comprehensive RFI Work Plan for Naval Air Station Memphis.* E/A&H: Memphis, Tennessee.

Kingsbury, James A. and John K. Carmichael (1995). *Hydrogeology of Post-Wilcox Group Stratigraphic Units in the Area of the Naval Air Station Memphis, Near Millington, Tennessee.* U.S. Geological Survey Water-Resources Investigations Report 95-4011.

United States Environmental Protection Agency (1991). *Standard Operating Procedures and Quality Assurance Manual.* USEPA Region IV: Atlanta, Georgia.

United States Geological Survey (1995). Oral and written communication with Mr. Jack Carmichael. USGS: Nashville, Tennessee.

Appendix A

Analytical Results — N-102 Battery Acid Neutralization Unit Contents

ENVIRONMENTAL TESTING & CONSULTING INC.
2924 WALNUT GROVE RD · MEMPHIS, TN 38111 · PHONE (901) 327-2780 FAX (901) 327-6334

July 14, 1992

Ms. Jan Campbell
Del-Jen, Inc. (NAS)
P.O. Box 54188
Millington, TN 38054

SWMU #26

REF: ANALYTICAL TESTING
SAMPLE DATE: 6/29/92
SITE ID: NAS
SAMPLE ID: NORTH 102 BATTERY ACID (LIQUID-SOLID)

Dear Ms. Campbell:

The above referenced sample has been analyzed per your instructions. The tests were performed in our laboratory (#02027) in accordance with the Solid Waste Manual, SW-846. The sample was leached/filtered according to Method 1311, Toxicity Characteristic Leaching Procedure. The results are shown on the attached Analysis Data Sheets.

Please call our office if you have any questions.

Sincerely,

Randall H. Thomas
Vice President

jw

Attachment

0629-034

Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To James Worthy	From LT Ron Gruzesky
Co. SouthDiv	Co. NAS Memphis
Dept. Envir.	Phone # DSN 966-5461
Fax # DSN 563-0465	Fax # (901) 873-5300

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
TCLP METALS

Client Name : Del-Jen, Inc.
Site ID : NAS

Sample ID : NORTH 102 BATTERY ACID
Sample Date : 6/29/92
Date Arrived : 6/29/92

File Name : _0629-034__
Sample ID : _0629-034-1

Date of TCLP Extraction : 7/01/92, Leachate/Filtrate Combined
Matrix Classification : Miscellaneous/Liquid-Solid

Metals	Results (ppm)	MS REC[1]		Results Fac(ppm)[2]	Regulatory Level (ppm)	Method (SW-846)	Date Analyzed	By
Arsenic	0.061	104	NF	0.061	5.0	7061	7/08/92	JF
Barium	0.30	112	NF	0.30	100.0	7080	7/02/92	BB
Cadmium	0.066	102	NF	0.066	1.0	7130	7/02/92	BB
Chromium	<0.02	97		<0.02	5.0	7190	7/01/92	BB
Lead	2.66	95		2.80	5.0	7420	7/09/92	BB
Mercury	0.0015	100	NF	0.0015	0.2	7470	7/01/92	JF
Silver	<0.01	100	NF	<0.01	5.0	7760	7/02/92	BB
Selenium	0.006	91		0.007	1.0	7741	7/08/92	JF
VOCs	See Attached							
BNAs	See Attached							

Detection Limits (ppm)

Arsenic	0.002
Barium	0.03
Cadmium	0.002
Chromium	0.02
Lead	0.05
Mercury	0.001
Silver	0.01
Selenium	0.002

1 - Matrix Spike (%)Percent Recovery for Matrix Classification
2 - Sample results factored for Matrix Recovery Bias per Federal Regist June 29, 1990.
NF - No Factor applied.

