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RAPID ASSESSMENT REPORT FOR SITE 10 BUILDING 657 ZONE H CNC CHARLESTON SC

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Rapid Assessment Report
for
Site 10, Building 657

Zone H
Charleston Naval Complex
North Charleston, South Carolina

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0068

November 1999

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RAPID ASSESSMENT REPORT
FOR
SITE 10, BUILDING 657

ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
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North Charleston, South Carolina 29406

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CERTIFICATION PAGE

I certify that the information contained in this report and on any attachments is true, accurate, and complete to the best of my knowledge, information, and belief.

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TABLE OF CONTENTS

SECTION		PAGE
1.0	**INTRODUCTION**	**1-1**
1.1	SITE DESCRIPTION	1-1
1.2	SITE HISTORY	1-2
1.3	RECEPTOR SURVEY RESULTS	1-3
1.4	REGIONAL GEOLOGY AND HYDROGEOLOGY	1-4
2.0	**ASSESSMENT INFORMATION**	**2-1**
2.1	SITE-SPECIFIC GEOLOGY AND HYDROGEOLOGY	2-1
2.1.1	Site Geology	2-1
2.1.2	Site Hydrogeology	2-1
2.2	ASSESSMENT RESULTS	2-2
2.3	FIELD SCREENING ASSESSMENT	2-3
2.3.1	Soil Vapor Assessment	2-3
2.3.2	Soil Mobile Lab Results	2-4
2.3.3	Groundwater Mobile Lab Results	2-4
2.4	CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER	2-4
2.4.1	Chemicals of Concern in Soil	2-4
2.4.2	Chemicals of Concern in Groundwater	2-5
2.5	ANALYTICAL DATA	2-5
2.6	AQUIFER CHARACTERISTICS AND EVALUATION	2-5
2.7	FATE AND TRANSPORT MODEL DESCRIPTION	2-7
2.8	PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN	2-7
3.0	**TIER 2 EVALUATION**	**3-1**
3.1	COMPARISON OF ANALYTICAL RESULTS WITH RBSLs	3-1
3.2	EXPOSURE SETTING CHARACTERIZATION	3-1
3.3	EXPOSURE PATHWAY ANALYSIS	3-1
3.4	INDENTIFICATION OF DATA REQUIREMENTS	3-2
3.5	SITE-SPECIFIC TARGET LEVELS	3-2
3.6	RECOMMENDATIONS	3-2
4.0	**REFERENCES**	**4-1**

TABLE OF CONTENTS(Continued)

TABLES

1 GROUNDWATER ELEVATIONS
2 GROUNDWATER FIELD MEASUREMENTS
3 SUMMARY OF OVA SOIL SCREENING RESULTS
4 SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOIL
5 SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR GROUNDWATER
6 SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
7 SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
8 COMPARISON OF MAXIMUM CONCENTRATIONS TO RBSLS

FIGURES

1 SITE LOCATION MAP
2 SITE VICINITY MAP
3 SITE MAP AND SAMPLING LOCATIONS
4 GEOLOGIC CROSS SECTION A - A'
5 GEOLOGIC CROSS SECTION B - B'
6 GROUNDWATER ELEVATION MAP, FEBRUARY 3, 1999
7 GROUNDWATER ELEVATION MAP, FEBRUARY 4, 1999
8 GROUNDWATER ELEVATION MAP, FEBRUARY 5, 1999
9 CONTAMINANTS OF CONCERN IN SOIL

APPENDICES

A UNDERGROUND STORAGE TANK ASSESSMENT REPORT – UST 657-1 AND 657-2
B GEOLOGIC BORING LOGS
C FIELD SAMPLING DATA SHEETS
D SOIL AND GROUNDWATER LABORATORY ANALYTICAL DATA
E AQUIFER CHARACTERIZATION GRAPHS

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment (RA) for Site 10 which includes two closed underground storage tank (USTS) systems which supplied fuel oil to Building 657 at Charleston Naval Complex (CNC) Zone H, in North Charleston, South Carolina. The RA was performed under the direction of the South Carolina Department of Health and Environmental Control's (SCDHEC's) Rapid Assessment Plan and approval letter dated November 4, 1998.

TtNUS performed the following actions during the RA:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate public and private potable wells, to locate utilities line areas, to locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed the previously prepared Underground Storage Tank Assessment Report for UST 657 to determine boring locations and monitoring well placements;
- Conducted site survey to identify utilities and to construct a site plan;
- Performed direct push investigation, collected soil and groundwater samples for field screening of total petroleum hydrocarbons using an organic vapor analyzer;
- Collected groundwater samples from direct push borings for mobile lab screening analysis of benzene, toluene, ethyl benzene, total xylenes (BTEX), and diesel range organics.
- Installed three temporary monitoring wells to approximately 12 feet below land surface (bls);
- Installed shallow permanent monitoring wells to approximately 12 feet and 15 bls, and a vertical delineation well to approximately 27 feet bls;
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis of analyzed for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260 and PAHs using USEPA Method 8270;
- Performed groundwater natural attenuation sampling;
- Collected soil samples for laboratory analysis for BTEX and naphthalene using USEPA Method 8260, polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270, total organic carbon (TOC) using USEPA Method 415.1, total recoverable petroleum

hydrocarbons (TRPH) using USEPA Method 9071, and grain size analysis using sieve and hydrometer methods; and

- Surveyed monitoring well and piezometer top of well casing elevations and collected depth to groundwater measurements to evaluate the groundwater flow direction.

Conclusion

No Chemicals of Concern (CoC) were detected in the onsite soils at concentrations that exceed the SCDHEC Risk Based Screening Levels (RBSLs) for a clayey-sand soil matrix. All groundwater CoCs from the March 2, 1999 sampling event were reported below laboratory detection limits and were below the RBSLs. No free product was detected in the groundwater during the RA investigation.

Recommendation

No further action is recommended for this site since concentrations of the detected CoCs were below their respective RBSLs for groundwater and soil.

1.0 INTRODUCTION

Site 10 includes two former underground storage tanks (USTS) which supplied fuel oil to Building 657 located at the Charleston Naval Complex (CNC), Zone H in Charleston, South Carolina. This Rapid Assessment (RA) was performed by Tetra Tech NUS, Inc.'s (TtNUS) Tallahassee, Florida, office, located at 1401 Oven Park Drive, Suite 102, Tallahassee, Florida 32308 (telephone number 850/385-9899) on behalf of the U.S. Navy Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFAC), 2155 Eagle Drive, North Charleston, South Carolina (telephone number 843/820-7307). Authorization to conduct the RA for the Site was issued by NAVFAC under Contract Task Order (CTO) 0068. The RA was performed under the direction of the South Carolina Department of Health and Environmental Control's (SCDHEC's) Rapid Assessment Plan and approval letter dated November 4, 1998. TtNUS performed fieldwork necessary to complete the RA from January 22, 1999, through March 18, 1999.

1.1 SITE DESCRIPTION

The CNC is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina, as shown on Figure 1. This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River. The Site is located within the developed portion of the base as shown on Figure 2.

The area surrounding CNC are "mature urban," having long been developed with commercial, industrial, and residential land use. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek. A site vicinity map, which exhibits adjacent properties and structures, vicinity roads, and vicinity surface drainage, is included as Figure 2.

Building 657 is a former Sports Bar and enlisted men's club located south of the intersection of Bordelon Avenue and Strong Street on the Naval Base. Two USTs were located on the north side of the building, between the building and Bordelon Avenue, and were used to store heating fuel for Building 657's boilers. The USTs were designated UST 657-1 and UST 657-2 (see Figure 3). UST 657-1 was a steel 5,000-gallon fuel oil tank installed in 1968. UST 657-2 was a 2,000-gallon tank installed in 1978 [Supervisor of

Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston (SPORTENDETCHASN), 1996].

1.2 SITE HISTORY

In 1901, the U.S. Navy acquired 2,250 acres near Charleston to a build shipyard, and the first naval officer was assigned duty in early 1902. Subsequently, buildings and a dry dock were constructed in the Naval Yard. The dry dock was completed in 1909 along with several other brick buildings and the main power plant, which is still in operation today. The first ship was placed in dry-dock and work began on fleet vessels in 1910. World War I brought about an expansion of the yards, facilities, land area, and work force. The yard built two gunboats, several submarine chasers, and tugs in addition to performing repairs and other services to the fleet. In 1933, building activity had increased principally in construction of several Coast Guard tugs, a Coast Guard cutter, and a Navy gunboat, creating the need for more facilities and a much larger work force. In 1943, civilian work force peaked with almost 26,000 employees divided among three daily shifts. In 1956, construction began on piers, barracks, and buildings for mine warfare ships and personnel. Later in the decade, the facility became a major home port for combatant ships and submarines of the U.S. Atlantic Fleet [Final RCRA Facility Investigation Report for Zone H, EnSafe/Allen & Hoshall (E/A&H), 1996)].

In 1993, major cuts in defense spending, as a result in part to the end of the cold war, caused CNC to be added to the list of bases scheduled for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure and transition of property back to the community (E/A&H, 1996). With the scheduled closure of the base, operations were scaled back and environmental cleanup proceeded to make the property available for redevelopment after closure. As part of the environmental cleanup process, the USTs at Building 657 were removed.

Between October 12 and November 8, 1996, the USTs were removed, drained, cut open at both ends, and cleaned with a steam cleaner. The tanks were then cut up and recycled as scrap metal. At the time of removal UST 657-1 was reported to be in very good condition without corrosion, pitting, or visible holes. UST 657-2 was also in sound condition. It contained mild corrosion and pitting, but did not contain visible holes. The copper and steel piping for the USTs were removed at the same time as the tank. The piping was described as having corrosion and mild pitting, but visible holes were not observed (SPORTENDETCHASN, 1996).

During the removal of USTs 657-1 and 657-2, groundwater was reported present in both excavations and "petroleum stained" or "contaminated soils" were identified in the UST 657-2 excavation, excavated soil pile, and vent pipe trench. Petroleum impacted soil from the UST 657-2 location was transferred to Building 1601 for remediation via Detachment Charleston's Bioremediation Pilot Project. After the UST was removed, angular rock was used to fill the excavation above the groundwater and Geofabric was laid over the rock. The remaining excavation for UST 657-1 was filled with the previously excavated soil from that location, whereas, UST 657-2 was filled with soil from an off-site location. Soil and groundwater samples were collected as part of the UST closure operations (SPORTENDETCHASN, 1996). The analytical results and the UST Assessment Report are included as Appendix A.

1.3 RECEPTOR SURVEY RESULTS

A survey of the site vicinity was conducted by TtNUS personnel to identify potential receptors for petroleum hydrocarbon contamination. The site plan (Figure 2) depicts the public utilities located within 250 feet of the former UST locations. Specific information concerning the depth of utilities below land surface (bls) is currently unavailable. However, according to facility personnel typically utility lines are located approximately 2 to 6 feet bls (SPORTENVDETCHASN, 1999). The following utility receptors were located:

- Water utility, sanitary sewer utility: Both fresh water and sanitary sewer lines originate at the north side of Building 657 and connect to lines located along the southern edge of Bordelon Avenue. The fresh water line along Bordelon Avenue connects to lines along the eastern edge of Strong and Proteus Streets, whereas the sanitary sewer line connects to a line on the eastern edge of Proteus Street. The nearest downgradient line is the water line located adjacent to the former UST excavation areas.

- Natural gas utility: A natural gas line extends along the entire northern edge of Bordelon Avenue. The line is situated approximately 70 feet north of the former UST locations in an upgradient direction.

- Storm sewer utility: storm sewer Utility lines extend along the western edge of Proteus Street east of Building 657 and in the parking area west and southwest of Building 657. A storm sewer line originates at Building 657 on the north side of the building and flows north to connect with the line on Proteus Street. The nearest storm sewer line to former UST location 657-2 is the line from Building 657, which is approximately 50 feet east of the former UST location in a cross-gradient direction.

- Electrical utility lines in the site are overhead and are located along the southern edge of Bordelon Avenue and the western edge of Proteus Street.

Potable wells and irrigation wells, which utilize the shallow aquifer, were not identified within 1,000 feet of the site (E/A&H, 1996). Numerous monitoring wells are located within 1,000 feet of the site (E/A&H, 1996). Building basements are not present on CNC. The nearest surface water body to the site is Shipyard Creek located approximately 1,300 feet south-southwest (downgradient) from the site.

There are no city, county or state zoning ordinances as the property (CNC) is currently owned by the federal government. Information concerning zoning ordinances can be obtained from the SOUTHDIV Remedial Project Manager located at 2155 Eagle Drive, North Charleston, South Carolina (telephone number 843/820-7307).

1.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

CNC is located in Charleston County, South Carolina, in the Lower South Carolina Coastal Plan Physiographic Province on the Cooper River side of the Charleston Peninsula. The peninsula is formed by the confluence of the Cooper and Ashley Rivers. Topography in the area is typical of the South Carolina lower coastal plain and is characterized by having low-relief plains broken by the meandering streams and rivers, flowing toward the coast past occasional marine terrace escarpments (E/A&H, 1996).

The geology of the Charleston area is typical of the southern Atlantic Coastal Plain. Cretaceous-age and younger sediments thicken seaward and are underlain by older igneous and metamorphic basement rock. Surface exposures consist of recent or Pleistocene sands, silts, and clays of high organic content referred to as the Wando Formation (E/A&H, 1996). Underlying the Wando Formation, increasing with age, are the Oligocene-age Cooper Group and the Eocene–age Santee Limestone. The Cooper Group is comprised of the Parkers Ferry, Ashley, and Harleyville Formations. The formation of particular importance in the Cooper Group is the Ashley Formation, which was formerly referred to as the Cooper Marl in most regional geologic literature. In more recent geologic nomenclature, the name "Cooper" has been given to a group of formations which includes the Ashley Formation, a pale-green to olive-brown, sandy phosphoric limestone or marl, which is locally muddy and/or sandy. The Ashley Formation in the Vicinity of Charleston is encountered at a depth of approximately 30 to 70 feet bls. The top of the Ashley Formation has been reported to be associated with an erosional basin and the entire Cooper Unit, including the Ashley Formation, is indicated to be approximately 300 feet thick (E/A&H, 1996).

Groundwater occurs under water table or poorly confined conditions within the recent or Pliestocene deposits overlying the Ashley Formation of the Cooper Group. Transitivity in the Pleistocene aquifer is

generally less than 1,000 feet per day and well yields are variable, ranging from 0 to 200 gallons per minute (gpm). This groundwater contains high concentrations of iron and is commonly acidic at shallow depths (E/A&H, 1996).