Randall H. Thomas
Vice President

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
ORGANIC ANALYSIS DATA SHEET
TCLP BASE NEUTRALS AND ACID EXTRACTABLES

CLIENT NAME : DEL-JEN, INC. PROJECT # : _____
SITE ID : NAS ANALYST : RR
SAMPLE ID : NORTH 102 BATTERY ACID
SAMPLE DATE : 06/29/92
DATE ARRIVED : 06/29/92 FILE NAME : 0629-034.DOC
MATRIX : TCLP LEACHATE/FILTRATE SAMPLE # : 0629-034

DATE OF TCLP EXTRACTION : 07/01/92
MATRIX CLASSIFICATION : MISC LIQUID/SOLID

DATE EXTRACTED : 07/08/92 METHOD (SW-846): 8270
DATE ANALYZED : 07/16-17/92

COMPOUND	SAMPLE RESULTS (ppm)	MS REC[2] (%)	SAMPLE RESULTS FAC(ppm)[3]	DL[1] (ppm)	REGULATORY LEVEL (ppm)
2,4-Dinitrotoluene	BDL	NF	BDL	0.05	0.13
Hexachlorobenzene	BDL	NF	BDL	0.05	0.13
Hexachlorobutadiene	BDL	NF	BDL	0.05	0.50
Hexachloroethane	BDL	NF	BDL	0.05	3.00
2-Methylphenol(o-cresol)	BDL	NF	BDL	0.05	200
3-Methylphenol(m-cresol)	BDL	NF	BDL	0.05	200
4-Methylphenol(p-cresol)	BDL	NF	BDL	0.05	200
Nitrobenzene	BDL	NF	BDL	0.05	2.00
Pentachlorophenol	0.05	85	0.06	0.05	100
2,4,5-Trichlorophenol	BDL	NF	BDL	0.05	400
2,4,6-Trichlorophenol	BDL	NF	BDL	0.05	2.00
Pyridine	BDL	NF	BDL	0.05	5.00

SURROGATE STANDARDS	RESULT	EXP(ng/ul)	%REC	QC LIMITS
Nitrobenzene-d5	111	100	111	35-114
2-Fluorobiphenyl	112	100	112	43-116
4-Terphenyl-d14	104	100	104	33-141
Phenol-D6	171	200	86	10-94
2,4,6-Tribromophenol	199	200	100	10-123
2-Fluorophenol	196	200	98	21-100

1 - DETECTION LIMIT
2 - MATRIX SPIKE RECOVERY FOR MATRIX CLASSIFICATION
3 - SAMPLE RESULTS FACTORED FOR MATRIX RECOVERY BIAS PER FEDERAL REGISTE JUNE 29, 1990.
BDL - BELOW DETECTION LIMIT
NF - NO FACTOR APPLIED.

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
ORGANIC ANALYSIS DATA SHEET
TCLP VOLATILE COMPOUNDS

CLIENT NAME : DEL-JEN, INC. PROJECT # :
SITE ID : NAS ANALYST : LS
SAMPLE ID : NORTH 102 BATTERY ACID
SAMPLE DATE : 06/29/92
DATE ARRIVED : 06/29/92 FILE NAME : 0629-034.DOC
MATRIX : TCLP LEACHATE/FILTRATE SAMPLE # : 0629-034

DATE OF TCLP EXTRACTION : 07/01/92
MATRIX CLASSIFICATION : MISC LIQUID/SOLID

DATE ANALYZED : 07/14/92
METHOD (SW-846): 8240

COMPOUND	SAMPLE RESULTS (ppm)	MS REC[2] (%)	SAMPLE RESULTS FAC(ppm)[3]	DL[1] (ppm)	REGULATOR LEVEL (ppm)
Benzene	BDL	NF	BDL	0.005	0.50
Carbon Tetrachloride	BDL	NF	BDL	0.005	0.50
Chlorobenzene	BDL	NF	BDL	0.005	100
Chloroform	BDL	NF	BDL	0.050	6.00
1,4-Dichlorobenzene	BDL	NF	BDL	0.005	7.50
1,2-Dichloroethane	BDL	NF	BDL	0.005	0.50
1,1-Dichloroethene	BDL	NF	BDL	0.005	0.70
Methyl Ethyl Ketone	BDL	NF	BDL	0.050	200
Tetrachloroethene	BDL	NF	BDL	0.005	0.70
Trichloroethene	BDL	NF	BDL	0.005	0.50
Vinyl Chloride	BDL	NF	BDL	0.005	0.20