The Cooper Group is hydrogeologically significant mainly because of its low permeability. In most locales, its sandy, finely granular limestone produces little or no water, but instead acts as confining material causing artesian conditions in the underlying Santee Limestone. Yields from wells in the Santee are usually less than 300 gpm (E/A&H, 1996).

2.0 ASSESSMENT INFORMATION

2.1 SITE-SPECIFIC GEOLOGY AND HYDROGEOLOGY

2.1.1 Site Geology

Nine direct push soil borings were advanced at Site 10 under the supervision of a TtNUS geologist between January 22, 1999, and January 23, 1999 (Figure 3). Lithologic descriptions from each soil boring were recorded to a maximum depth of 4 feet bls. Lithologic descriptions were recorded in soil boring CNC10-B02 to a depth of 13 feet bls because this soil boring was completed as a permanent piezometer (the piezometer was installed to a depth of 12 feet bls). Lithologic descriptions of the soil borings are presented in Appendix B.

Based on lithologic descriptions from the above soil borings and piezometers, the on-site subsurface soils consist of dark gray, interbedded sandy clay and silty sand units. Marine deposits were also described accompanied by significant portions of marine shells. Figures 4 and 5 present geologic cross sections of the deposits within the depth of investigation at the site. Figure 3 presents a plan view of the cross-section area.

2.1.2 Site Hydrogeology

Four piezometers were installed on-site at the locations shown on Figure 3. Three of the piezometers (CNC10-P01, CNC10-P02, and CNC10-P03) were installed as temporary piezometers in the area surrounding former UST 657-2. The temporary piezometers were installed screened to bracket water table and surveyed to a local reference point. A single permanent piezometer, CNC10-P04, was installed south of USTs 657-1 and 657-2 and north of Building 657. The permanent piezometer was installed to a depth of 12 feet bls and was surveyed relative to mean sea level by a licensed professional surveyor. The permanent piezometer was screened from 2 to 12 feet bls and constructed of Schedule 80 polyvinyl chloride (PVC) screen and casing. A lithologic description and construction log for the permanent piezometer is presented in Appendix B.

In the site area, groundwater generally occurs under unconfined conditions at depths of 1 to 4 feet bls. Groundwater elevation measurements were recorded on February 3, 4, and 5, 1999. The recorded water-level data are presented in Table 1. Figures 6, 7, and 8 present the groundwater potentiometric surface recorded during the field events on February 3, 4, and 5, 1999, respectively.

Although only the permanent piezometer was surveyed by a licensed surveyor, the additional three temporary piezometers were referenced to that survey based on a relative survey (including the permanent monitoring well CNC10-P04) previously completed. Therefore, groundwater elevation measurements for each of the monitoring wells are provided in the table and figures relative to mean sea level. The groundwater potentiometric surface for the February 4, 1999, measuring event was dissimilar from the other two events and is believed to represent measurement error. Based on the potentiometric map, it appears groundwater flow is toward the west-southwest. As part of the Final RCRA Facility Investigation Report for Zone H (E/A&H, 1996), a tidal influence investigation was conducted. The objective of the investigation was to provide long-term water level monitoring to determine the effects of the tidal fluctuation on wells and groundwater flow throughout Zone H.

Results of the tidal survey identified the maximum fluctuation in shallow monitoring wells to be 1.12 feet, with monitoring wells located closer to the tidal source being more influenced by tidal changes than wells on the peninsula. The heterogeneity of the aquifer material may limit or accentuate the tidal response in some wells. Tidal influence from Shipyard Creek appears to be greater than that of the Cooper River (possibly because of the quay wall along the river). It was reported that the minimal fluctuations in the groundwater levels are not expected to play a significant role in directing contaminant transport in any direction other than that determined by the natural groundwater gradient (E/A&H, 1996).

2.2 ASSESSMENT RESULTS

Nine soil borings were completed as part of the screening portion of the soil investigation at Site 10. The soil borings for screening evaluation were completed using a Direct Push Technology (DPT) rig and samples were collected to evaluate subsurface soil vapors, soil contaminant concentrations (via a mobile laboratory), and groundwater contaminant concentrations (via a mobile laboratory). The soil and groundwater samples were collected from maximum depths of 4 and 8 feet bls, respectively, and were analyzed for benzene, toluene, ethyl benzene, and total xylenes (BTEX), and diesel range organics.

The soil samples analyzed for Chemicals of Concern (CoCs) at an off-site laboratory were collected from a maximum depth of 4 feet bls. Soil samples collected for fixed base laboratory analysis were analyzed for BTEX, and naphthalene using U.S. Environmental Protection Agency (EPA) Method 8260; and polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8270. One sample was collected for total organic carbon (TOC) analysis using EPA Method 415.1, total recoverable petroleum hydrocarbons (TRPH) using EPA method 9071, and grain-size analysis using sieve and hydrometer methods. The sample collection was conducted in accordance with the SCDHEC guidance document "Standard Limited

Assessment" (June 1997). The soil boring locations are shown on Figure 3 and the assessment results are presented in Section 2.4.1.

The groundwater assessment for CoCs included a single groundwater sample collected from piezometer CNC10-P04 on March 18, 1999. Groundwater sampling was conducted using a peristaltic pump and low flow, quiescent techniques. The monitoring well was sampled in accordance with SCDHEC's guidance document "South Carolina Risk-Based Corrective Action for Petroleum Releases" (January 1998). The well was purged of four well volumes and until water quality parameters of pH, temperature, and conductivity stabilized. The field data sheets are included in Appendix C. A summary of the field parameter measurements is presented in Table 2. Groundwater samples were analyzed for BTEX, methyl tert-butylether (MTBE), and naphthalene using EPA Method 8260 and PAHs using EPA Method 8270.

2.3 FIELD SCREENING ASSESSMENT

2.3.1 Soil Vapor Assessment

Each of the nine soil borings completed was evaluated for soil vapors as part of the soil screening assessment at Site 10. Organic Vapor Analyzer (OVA) headspace measurements were recorded at 1-foot intervals to the top of the water table. All of the soil borings except CNC10-B08 encountered the water table at 4 feet bls. The water table was encountered at 3 feet bls in soil boring CNC10-B08. Table 3 summarizes the soil vapor screening results. Figure 3 presents the soil boring locations.

Soil vapor concentrations ranged from not detected to 600 parts per million (ppm). However, only three of the samples (recovered from two soil borings) were reported to contain soil vapor concentrations exceeding 40 ppm. The three samples and their corresponding soil vapor concentration are as follows: CNC10-B03 02 - 90 ppm, CNC10-B03 03 – 600 ppm, and CNC10-09 03 – 80 ppm. The soil vapor concentrations generally increased with depth in each individual soil boring with the highest concentration reported at the water table. This is generally indicative of soil vapor concentrations resulting from contaminated groundwater as opposed to a contaminated soil source area.

The soil vapor assessment was used as a screening method to assist in identifying locations for collection of soil samples and groundwater monitoring wells. Soil sample and monitoring well locations were determined, in part, based on these data.

2.3.2 Soil Mobile Lab Results

One soil sample collected from each soil boring was analyzed in a mobile laboratory for BTEX and diesel range organics using EPA Method 8260. The soil samples were selected based on the soil vapor screening results with the additional criterion that the samples originate in the vadose zone above the water table. Table 4 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 4, total xylenes and diesel range were the only analytes detected above method detection limits. Total xylenes was detected at concentrations ranging from 3.6 to 3.9 parts per billion (ppb) and diesel range organics was detected at a concentration of 240,000 ppb. The concentration of diesel range organics detected in soil boring CNC10-B02 did not collaborate with the results of the soil vapor screening investigation, which indicated elevated soil vapors in soil borings CNC10-B03 and CNC10-B09, but not soil boring CNC10-B02.

The mobile laboratory soil analysis was used as a screening method to assist in identifying locations for collection of soil samples for fixed base laboratory analysis and locations for groundwater monitoring wells. Soil sample locations were determined in part based on these data.

2.3.3. Groundwater Mobile Lab Results

One groundwater sample collected from each soil boring was analyzed in a mobile laboratory BTEX and diesel range organics using EPA Method 8260. The groundwater screening samples were typically collected across the water table at depths ranging from 3 to 8 feet bls. Table 5 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 5, none of the compounds analyzed for were detected above instrument detection limits.

2.4 CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER

2.4.1 Chemicals of Concern in Soil

Four subsurface soil samples (plus one duplicate sample) were collected from the Site 10 area for determination of CoCs. The soil boring locations are shown on Figure 3, and Table 6 summarizes the

CoCs detected in the soil samples. As indicated on Table 6 only one of the soil samples, the sample from soil boring CNC10-B02, was reported to contain CoCs at concentrations above method detection limits. Sample CNC10-B0203 contained benzo(a)anthracene, benzo(b)anthracene, benzo(k)anthracene, and chrysene at concentrations below the SCDHEC Risk Based Screening Levels (RBSLs). Figure 9 shows the CoC concentrations detected in subsurface soil samples.

2.4.2 Chemicals of Concern in Groundwater

The groundwater assessment for CoCs included collection of a groundwater sample from piezometer CNC10-P04 on March 18, 1999. Table 7 presents the analytical results for CoCs detected in the groundwater sample. As indicated on the table, none of the groundwater CoCs were detected above method detection limits in the sample. A groundwater analytical data sheet for piezometer CNC10-P04 is presented in Appendix D.

2.5 ANALYTICAL DATA

Historical soil analytical data from the November 1996 UST removal are presented in Appendix A. All soil analytical data from this site assessment are summarized in Table 6 and included in Appendix D. Current groundwater analytical data are summarized in Table 7 and included in Appendix D.

2.6 AQUIFER CHARACTERISTICS AND EVALUATION

Groundwater levels were measured on March 3, 4, and 5, 1999. Water level contours plotted on Figure 6 indicate that the groundwater flows to the west-southwest, with a hydraulic gradient ranging from 0.0015 to 0.002 feet per foot between monitoring wells CNC10-P02 and CNC10-P01.

As part of the Final RFI Report for Zone H, rising and falling head slug tests were conducted on 19 shallow monitoring wells throughout Zone H to determine the hydraulic conductivity of the surficial aquifer (E/A&H, 1996). Slug tests were conducted by instantaneously removing (rising head) or adding (falling head) a volume (slug) of water from the well and measuring the recovering water level with a data logger. The data were then used to calculate the hydraulic conductivity for the rising head test and the hydraulic conductivity for the falling head test. The average hydraulic conductivity for each well was determined by calculating the geometric mean of the rising and falling head values. Because hydraulic conductivity data are lognormally distributed, the geometric mean was determined to be the most representative measure of central tendency.

The well construction details and boring logs for each well tested during the RCRA investigation were reviewed to determine which wells were most representative of the conditions present at Site 10. To make this determination the screened interval, lithology, and proximity to the site were evaluated. Based on this evaluation, monitoring well NBCH-656-001 was selected as the most representative well. NBCH-656-001 is located approximately 200 feet north of Site 10 and is completed to a depth of approximately 13.5 feet with a 10-foot screened interval. The boring log indicates that the lithology consists of alternating sand, sandy clay, and clayey sand, similar to the lithology observed in other monitoring wells at Site 10. The geometric mean of the rising and falling head conductivity measurements for NBCH-656-001 was 0.435 feet per day.

Potential movement of groundwater at the site may be described in terms of transportation by natural flow system in the saturated zone, assuming groundwater flow follows Darcy's Law. Darcy's Law may be expressed as:

$$V = \left(\frac{K}{n}\right) x\, i$$

where:

v	=	average velocity
k	=	hydraulic conductivity = 0.435 ft/day
n	=	effective porosity = 0.44 (from sieve results of 61.7% sand & 25.5% clay and Figure C1 in SCDHEC, 1998)
i	=	average hydraulic gradient = 0.00175 ft/ft

therefore:

$$V = \left(\frac{0.435\ \text{ft/day}}{0.44}\right) x\, 0.00175\ \text{ft/ft}$$

$$V = 0.00173\ \text{ft/day}$$

In summary, the seepage velocity of the surficial aquifer was calculated to be approximately 1.4 feet per year based on a hydraulic conductivity of 0.435 feet per day, a hydraulic gradient of 0.0038 feet per foot, and a porosity of 42% for clayey sand and sandy clay. Aquifer characterization graphs are provided in Appendix E.

2.7 FATE AND TRANSPORT MODEL DESCRIPTION

No soil or groundwater concentrations exceeded the SCDHEC RBSLs; therefore, evaluation of the site will stop at Tier 1. Fate and transport modeling is not required for a Tier 1 evaluation.

2.8 PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN

Since fate and transport modeling was not performed, prediction and attenuation of CoCs were not evaluated.

3.0 TIER 1 EVALUATION

3.1 COMPARISON OF ANALYTICAL RESULTS WITH RBSLs

Soil samples were collected on January 20, 1999. The samples were analyzed for BTEX and PAH. Four PAH compounds [benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)anthracene, and chyrsene] were detected in the subsurface soil at the site. However, no analyte concentration exceeded its RBSL for sandy soil less than 5 feet above groundwater.

Groundwater sampling was conducted on March 5, 1999. The samples were analyzed for BTEX, MTBE, and PAH. No analytes were detected above the instrument detection limit. A comparison of soil and groundwater concentrations to RBSLs is summarized in Table 8.

3.2 SITE CONCEPTUAL EXPOSURE MODEL

This section focuses on the current and future land use issues concerning the site. Figure 1 shows that the site is surrounded by the City of North Charleston and therefore is in an urban setting. The site is a former post office for CNC. The facility is included in the BRAC activities; therefore, the future use of the facility is unknown.

The City of North Charleston provides drinking water for CNC. A water well survey conducted as part of the UST Closure in 1996 did not reveal the presence of any water supply wells within 1,000 feet of the site.

The nearest surface water to Building 657 is the backwater of Shipyard Creek located approximately 1,300 feet south-southwest of the site. Groundwater at the site flows to the south-southeast, toward the creek.

3.3 EXPOSURE PATHWAY ANALYSIS

This section presents the receptor characterizations of the potentially exposed populations in the vicinity of the site and identifies the potentially complete exposure pathways for those receptors. SCDHEC requires that only those exposure pathways with CoC concentrations exceeding Tier 1 RBSL concentrations are examined in a Tier 2 Risk-Based Corrective Action Report. Since there were no CoC concentrations exceeding the RBSLs, an exposure pathway analysis is not required.

3.4 IDENTIFICATION OF DATA REQUIREMENTS

No additional data are required.

3.5 SITE-SPECIFIC TARGET LEVELS

Site-specific target levels (SSTLs) were not required because soil and groundwater concentrations did not exceed RBSLs.

3.6 RECOMMENDATIONS

Concentrations of detected CoCs were below their respective RBSLs for soil and groundwater; therefore, no further action is recommended for this site.

4.0 REFERENCES

E/A&H (Ensafe/Allen & Hoshall, Inc.), 1996. Final RCRA Facility Investigation for Zone H, Naval Base Charleston, Charleston, South Carolina, July 5, 1996.

SCDHEC (South Carolina Department of Health and Environmental Control), 1997. South Carolina Standard Limited Assessment, June 1997.

SCDHEC (South Carolina Department of Health and Environmental Control), 1998. South Carolina Risk Based Corrective Action for Petroleum Releases, January 1998.

SPORTENDETCHASN (Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston), 1996. Underground Storage Tank (UST) Assessment Report for USTs 657-1 and 657-2, Charleston Naval Base Complex, North Charleston, South Carolina, November 8, 1996.

SPORTENDETCHASN (Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston), 1999. Personal Contact between Paul Calligan, TtNUS and Copes Wannamaker, SPORTENDCHASN, June 17, 1999.

TABLE 1

GROUNDWATER ELEVATIONS
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
SOUTH CHARLESTON, SOUTH CAROLINA

Well #	Total Depth of Well (ft)	Top of Casing Elevation (local relative[1])	Top of Casing Elevation (MSL[2])	Date Measured	Depth to Water (BTOC)	Groundwater Elevation (MSL)
CNC10-P01	4	99.45	10.68	2/3/99	3.00	7.68
				2/4/99	3.08	7.60
				2/5/99	3.34	7.34
CNC10-P02	4	99.99	11.22	2/3/99	3.50	7.72
				2/4/99	3.60	7.62
				2/5/99	3.85	7.37
CNC10-P03	4	100.00	11.23	2/3/99	3.51	7.72
				2/4/99	3.59	7.64
				2/5/99	3.87	7.36
CNC10-P04	12	98.03	9.26	2/3/99	1.58	7.68
				2/4/99	1.64	7.62
				2/5/99	1.92	7.34

Notes:
BTOC - Below Top of Casing
MSL - Mean Sea Level
(1) Local reference point is 100 ft elevation for top of casing on piezometer CNC10-P03.
(2) Licensed surveyor elevation referenced to mean sea level. Only CNC10-P04 was surveyed; all other piezometers calculated to this point.

TABLE 2

GROUNDWATER FIELD MEASUREMENTS
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well I.D.	Date Sampled	Purge Method	Volume (gallons)	Temp (°C)	Ph	Conductivity (uMHOS/cm)	Turbidity (NTU)	DO (mg/l)
CNC10-P04	3/18/99	PP	4.0	16.7	7.09	2.89	2	0.13

Notes:
(°C) Degrees Celsius
PP - Peristaltic Pump, low flow technique
uMHOS/cm - Micro HOS per centimeter
NTU - Nephelometric turbidity units.

TABLE 3

SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (PPM)
CNC10-B01	10SSB0101	1 - 2	ND
	10SSB0102	2 - 3	26
	10SSB0103	3 - 4	NA
CNC10-B02	10SSB0201	1 - 2	ND
	10SSB0202	2 - 3	23
	10SSB0203	3 - 4	40
CNC10-B03	10SSB0301	1 - 2	20
	10SSB0302	2 - 3	90
	10SSB0303	3 - 4	600
CNC10-B04.	10SSB0401	1 - 2	10
	10SSB0402	2 - 3	20
	10SSB0403	3 - 4	8
CNC10-B05	10SSB0501	1 - 2	4
	10SSB0502	2 - 3	18
	10SSB0503	3 - 4	15
CNC10-B06	10SSB0601	1 - 2	ND
	10SSB0602	2 - 3	ND
	10SSB0603	3 - 4	ND
CNC10-B07	10SSB0701	1 - 2	ND
	10SSB0702	2 - 3	2
	10SSB0703	3 - 4	22
CNC10-B08	10SSB0801	1 - 2	ND
	10SSB0802	2 - 3	30
CNC10-B09	10SSB0901	1 - 2	ND
	10SSB0902	2 - 3	22
	10SSB0903	3 - 4	80

Notes:
OVA - organic vapor analyzer equipped with a flame ionization detector
PPM – parts per million
NA – not available, refusal due to gravel
ND – not detected

TABLE 4

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOILS
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Sample Depth (feet)	Mobile Laboratory Screening Data (PPB)[1]				
			Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel Range Organics
CNC10-B01	10SFB0103	2 - 3	<1.0	<1.0	<1.0	<1.0	<50,000
CNC10-B02	10SFB0203	2 - 3	<1.0	<1.0	<1.0	3.9	240,000
CNC10-B03	10SFB0304	3 - 4	<1.0	<1.0	<1.0	3.6	<50,000
CNC10-B04	10SFB0403	2 - 3	<1.0	<1.0	<1.0	<1.0	<50,000
CNC10-B05	10SFB0503	2 - 3	<1.0	<1.0	<1.0	<1.0	<50,000
CNC10-B06	10SFB0604	3 - 4	<1.0	<1.0	<1.0	<1.0	<50,000
CNC10-B07	10SFB0704	2 - 3	<1.0	<1.0	<1.0	<1.0	<50,000
CNC10-B08	10SFB0803	2 - 3	<1.0	<1.0	<1.0	<1.0	<50,000
CNC10-B09	10SFB0904	3 - 4	<1.0	<1.0	<1.0	<1.0	<50,000

NOTES:
[1] Laboratory screening data were analyzed using EPA Method 8260. Compounds not detected are reported as less than the instrument detection limit.
PPB - parts per billion

TABLE 5

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR GROUNDWATER
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Mobile Laboratory Screening Data (PPB)[1]				
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel Range Organics
CNC10-B01	10GFB01	<1.0	<1.0	<1.0	<1.0	<10,000
CNC10-B02	10GFB02	<1.0	<1.0	<1.0	<1.0	<10,000
CNC10-B03 Piezometer No. CNC10-P01	CNC10GFP0101	<1.0	<1.0	<1.0	<1.0	<10,000
CNC10-B04 Piezometer No. CNC10-P03	CNC10GFP0301	<1.0	<1.0	<1.0	<1.0	<10,000
CNC10-B05 Piezometer No. CNC10-P02	CNC10GFP0201	<1.0	<1.0	<1.0	<1.0	<10,000
CNC10-B06	10GFB06	<1.0	<1.0	<1.0	<1.0	<10,000
CNC10-B08	10GFB08	<1.0	<1.0	<1.0	<1.0	<10,000
CNC10-B09	10GFB09	<1.0	<1.0	<1.0	<1.0	<10,000

NOTES:
[1] Laboratory screening data was analyzed using USEPA Method 8260. Compounds not detected are reported as less than the instrument detection limit.
PPB - parts per billion

TABLE 6

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS CHEMICALS OF CONCERN IN SOIL
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Soil Boring / Sample No.	Sample Date	Benzene	Ethyl-benzene	Naphthalene	Toluene	Xylenes (total)	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Dibenzo(a,h) anthracene	Chrysene	Total Organic Carbon*
RBSL[1]		5	1260	210	1622	42471	73084	29097	231109	87866	12998	
CNC10-B02/ 10SLB0203	26-Jan-99	ND	ND	ND	ND	ND	2080	1700 (j)	1450 (j)	ND	1990	NA
CNC10-B02/ 10SLB0203D[2]	26-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC10-B04/ 10SLB0403	26-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	21000
CNC10-B06/ 10SLB0603	26-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC10-B08/ 10SLB0803	26-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
ZHTL0901[3]	26-Jan-99	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA
ZHRL00201[4]	20-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA

All concentrations are in micrograms per kilograms (ug/kg)

ND - Compound not detected

NA - Compound not analyzed.

* Concentration in milligrams per kilograms

SampleS 10SLB0203 and 10SLB0203D were also analyzed for total recoverable petroleum hydrocarbons and contained 211 and 156 milligrams/kilograms, respectively.

(1) South Carolina Department of Health and Environmental Control Risk Based Screening Levels for sandy soils; depth to groundwater less than 5 feet.

(2) Duplicate sample

(3) trip blank sample.

(4) equipment blank sample.

TABLE 7

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Monitoring Well/Sample No.	Sample Date	Benzene	Ethyl-benzene	Toluene	Xylenes (total)	Naphthalene	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	MTBE
RBSL[1]		5	700	1000	10000	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]	40
CHC10-P01 / 10GLP0401	18-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZHTL01901[3]	18-Mar-99	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
ZHRL00601[4]	22-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
All concentrations are in ug/l.
ND - Compound not detected.
NA - Compound not analyzed.
(1) South Carolina Department of Health and Environmental Control Risk Based Screening Levels for clay-rich soils; depth to groundwater less than 5 feet.
(2) The Risk Based Screening Level for individual PAH CoC is 10 ug/l or 25 ug/l for total PAHs.
(3) trip blank sample.
(4) equipment blank sample.

TABLE 8

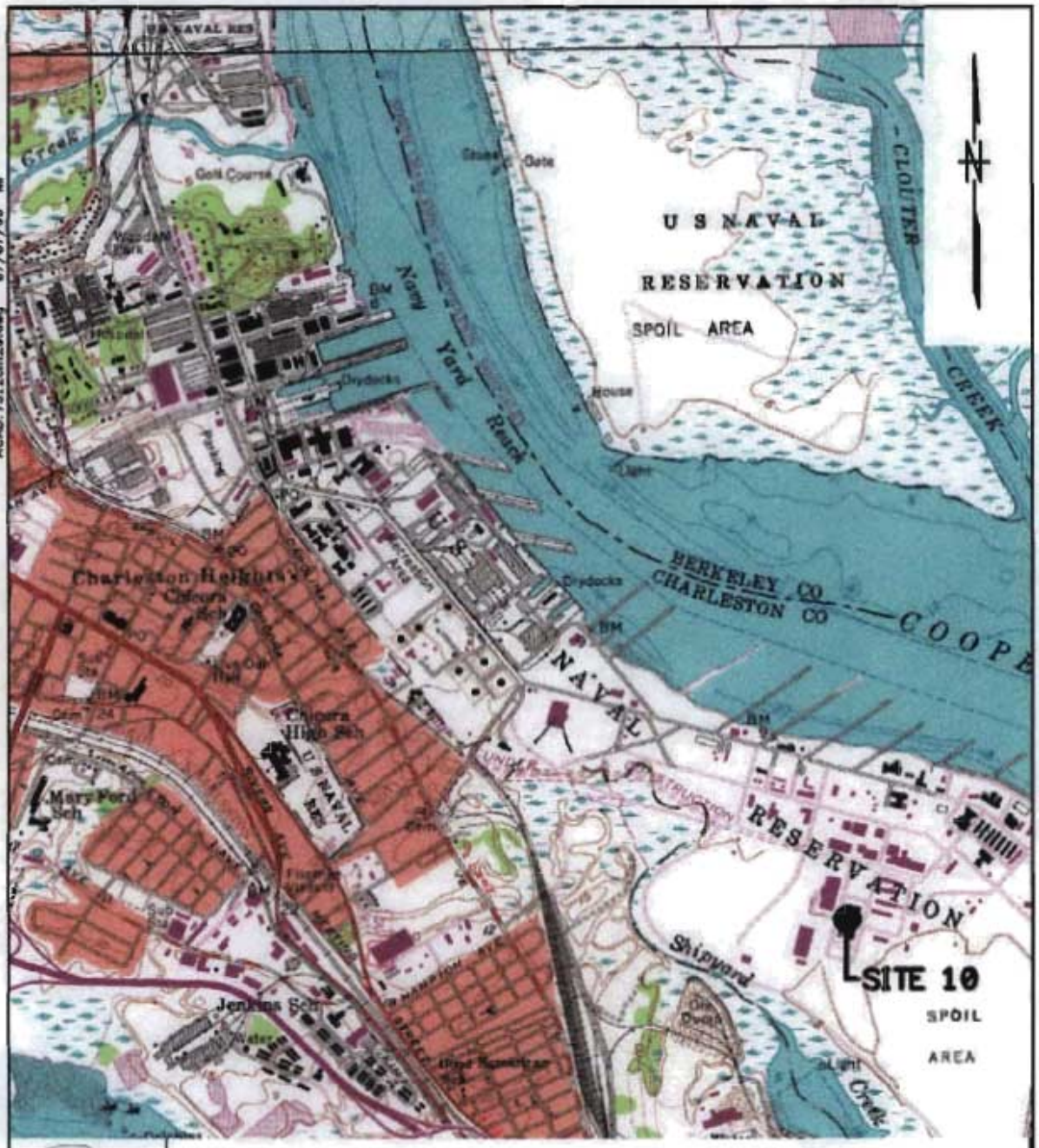
COMPARISON OF MAXIMUM CONCENTRATIONS TO RBSLs
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Concern	Maximum Concentration (Soil) (ug/kg)	RBSLs (Soil) (ug/kg)[1]	Maximum Concentration (GW) (ug/l)	RBSLs Groundwater (ug/l)[2]
Benzene	ND	5	ND	5
Toluene	ND	478	ND	1000
Ethylbenzene	ND	364	ND	700
Xylenes	ND	1119	ND	10000
Naphthalene	NA	52	ND	10
Benzo(a)anthracene	1930	17687	ND	10
Benzo(b)fluoranthene	1700	7042	ND	10
Benzo(k)anthracene	1450	5593	ND	10
Chrysene	1990	3146	ND	10

[1] - From Risk-Based Corrective Action for Petroleum Releases, Table B4, Depth to GW - <5 ft, SCDHEC RBCA Guidelines, 1998.

[2] - From Risk-Based Corrective Action for Petroleum Releases, Table B1, SCDHEC RBCA Guidelines, 1998.