SURROGATE STANDARDS	RESULT	EXP(ug/L)	%REC	QC LIMITS
1,2-Dichloroethane-d4	39.9	50.0	80	76-114
Toluene-d8	45.3	50.0	91	88-110
4-Bromofluorobenzene	46.6	50.0	93	86-115

1 - DETECTION LIMIT
2 - MATRIX SPIKE RECOVERY FOR MATRIX CLASSIFICATION.
3 - SAMPLE RESULTS FACTORED FOR MATRIX RECOVERY BIAS PER FEDERAL REGISTI JUNE 29, 1990.
BDL - BELOW DETECTION LIMIT
NF - NO FACTOR APPLIED.

LABORATORY MANAGER

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To James Worthy	From Lt. Gruzesky
Co. Southern Division	Co. NAS-Memphis
Dept.	Phone # (DSN) 966-5461
Fax # DSN 563-0965	Fax # (DSN) 966-5300

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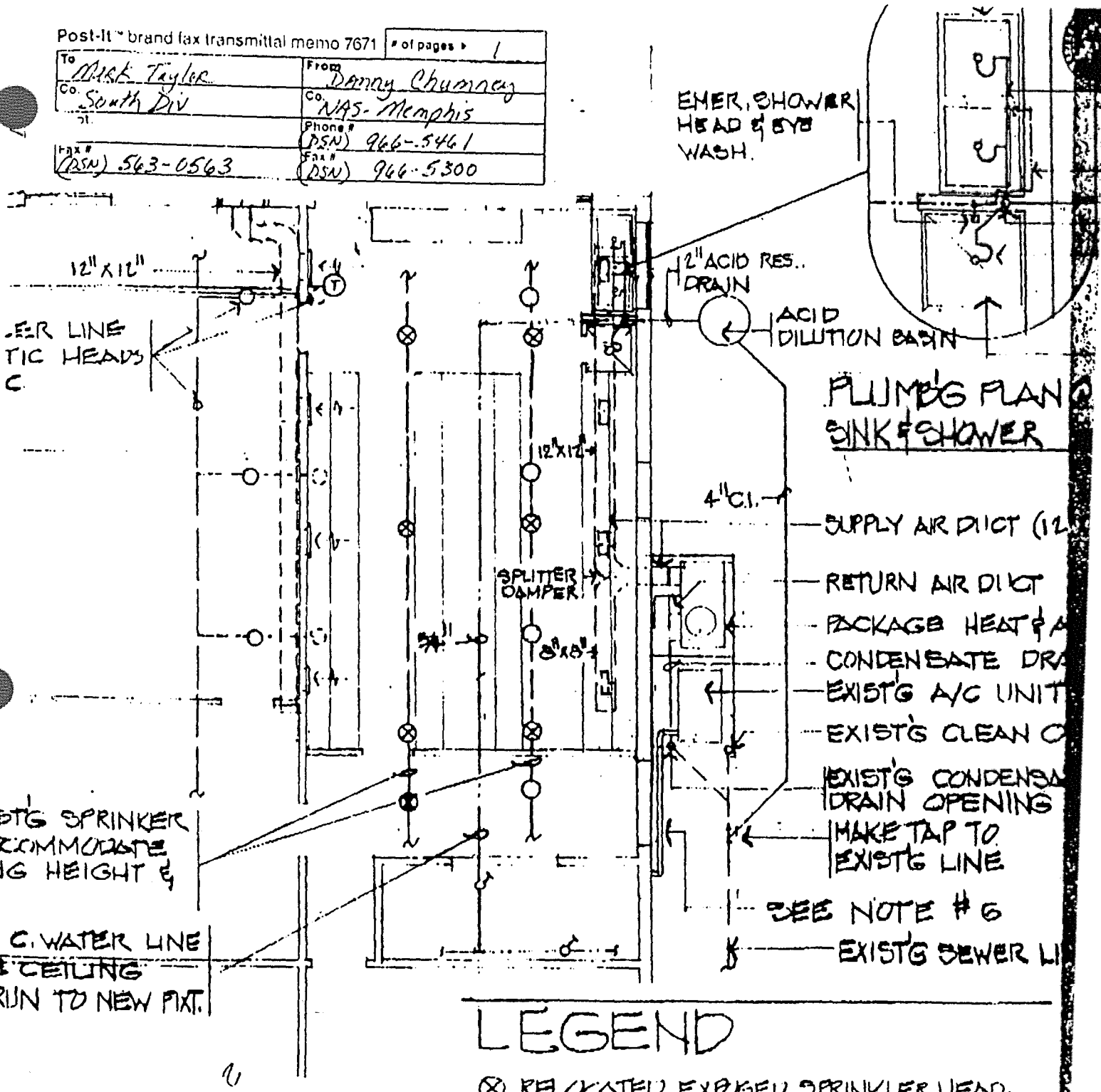
To Mark Taylor	From Danny Chumney
Co. South Div	Co. NAS-Memphis
Dept.	Phone # (DSN) 966-5461
Fax # (DSN) 563-0563	Fax # (DSN) 966-5300