RBSLs - Risk Based Screening Levels



SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1979
QUADRANGLE MAP NORTH CHARLESTON REVISED, 1979

DRAWN BY MF	DATE 7/7/99	SITE LOCATION MAP SITE 10, BUILDING 657 ZONE H, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 7912
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHED-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 0

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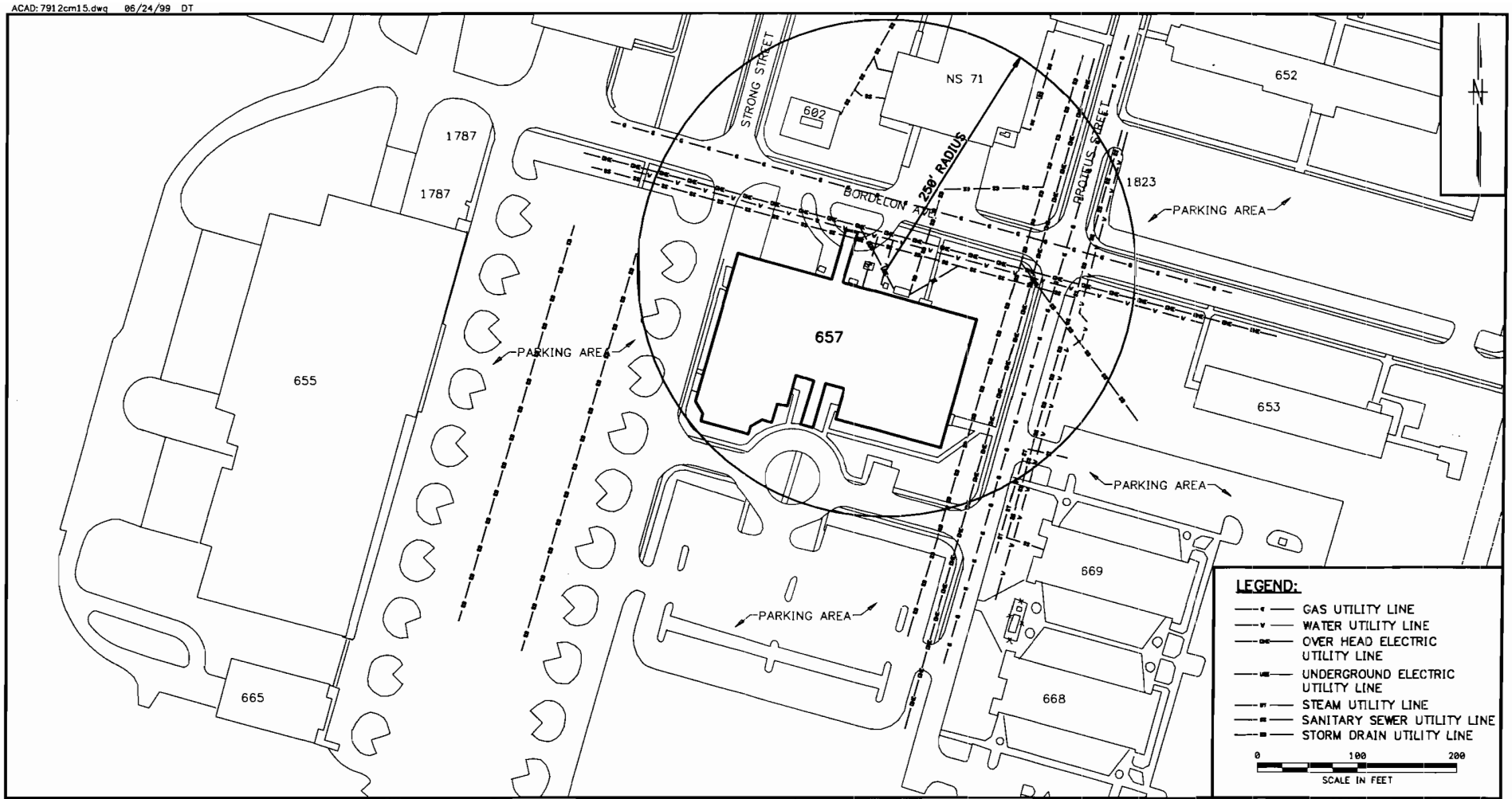

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY KW DATE 5/24/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE VICINITY MAP
SITE 10, BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2
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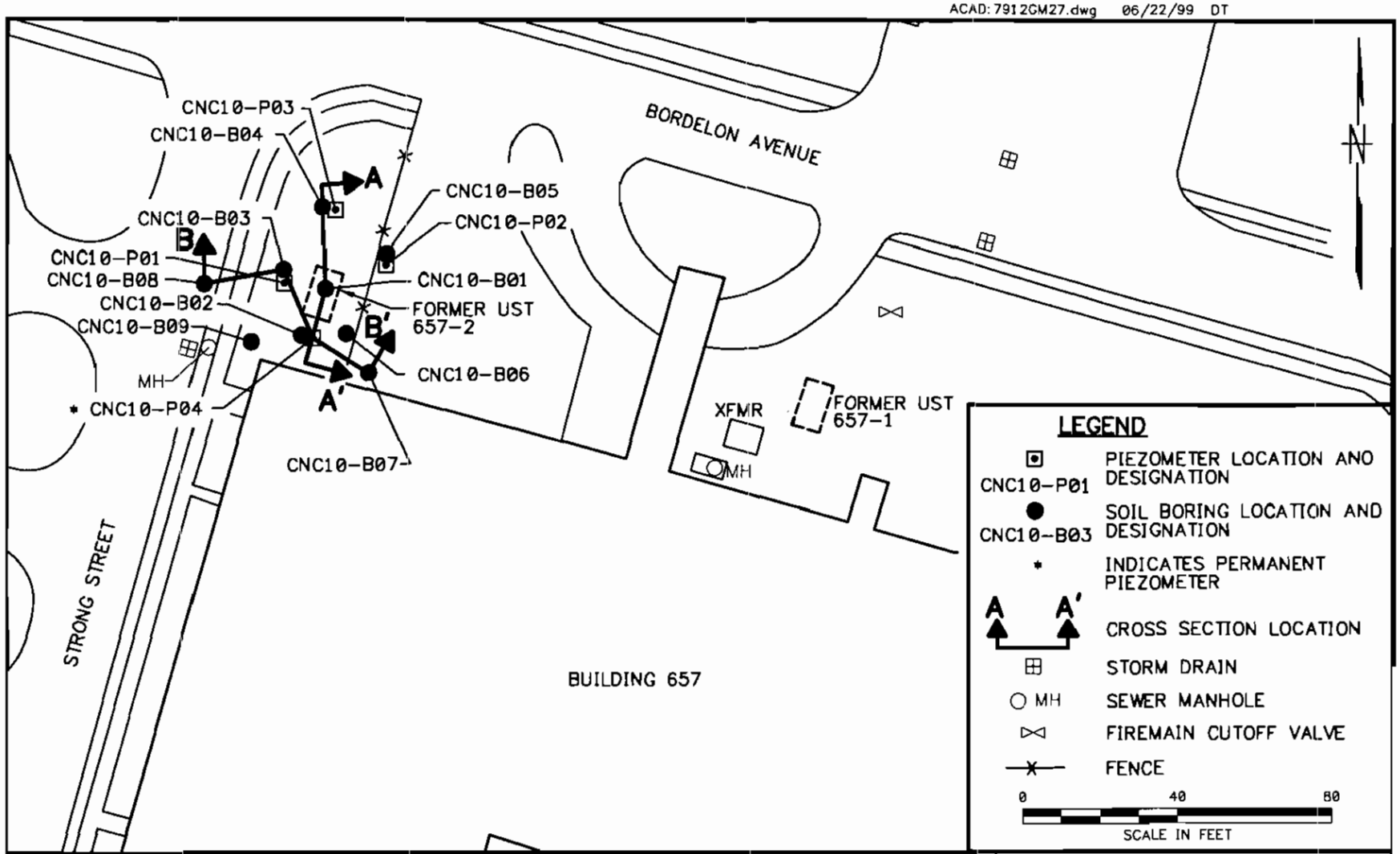

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CHECKED BY DATE		APPROVED BY DATE
COST/SCHED-AREA		APPROVED BY DATE
SCALE AS NOTED		DRAWING NO. FIGURE 3 REV. 0

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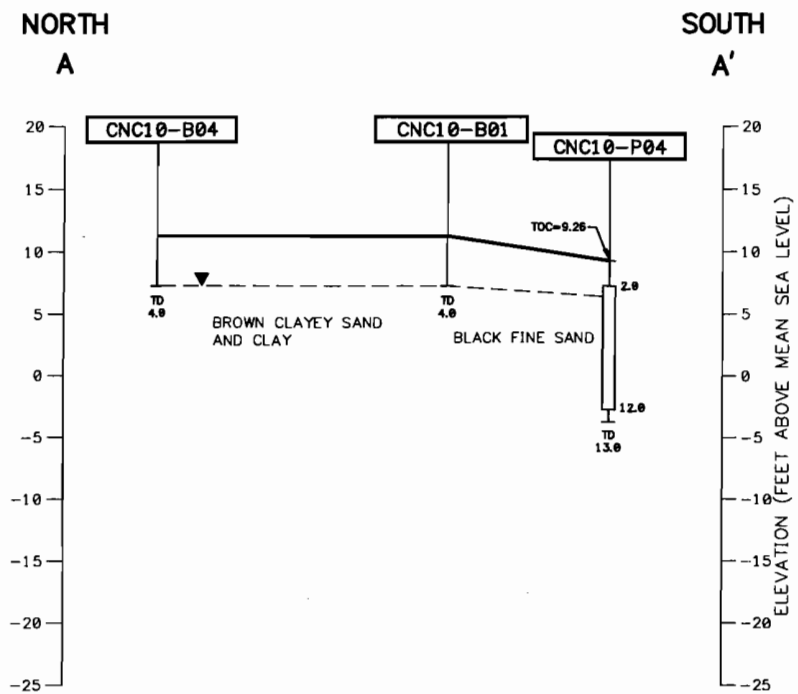
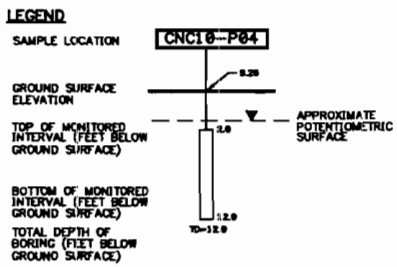
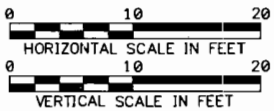




NOTE: ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (FT AMSL)



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MF DATE 6/11/99
CHECKED BY DATE
COST/SCHED--AREA
SCALE AS NOTED

GEOLOGIC CROSS SECTION
A-A'
SITE 10 BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4
REV. 0

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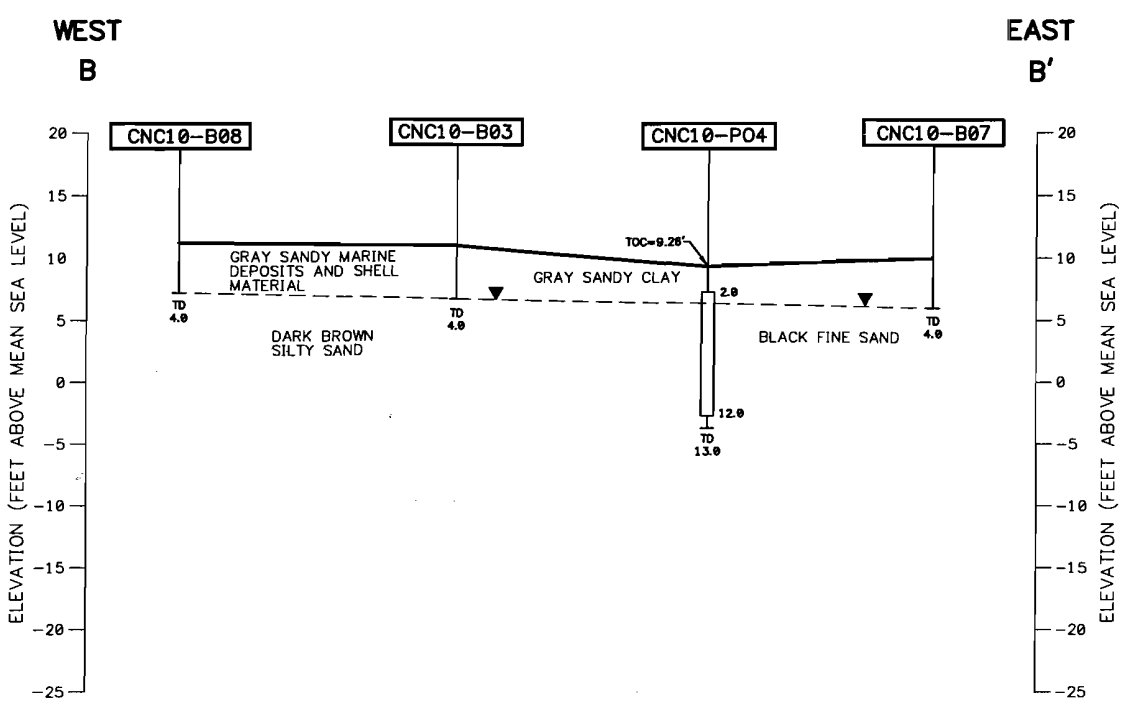