LEGEND

⊗ RELOCATED EXPOSED SPRINKLER HEAD.

⊗ NEW EXPOSED SPRINKLER HEAD.

○ RELOCATED SPRINKLER HEAD IN ATTIC

SUPPLY AIR REG. 12"x 6" IN CEILING

EXHAUST AIR REG 12"x6" IN WALL, (4

GAS TIGHT CAST IRON COVER
GROUT IN PLACE - 3' DIA. OPEN'G

ECHANICAL PLAN

CALE: 1/8" = 1'-0"

LL DUCTWORK SHALL BE
ALVANIZED STEEL.

Appendix B

Analytical Results — GeoProbe Investigation

FORMAT: *XXXX* \ 1 2 3 4 5 6 7 8 9 0

XXXX \	- OPTIONAL project prefix
1 2 3	- SITE where sample collected
4	- MATRIX / QC code
5 6 7 8	- SAMPLING LOCATION
9 0	- DEPTH, INTERVAL, SERIAL #

All spaces MUST be filled and no extra characters included.
Use zeroes as space-fillers. Indicate MS/MSDs on COCs.

MATRIX/QC CODES:
S - soil (surface, borings, and trenches)
C - soil duplicate sample
M - sediment (settled, fluid-borne solid)
N - sediment duplicate
G - groundwater
H - groundwater duplicate sample
W - surface water
R - surface water duplicate sample
U - sludge
Y - sludge duplicate
A - air
Z - liquid waste (including IDW drums)
V - solid waste (including IDW drums)

T - trip blank
E - equipment rinsate blank
D - DI system blank
P - potable water blank
F - field blank
L - filter blank
B - EPA blind spike sample
2 - cement blank
3 - drilling mud
4 - grout blank
5 - bentonite blank
6 - sand blank