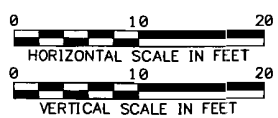

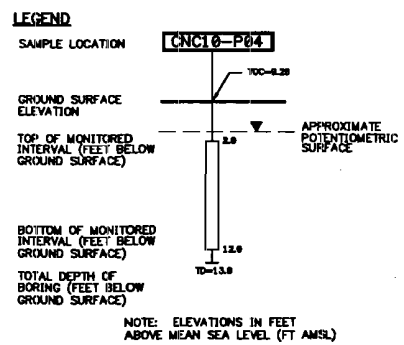

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GEOLOGIC CROSS SECTION
B-B'
SITE 10 BUILDING 657
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 5
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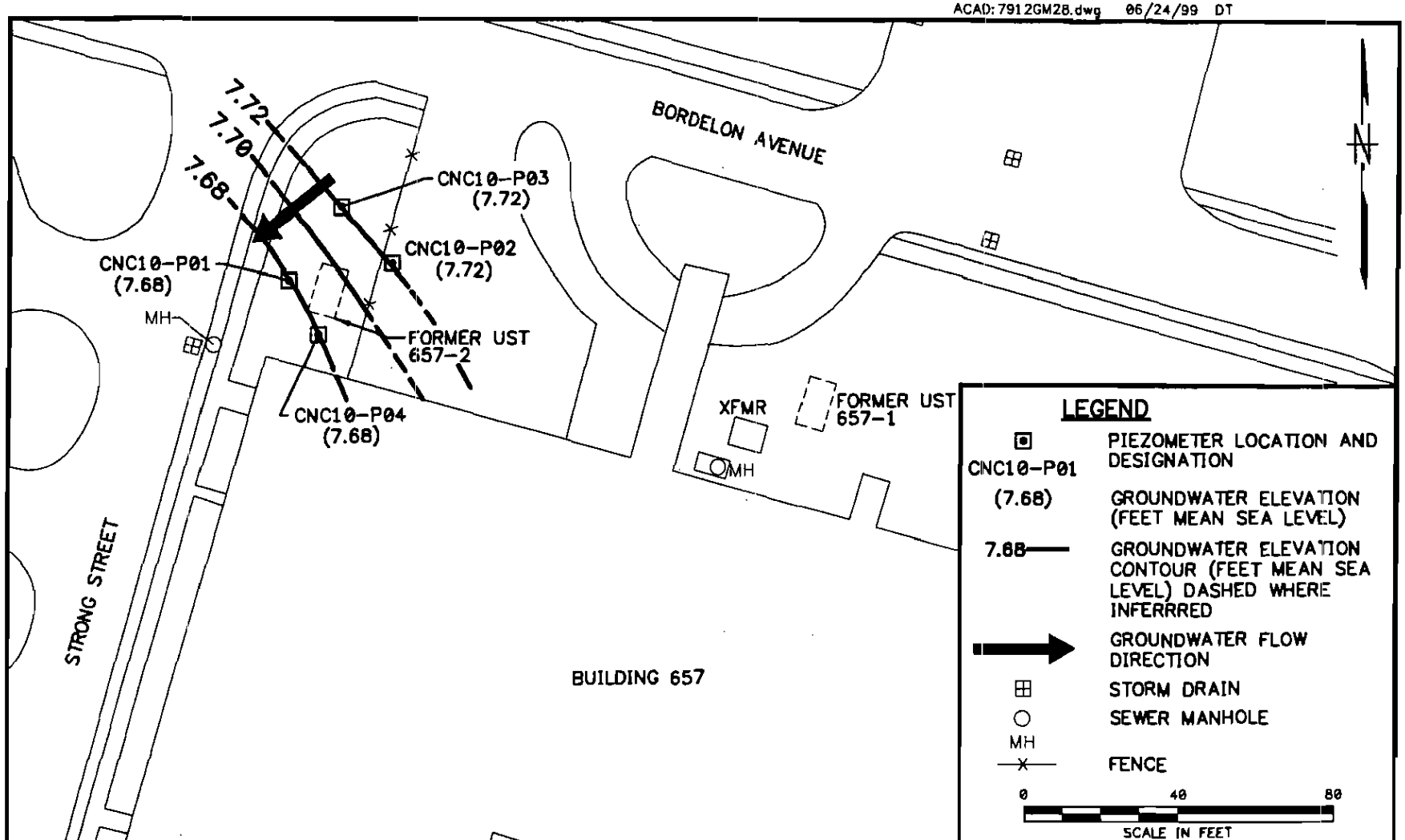

DRAWN BY MF DATE 6/14/99	DEPARTMENT OF THE NAVY SOUTHERN DIV FACILITIES ENGINEERING COMD	GROUNDWATER ELEVATION MAP FEBRUARY 3, 1999 SITE 10, BUILDING 657 ZONE H, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 7912
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 6 REV. 0

FORM CADD NO. SDIV_AH.DWG - REV 0 - 1/20/98

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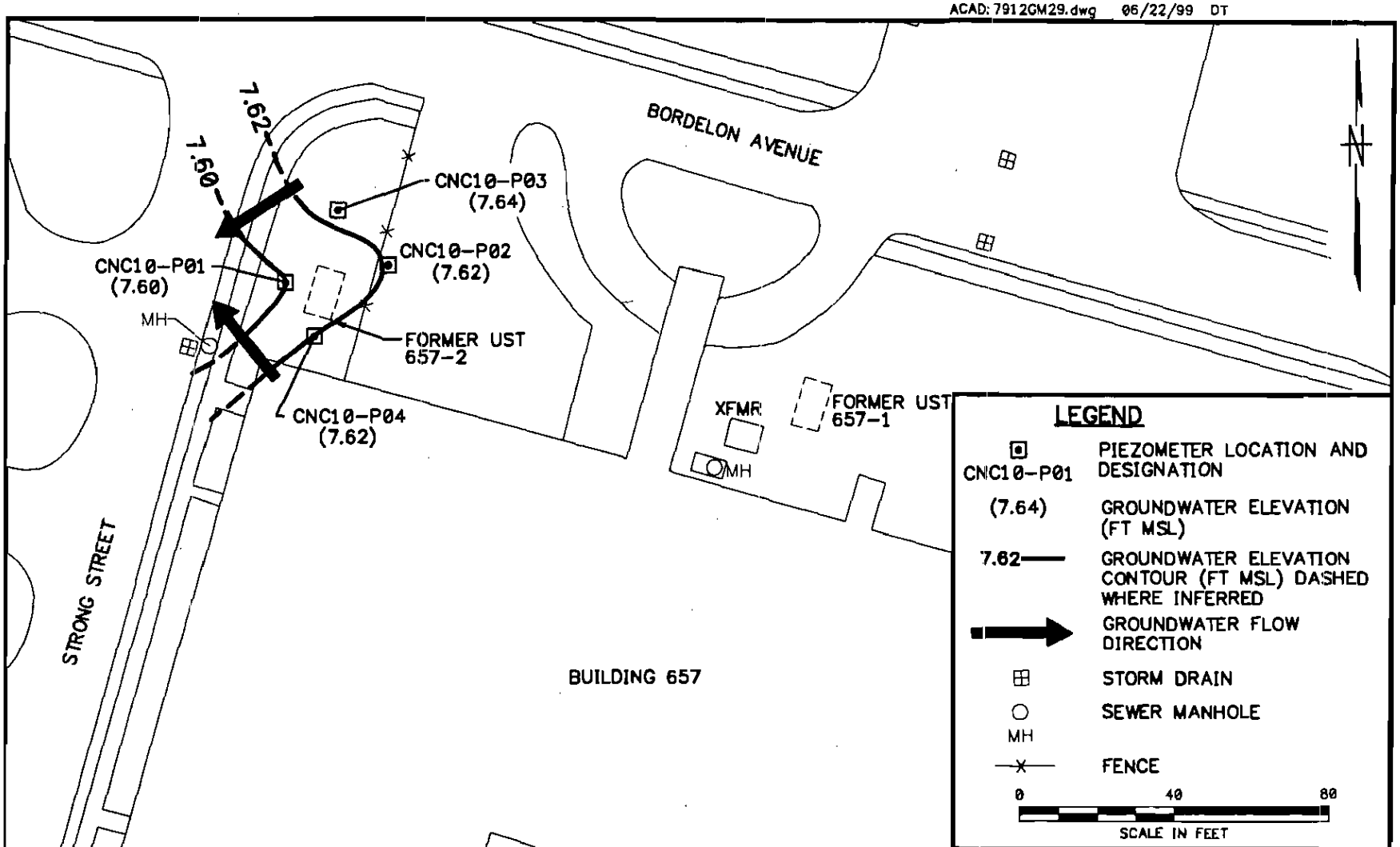

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CHECKED BY DATE		APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 7	REV. 0

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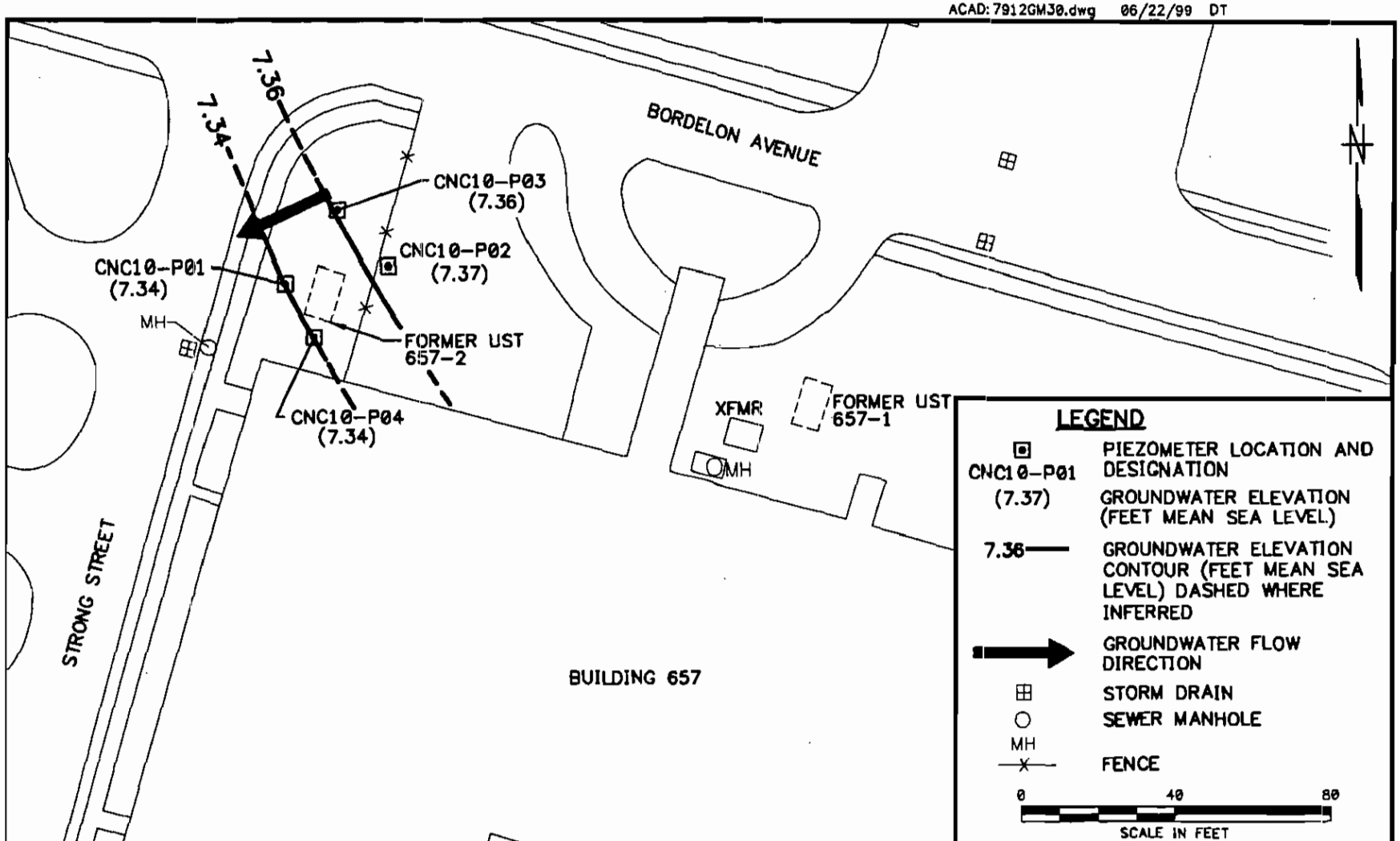

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CHECKED BY DATE		APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 8	REV. 0

FORM CADD NO. SDIV_AH.DWG - REV 0 - 1/20/98

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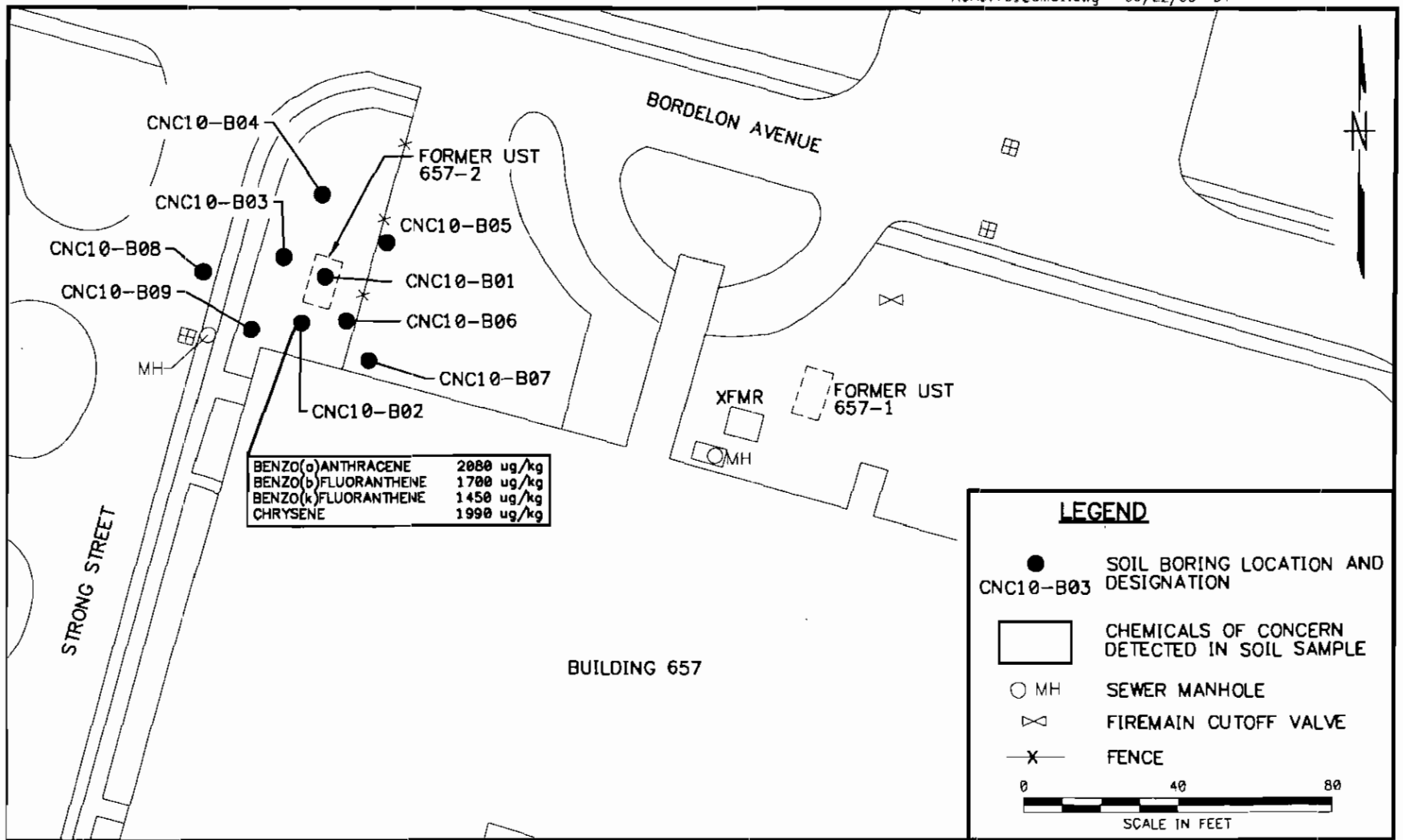


DRAWN BY MF DATE 6/11/99	CONTAMINANTS OF CONCERN IN SOIL SITE 10, BUILDING 657 ZONE H, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 7912
CHECKED BY DATE		APPROVED BY DATE
COST/SCHED-AREA		APPROVED BY DATE
SCALE AS NOTED		DRAWING NO. FIGURE 9 REV. 0

FORM CADD NO. SDIV_AH.DWG - REV 0 - 1/20/98

APPENDIX A

UNDERGROUND STORAGE TANK ASSESSMENT REPORT- UST 657-1 AND 657-2

South Carolina Department of Health and Environmental Control (S.C.D.H.E.C.)
Underground Storage Tank (UST) Assessment Report

Date Received State Use Only

Submit Completed Form to:
UST Regulatory Section
SCDHEC
2600 Bull Street
Columbia, South Carolina 29201
Telephone (803) 734-5331

I OWNERSHIP OF UST(S)

Agency/Owner: Southern Division, Naval Facilities Engineering Command, Caretaker Site Office

Mailing Address: P.O. Box 190010

City: N. Charleston State: SC Zip Code: 29419-9010

Area Code: 803 Telephone Number: 743-9985 Contact Person: LCDR Paul Rose

II SITE IDENTIFICATION AND LOCATION

Site I.D. #: Unregulated

Facility Name: Charleston Naval Base Complex, Building 657

Street Address: Bordelon Avenue

City: North Charleston, 29405-2413 County: Charleston

III CLOSURE INFORMATION

Closure Started: 12 Oct 1996 Closure Completed: 8 Nov 1996

Number of USTs Closed: 2

N/A
Consultant

SPORTENVDETCHASN
UST Removal Contractor

IV. CERTIFICATION (Read and Sign after completing entire submittal)

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

LCDR Paul Rose
Name (Type or Print)

Signature

V. UST INFORMATION

		657-1	657-2	Tank 3	Tank 4	Tank 5	Tank 6
A.	Product	Fuel oil	Fuel oil				
B.	Capacity	5000	2000				
C.	Age	1968	1978				
D.	Construction Material	Steel	Steel				
E.	Month/Year of Last Use	Unk	Unk				
F.	Depth (ft.) To Base of Tank	10'	7'				
G.	Spill Prevention Equipment Y/N	N	N				
H.	Overfill Prevention Equipment Y/N	N	N				
I.	Method of Closure Removed/Filled	R	R				
J.	Visible Corrosion or Pitting Y/N	N	N				
K.	Visible Holes Y/N	N	N				

L. Method of disposal for any USTs removed from the ground (attach disposal manifests)

UST 657-1 & 657-2 were removed, drained, cut open at both ends, and cleaned with a steam cleaner. They were then cut up for recycling as scrap metal. (See Attachment III.)

M. Method of disposal for any liquid petroleum, sludges, or waste waters removed from the USTs (attach disposal manifests)

The residual fuel oil, waste water, and sludge were recycled.

N. If any corrosion, pitting, or holes were observed, describe the location and extent for each UST

UST 657-1 was covered with a protective coating of tar. It was in very good condition and had no corrosion, pitting, or holes. UST 657-2 was also in sound condition. It contained mild corrosion and pitting, but no holes were found.

VI. PIPING INFORMATION

	657-1	657-2	Tank 3	Tank 4	Tank 5	Tank 6
A. Construction Material	copper & steel	copper & steel				
B. Distance from UST to Dispenser	16' See note 1	25' See note 1				
C. Number of Dispensers	1	1				
D. Type of System P/S	S	S				
E. Was Piping Removed from the Ground? Y/N	Y	Y				
F. Visible Corrosion or Pitting Y/N	N	N				
G. Visible Holes Y/N	N	N				
H. Age	1968	1978				

Note 1: The tanks provided fuel oil to Building 657.

I. If any corrosion, pitting, or holes were observed, describe the location and extent for each line.

UST 657-1 and 657-2 piping contained corrosion and mild pitting, but no holes were found.

VII. BRIEF SITE DESCRIPTION AND HISTORY

Building 657 is the former Sports bar/Enlisted men's club located on the Naval Base. There are two UST's at this building and both were used to store heating fuel for operating boilers. UST 657-1 was 5,000 gallons and UST 657-2 was 2,000 gallons.

VIII. SITE CONDITIONS

		Yes	No	Unk
A.	Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells? If yes, indicate depth and location on the site map. **[UST 657-2 excavation, 4' below GSL; UST 657-2 excavated soil and ppg trench for vent piping, 3' below GSL]**	X		
B.	Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells? If yes, indicate location on site map and describe the odor (strong, mild, etc.) **[UST 657-2 vent piping trench, strong]**	X		
C.	Was water present in the UST excavation, soil borings, or trenches? If yes, how far below land surface (indicate location and depth)? Groundwater was found in both UST excavations. See Site Maps for details.	*X		
D.	Did contaminated soils remain stockpiled on site after closure? If yes, indicate the stockpile location on the site map. Name of DHEC representative authorizing soil removal: _____	*X		
E.	Was a petroleum sheen or free product detected on any excavation or boring waters? If yes, indicate location and thickness on the site map.		X	

* For UST 657-1, angular rock was used to fill the area covered by the groundwater. Geofabric was laid over the rock and then all soil from the excavation was returned to the tank pit.

For UST 657-2, angular rock was used to fill the area covered by the groundwater. Geofabric was laid over the rock and then clean fill was used to fill the tank pit. Contaminated soil was transferred to Building 1601 for clean-up via Detachment Charleston's bioremediation pilot project.

IX. SAMPLE INFORMATION

S.C.D.H.E.C. Lab Certification Number 10120

Sample #	Location	Sample Type (Soil/Water)	Depth*	Date/Time of Collection	Collected By	OVA#
SPORT 0218-1	west end of UST 657-2 excavation	Soil	4'	10/23/96 1030	B. Murray	Not Taken
SPORT 0218-2	east end of UST 657-2 excavation	Soil	4'	10/23/96 1040	B. Murray	Not Taken
SPORT 0218-3	Dirt pile UST 657-2	Soil	-	10/23/96 1100	B. Murray	34 ppm
SPORT 0218-4	UST 657-2 vent piping	Soil	3'	10/23/96 1110	B. Murray	501 ppm
SPORT 0218-5	UST 657-2 excavation, center	water	4'	10/23/96 1050	B. Murray	Not Taken
SPORT 0222-1	UST 657-2 pipe run, 14' from building	Soil	3'	10/25/96 0900	B. Murray	0 ppm
SPORT 0222-2	UST 657-2 pipe run, 2' from building	Soil	2'	10/25/96 1000	B. Murray	0 ppm
SPORT 0217-2	west end of UST 657-1 excavation	Soil	5 1/2'	10/23/96 0930	B. Murray	Not Taken
SPORT 0217-3	east end of UST 657-1 excavation	Soil	5 1/2'	10/23/96 0940	B. Murray	Not Taken
SPORT 0217-4	Dirt pile, UST 657-1	Soil	-	10/23/96 0955	B. Murray	0 ppm
SPORT 0217-5	Dirt pile, UST 657-1	Soil	-	10/23/96 1005	B. Murray	0 ppm
SPORT 0217-6	UST 657-1 excavation, center	water	5 1/2'	10/23/96 0945	B. Murray	Not Taken
SPORT 0222-3	UST 657-1 pipe/vent run, 18" from steps @ building	Soil	3 1/2'	10/25/96 1100	B. Murray	0 ppm

* = Depth Below the Surrounding Land Surface

X. SAMPLING METHODOLOGY

Provide a detailed description of the methods used to collect and store (preserve) the samples.

After the removal of UST 657-1 and UST 657-2 soil and ground water samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

The sample locations shown on the site maps using the Detachment's "SPORT - " sample numbers are correct. The technician taking the samples at the site incorrectly reversed the tank numbers in his log and on the chain of custody.

The samples are correctly identified as follows:

	Detachment Charleston		General Engineering Labs
Tank 657-1			
VOA Trip Blank	UST657	=	SPORT -0217-1
Soil Sample	UST657-2-1	=	SPORT -0217-2
Soil Sample	UST657-2-2	=	SPORT -0217-3
Soil Sample	UST657-2-3	=	SPORT -0217-4
Soil Sample	UST657-2-4	=	SPORT -0217-5
Ground Water Sample	UST657-2-5	=	SPORT -0217-6
Soil Sample	UST657-2-6	=	SPORT -0222-3
Tank 657-2			
Soil Sample	UST657-1-1	=	SPORT -0218-1
Soil Sample	UST657-1-2	=	SPORT -0218-2
Soil Sample	UST657-1-3	=	SPORT -0218-3
Soil Sample	UST657-1-4	=	SPORT -0218-4
Ground Water Sample	UST657-1-5	=	SPORT -0218-5
Soil Sample	UST657-1-6	=	SPORT -0222-1
Soil Sample	UST657-1-7	=	SPORT -0222-2
VOA Trip Blank	UST657	=	SPORT -0222-4

Sample jars were prepared by the testing laboratory. For all excavation samples, the grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were extracted at the tank ends just above the ground water level. UST piping soil samples were taken under the piping at the mechanical connections. Ground water samples were taken from the bottom center of the excavation. Biased composite samples were taken from the excavation dirt piles to characterize the soil for reuse or remediation.

The samples were marked, logged, and immediately placed in sample coolers packed with ice to maintain an approximate temperature of 4° C. Tools were thoroughly cleaned and decontaminated with organic-free soap and water after each sample.

The samples remained in the custody of SPORTENVDETCHASN until they were transferred to General Engineering Laboratories for analysis as documented in the attached Chain-of-Custody Record.

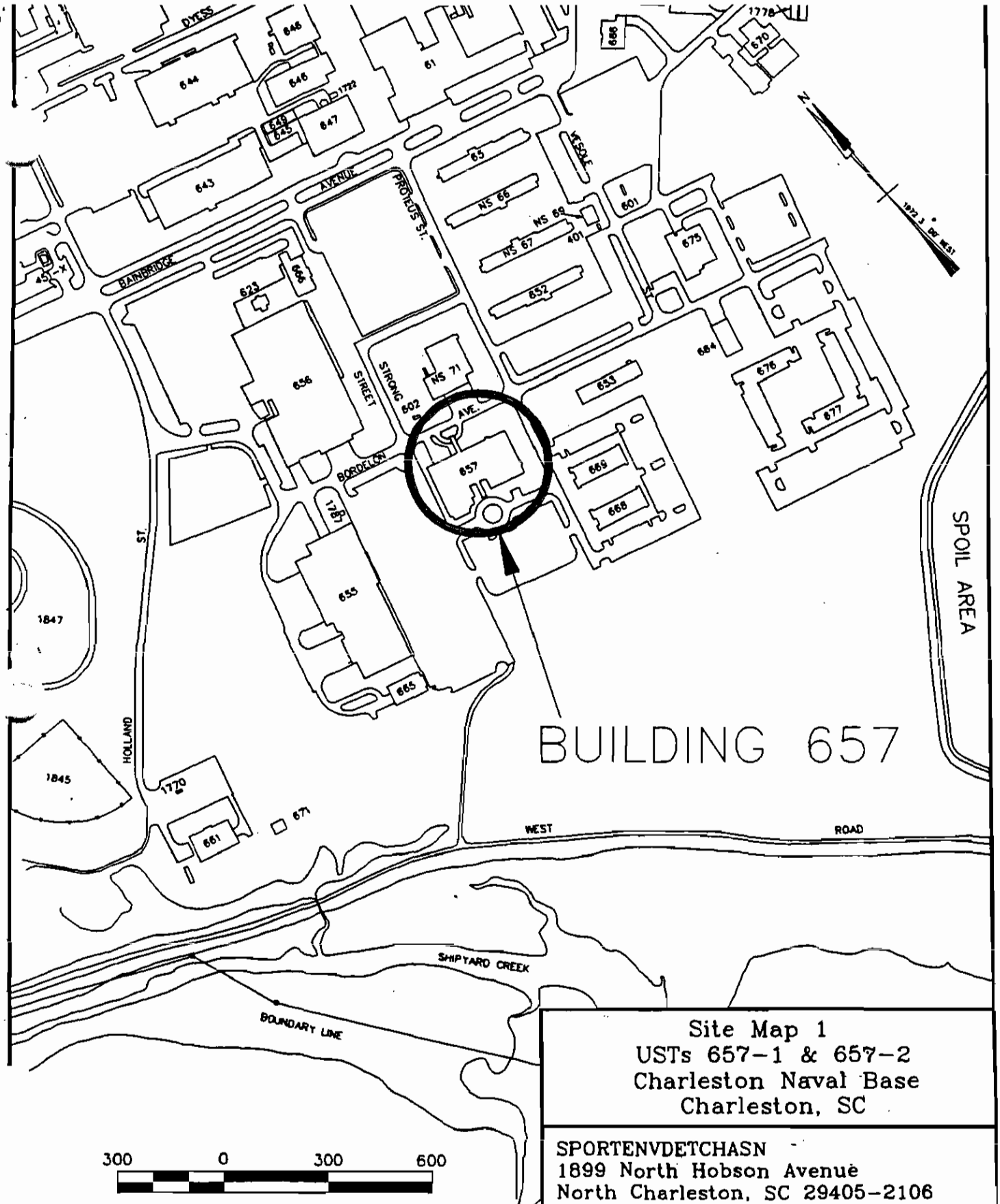
XI. RECEPTORS

		Yes	No
A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system? **[UST 657-2 ~1000 ft. Cooper R.]** If yes, indicate type of receptor, distance, and direction on site map.		X
B.	Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system? If yes, indicate type of well, distance, and direction on site map.		X
C.	Are there any underground structures (e.g., basements) located within 100 feet of the UST system? If yes, indicate the type of structure, distance, and direction on site map.		X
D.	Are there any underground utilities (e.g., telephone, electricity, gas, water, sewer, storm drain) located within 100 feet of the UST system that could potentially come in contact with the contamination? **[electricity, water, sewer and storm drain]** If yes, indicate the type of utility, distance, and direction on the site map.	X	
E.	Has contaminated soil been identified at a depth of less than 3 feet below land surface in an area that is not capped by asphalt or concrete? If yes, indicate the area of contaminated soil on the site map.	X	

Attachment I
SITE MAP

You must supply a scaled site map. It should include all buildings, road names, utilities, tank and pump island locations, sample locations, extent of excavation, and any other pertinent information.