NAS MEMPHIS
NAS MEMPHIS, RFI, ASSEMBLY C
SWMU 26 - Primary Samples

METAL													
	SAMPLE ID ------->	026-S-0001-04		026-S-0001-08		026-S-0001-18		026-S-0002-04		026-S-0002-08		026-S-0002-18	
	ORIGINAL ID ----->	026S000104		026S000108		026S000118		026S000204		026S000208		026S000218	
	LAB SAMPLE ID --->	4-124590S		4-124591S		4-124592S		4-124593S		4-124594S		4-124595S	
	ID FROM REPORT -->	026S000104		026S000108		026S000118		026S000204		026S000208		026S000218	
	SAMPLE DATE ----->	06/05/95		06/05/95		06/05/95		06/05/95		06/05/95		06/05/95	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ---------->	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
CAS #	Parameter	1439	VAL	1439	VAL	1439	VAL	1439	VAL	1439	VAL	1439	VAL
AS	Arsenic	3.6	UJ	5.1	J	2.	UJ	9.	J	3.8	J	2.9	UJ
CD	Cadmium	0.75	UJ	0.76	UJ	0.73	UJ	0.79	UJ	1.	J	0.72	UJ
PB	Lead	6.3		7.6		5.		7.8		6.1		5.8	
HG	Mercury	0.13	U	0.12	U	0.12	U	0.13	U	0.12	U	0.12	U
NI	Nickel	11.8	J	15.9	J	13.5	J	18.8	J	16.8	J	14.5	J
ZN	Zinc	29.2		32.3		17.7		42.		31.6		15.1	
SB	Antimony	NR		NR		NR		NR		NR		NR	
BA	Barium	NR		NR		NR		NR		NR		NR	
BE	Beryllium	NR		NR		NR		NR		NR		NR	
CR	Chromium	NR		NR		NR		NR		NR		NR	
CO	Cobalt	NR		NR		NR		NR		NR		NR	
CU	Copper	NR		NR		NR		NR		NR		NR	
SE	Selenium	NR		NR		NR		NR		NR		NR	
AG	Silver	NR		NR		NR		NR		NR		NR	
TL	Thallium	NR		NR		NR		NR		NR		NR	
V	Vanadium	NR		NR		NR		NR		NR		NR	
SN	Tin	NR		NR		NR		NR		NR		NR	

*** Validation Complete ***

NAS MEMPHIS
NAS MEMPHIS, RFI, ASSEMBLY C
SWMU 26 - Primary Samples

METAL													
	SAMPLE ID ------->	026-S-0003-04		026-S-0003-08		026-S-0003-18		026-S-0004-04		026-S-0004-08		026-S-0004-15	
	ORIGINAL ID ----->	026S000304		026S000308		026S000318		026S000404		026S000408		026S000415	
	LAB SAMPLE ID --->	4-124596S		4-124597S		4-124598S		4-124599S		4-124600S		4-124601S	
	ID FROM REPORT -->	026S000304		026S000308		026S000318		026S000404		026S000408		026S000415	
	SAMPLE DATE ----->	06/05/95		06/05/95		06/05/95		06/05/95		06/05/95		06/05/95	
	MATRIX ---------->	Soil		Soil		Soil		Soil		Soil		Soil	
	UNITS ---------->	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
CAS #	Parameter	1439	VAL	1439	VAL	1439	VAL	1439	VAL	1439	VAL	1439	VAL
AS	Arsenic	6.6	J	0.49	UJ	1.1	UJ	3.9	J	7.3	J	1.7	UJ
CD	Cadmium	0.97	J	0.96	J	0.77	J	0.78	J	1.2	J	0.68	UJ
PB	Lead	5.9		7.4		7.1		0.49	U	5.2		6.5	
HG	Mercury	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
NI	Nickel	18.5	J	15.8	J	11.1	J	19.9	J	16.4	J	11.4	J
ZN	Zinc	34.7		29.		18.		30.1		23.8		21.	
SB	Antimony	NR		NR		NR		NR		NR		NR	
BA	Barium	NR		NR		NR		NR		NR		NR	
BE	Beryllium	NR		NR		NR		NR		NR		NR	
CR	Chromium	NR		NR		NR		NR		NR		NR	
CO	Cobalt	NR		NR		NR		NR		NR		NR	
CU	Copper	NR		NR		NR		NR		NR		NR	
SE	Selenium	NR		NR		NR		NR		NR		NR	
AG	Silver	NR		NR		NR		NR		NR		NR	
TL	Thallium	NR		NR		NR		NR		NR		NR	
V	Vanadium	NR		NR		NR		NR		NR		NR	
SN	Tin	NR		NR		NR		NR		NR		NR	