Site Maps 1, 2, 3, 4 and 5
Photographs 1 and 2 (657-1)
Photograph 1 (657-2)

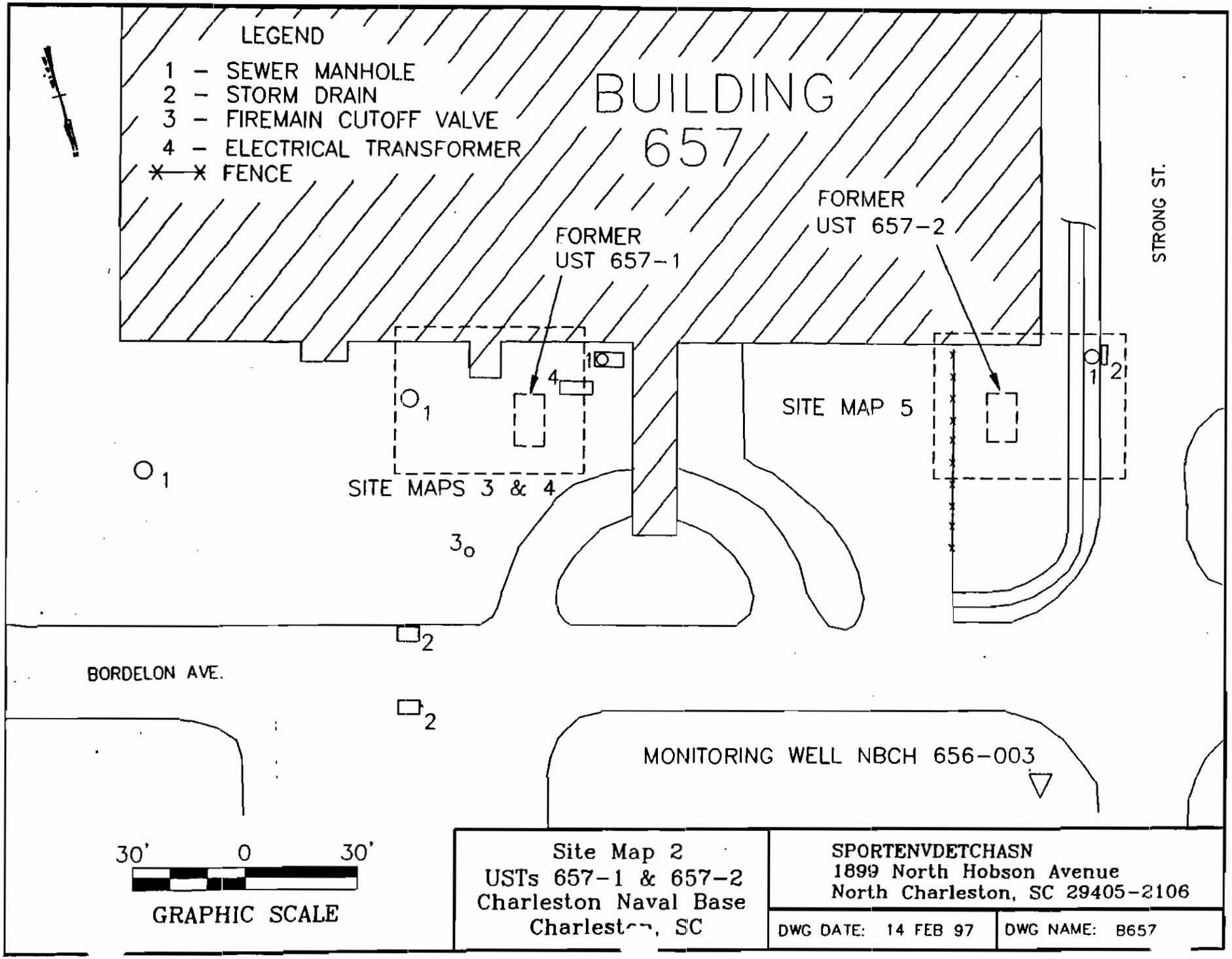


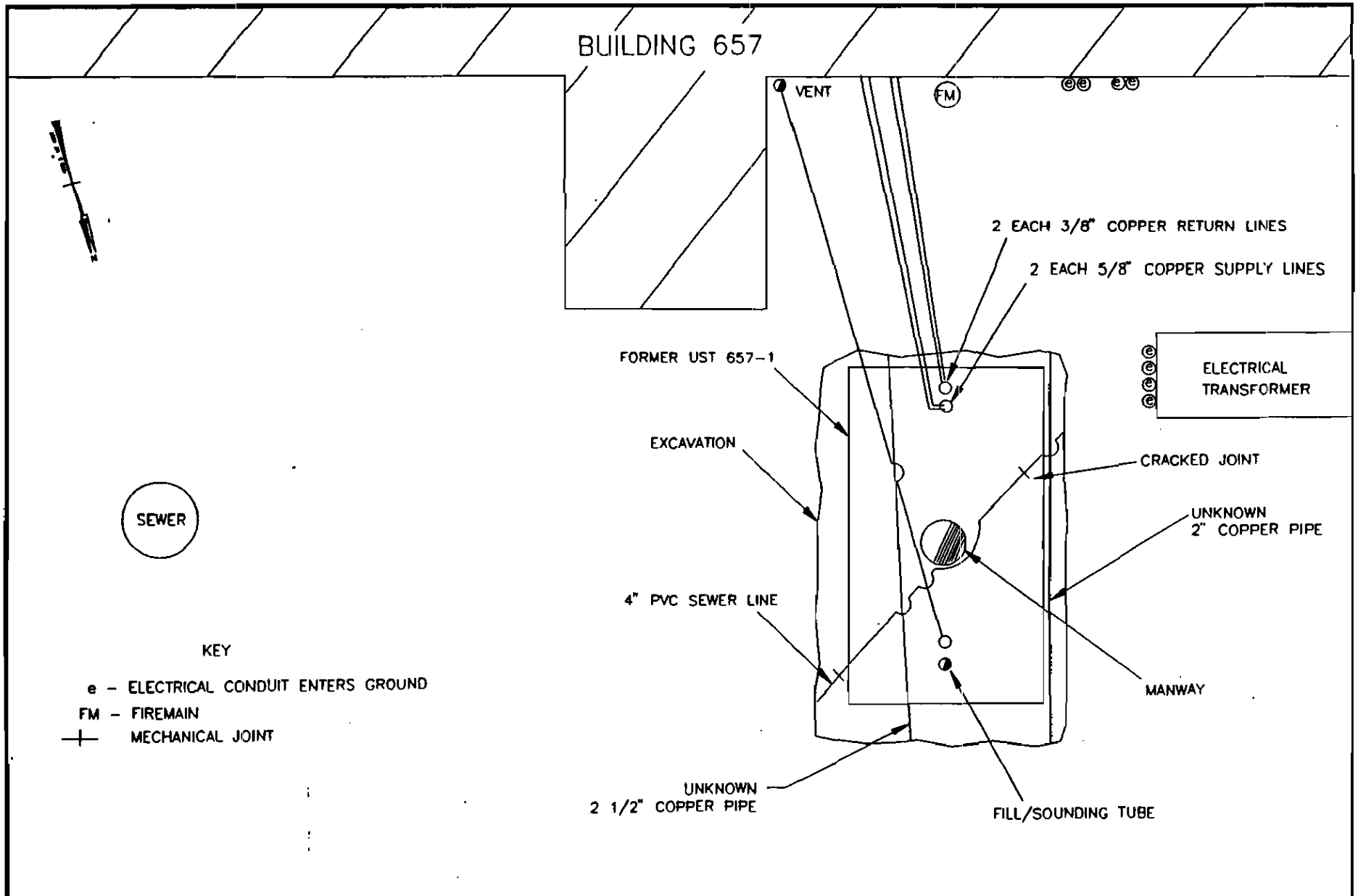
Site Map 1
USTs 657-1 & 657-2
Charleston Naval Base
Charleston, SC

300 0 300 600
GRAPHIC SCALE

SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG DATE: 5 FEB 97	DWG NAME: B657_1


LEGEND
1 – SEWER MANHOLE
2 – STORM DRAIN
3 – FIREMAIN CUTOFF VALVE
4 – ELECTRICAL TRANSFORMER
FENCE
BUILDING 657
FORMER UST 657-1
FORMER UST 657-2
SITE MAPS 3 & 4
SITE MAP 5
STRONG ST.
BORDELON AVE.
MONITORING WELL NBCH 656-003
30' 0 30'
GRAPHIC SCALE
Site Map 2
USTs 657-1 & 657-2
Charleston Naval Base
Charleston, SC
SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106
DWG DATE: 14 FEB 97
DWG NAME: B657

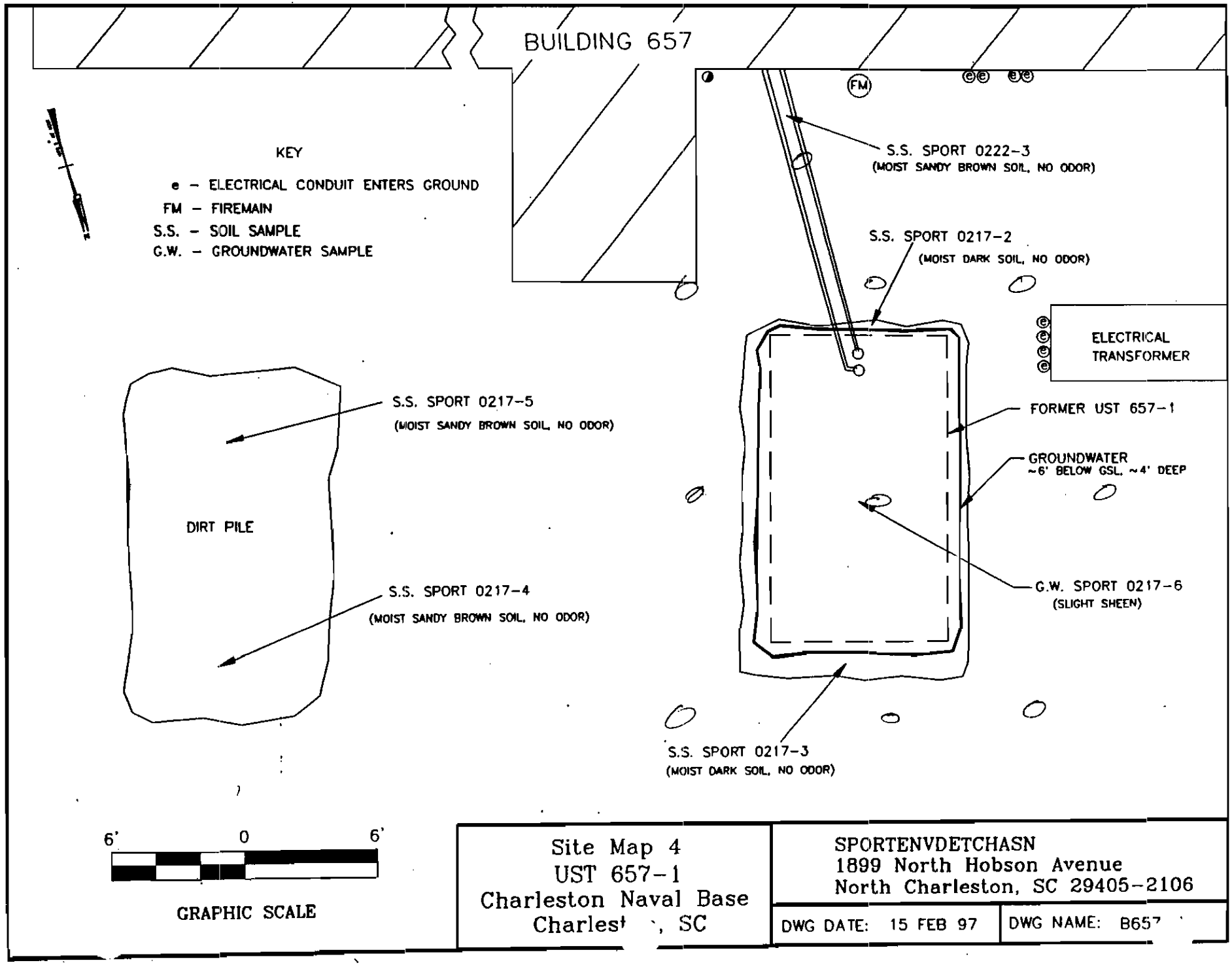


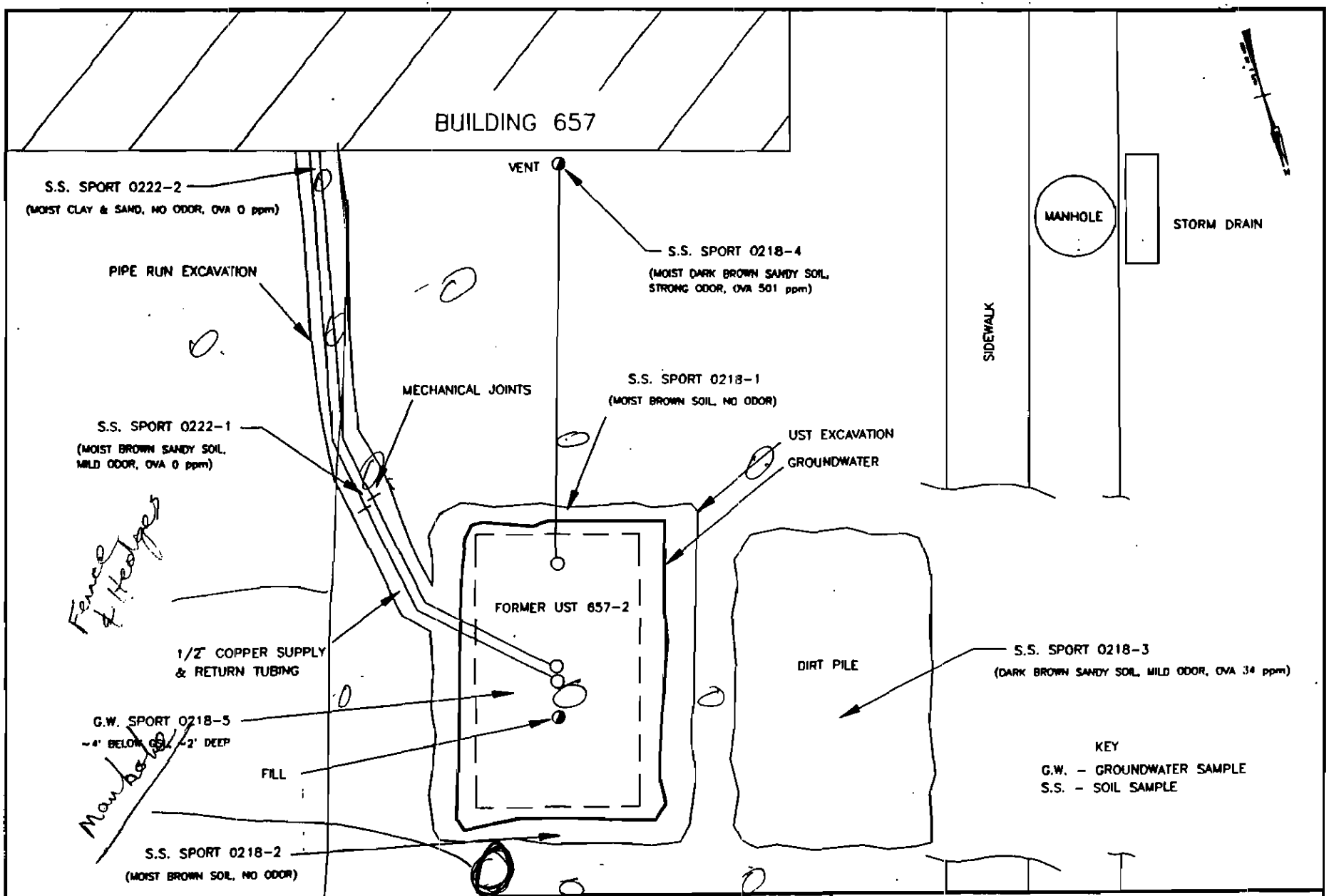
Site Map 3
UST 657-1
Charleston Naval Base
Charleston, SC

SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG DATE: 15 FEB 97

DWG NAME: B657_3


BUILDING 657
KEY
e – ELECTRICAL CONDUIT ENTERS GROUND
FM – FIREMAIN
S.S. – SOIL SAMPLE
G.W. – GROUNDWATER SAMPLE
FM
S.S. SPORT 0222-3
(MOIST SANDY BROWN SOIL, NO ODOR)
S.S. SPORT 0217-2
(MOIST DARK SOIL, NO ODOR)
ELECTRICAL TRANSFORMER
FORMER UST 657-1
GROUNDWATER
~6' BELOW GSL, ~4' DEEP
G.W. SPORT 0217-6
(SLIGHT SHEEN)
S.S. SPORT 0217-3
(MOIST DARK SOIL, NO ODOR)
S.S. SPORT 0217-5
(MOIST SANDY BROWN SOIL, NO ODOR)
DIRT PILE
S.S. SPORT 0217-4
(MOIST SANDY BROWN SOIL, NO ODOR)
6' 0 6'
GRAPHIC SCALE
Site Map 4
UST 657-1
Charleston Naval Base
Charlest , SC
SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106
DWG DATE: 15 FEB 97
DWG NAME: B657



Site Map 5
UST 657-2
Charleston Naval Base
Charleston, SC

SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG DATE: 16 FEB 97 | DWG NAME: B657_5

UST 657-1

Photo 1: UST 657-1 just after removal.

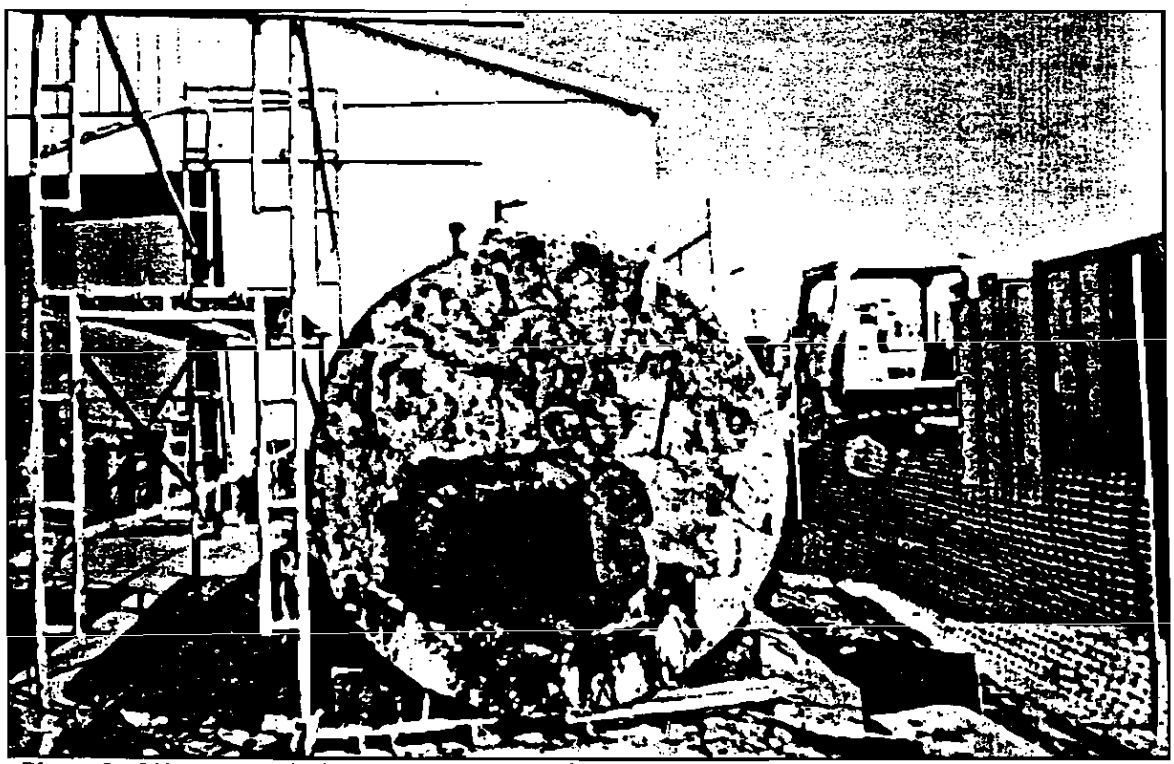


Photo 2: UST 657-1 during cutting and cleaning.

UST 657-2

Photo 1 UST-657-2 excavation during piping removal

Attachment II

ANALYTICAL RESULTS

You must submit the laboratory report and chain-of-custody form for the samples. These samples must be analyzed by a South Carolina certified laboratory.

Certified Analytical Results
Chain-of-Custody

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87284	E87472/87451
NC	233	
SC	10120	10032
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hess

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: November 01, 1996

Sample ID	: SPORT0217-1
Lab ID	: 9610513-01
Matrix	: GroundH2O
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 liters											
Benzene	U	0.00	1.00	2.00	ug/l	1.0	RMB	10/29/96	2054	93002	1
Ethylbenzene	U	0.00	1.00	2.00	ug/l	1.0					
Toluene	U	0.460	1.00	2.00	ug/l	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/l	1.0					
Methyl Tert Butyl Ether	U	0.00	1.00	2.00	ug/l	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	91.6	(80.0 - 128.)
Dibromofluoromethane	BTEX-8260	102.	(67.7 - 135.)
Toluene-d8	BTEX-8260	91.2	(76.8 - 122.)
Bromofluorobenzene	MTBE-8260	91.6	(80.0 - 128.)
Dibromofluoromethane	MTBE-8260	102.	(67.7 - 135.)
Toluene-d8	MTBE-8260	91.2	(76.8 - 122.)
Bromofluorobenzene	NAP-8260	91.6	(80.0 - 128.)
Dibromofluoromethane	NAP-8260	102.	(67.7 - 135.)
Toluene-d8	NAP-8260	91.2	(76.8 - 122.)

M = Method	Method-Description
M 1	EPA 8260

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9610513-01

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Laboratory Certifications

STATE	ORL	RPI
FL	E87156/87294	E87472/87458
NC	253	
SC	10120	10083
TN	[illegible]	[illegible]

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 01, 1996

Sample ID : SPORT0217-1

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87284	E87472/87458
NC	233	
SC	10120	10002
TN	02924	02924

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 04, 1996 |

Sample ID	: SPORT0217-2
Lab ID	: 9610513-02
Matrix	: Soil
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JGS2	10/29/96	1504	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	J	1.22	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	163	330	ug/kg	1.0	BDG	10/30/96	1708	92827	2
Acenaphthylene	U	0.00	163	330	ug/kg	1.0					
Anthracene	U	0.00	163	330	ug/kg	1.0					
Benzo(a)anthracene	U	71.7	163	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	163	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	71.7	163	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	163	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	163	330	ug/kg	1.0					
Chrysene	U	61.9	163	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	163	330	ug/kg	1.0					
Fluoranthene		531	163	330	ug/kg	1.0					
Fluorene	U	0.00	163	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	163	330	ug/kg	1.0					
Naphthalene	U	0.00	163	330	ug/kg	1.0					
Phenanthrene	U	0.00	163	330	ug/kg	1.0					
Pyrene	J	280	163	330	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds — TNF 10/24/96 2100 92827 3

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9610513-02

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87W
NC	233	
SC	10120	10582
TN	02924	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID : SPORT0217-2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	47.6	(30.0 - 115.)
Nitrobenzene-d5	M610	43.0	(23.0 - 120.)
p-Terphenyl-d14	M610	77.8	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	106.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	108.	(74.0 - 128.)
Toluene-d8	BTEX-8260	106.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	106.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	108.	(74.0 - 128.)
Toluene-d8	NAP-8260	106.	(53.4 - 163.)

M = Method	Method Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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(803) 556-8171 • Fax (803) 766-1178

9610513-02

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	E87472/87451
NC	219	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hicks

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: November 04, 1996

Sample ID : SPORT0217-3
Lab ID : 9610513-03
Matrix : Soil
Date Collected : 10/23/96
Date Received : 10/24/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JGS2	10/29/96	1534	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	J	1.40	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	165	330	ug/kg	1.0	BDG	10/30/96	1741	92827	2
Acenaphthylene	U	0.00	165	330	ug/kg	1.0					
Anthracene	U	0.00	165	330	ug/kg	1.0					
Benzo(a)anthracene	U	59.2	165	330	ug/kg	1.0					
Benzo(a)pyrene	U	42.8	165	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	85.5	165	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	165	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	165	330	ug/kg	1.0					
Chrysene	U	65.8	165	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	165	330	ug/kg	1.0					
Fluoranthene		480	165	330	ug/kg	1.0					
Fluorene	U	0.00	165	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	165	330	ug/kg	1.0					
Naphthalene	U	0.00	165	330	ug/kg	1.0					
Phenanthrene	U	0.00	165	330	ug/kg	1.0					
Pyrene	J	266	165	330	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds

TNF 10/24/96 2100 92827 3

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Laboratory Certifications

STATE	CERL	EPI
FL	E87156/87294	[illegible]
NC	233	
SC	10120	10032
TN	02934	02934

Client:	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Env. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID : SPORT0217-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	51.9	(30.0 - 115.)
Nitrobenzene-d5	M610	46.7	(23.0 - 120.)
p-Terphenyl-d14	M610	75.2	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	105.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	106.	(74.0 - 128.)
Toluene-d8	BTEX-8260	108.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	105.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	106.	(74.0 - 128.)
Toluene-d8	NAP-8260	108.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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STATE	GEL	EPA
FL	E87156/87284	E87272/87458
NC	233	
SC	10120	10582
TN	02894	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: November 04, 1996

Sample ID	: SPORT0217-4
Lab ID	: 9610513-04
Matrix	: Soil
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JCS2	10/29/96	1605	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	166	331	ug/kg	1.0	JCB	10/30/96	1014	92827	2
Acenaphthylene	U	0.00	166	331	ug/kg	1.0					
Anthracene	U	0.00	166	331	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	166	331	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	166	331	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	166	331	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	166	331	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	166	331	ug/kg	1.0					
Chrysene	U	0.00	166	331	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	166	331	ug/kg	1.0					
Fluoranthene		636	166	331	ug/kg	1.0					
Fluorene	U	0.00	166	331	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	166	331	ug/kg	1.0					
Naphthalene	U	0.00	166	331	ug/kg	1.0					
Phenanthrene	U	0.00	166	331	ug/kg	1.0					
Pyrene		417	166	331	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds

TNF 10/24/96 2100 92827 3

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	E87472/5
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID : SPORT0217-4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	71.9	(30.0 - 115.)
Nitrobenzene-d5	M610	70.9	(23.0 - 120.)
p-Terphenyl-d14	M610	75.5	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	114.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	102.	(74.0 - 128.)
Toluene-d8	BTEX-8260	113.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	114.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	102.	(74.0 - 128.)
Toluene-d8	NAP-8260	113.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
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STATE	GEL	EPA
FL	E87156/87294	E87472/87451
NC	280	
SC	10120	10983
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: November 04, 1996

Sample ID : SPORT0217-5
Lab ID : 9610513-05
Matrix : Soil
Date Collected : 10/23/96
Date Received : 10/24/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JGS2	10/30/96	1100	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene		628	164	330	ug/kg	1.0	BDG	10/30/96	1814	92827	2
Acenaphthylene	U	0.00	164	330	ug/kg	1.0					
Anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)anthracene	J	288	164	330	ug/kg	1.0					
Benzo(a)pyrene	J	235	164	330	ug/kg	1.0					
Benzo(b)fluoranthene		419	164	330	ug/kg	1.0					
Benzo(ghi)perylene	U	101	164	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Chrysene		353	164	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	164	330	ug/kg	1.0					
Fluoranthene		1160	164	330	ug/kg	1.0					
Fluorene	U	0.00	164	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	111	164	330	ug/kg	1.0					
Naphthalene	U	0.00	164	330	ug/kg	1.0					
Phenanthrene		791	164	330	ug/kg	1.0					
Pyrene		719	164	330	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds

TNF 10/24/96 2100 92827 3

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Laboratory Certifications

STATE	GEL	EPA
FL	E871968[illegible]7204	E87472[illegible]
NC	233	
SC	10120	10583
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 04, 1996 |

Sample ID : SPORT0217-5

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	74.8	(30.0 - 115.)
Nitrobenzene-d5	M610	81.8	(23.0 - 120.)
p-Terphenyl-d14	M610	81.4	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	115.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	104.	(74.0 - 128.)
Toluene-d8	BTEX-8260	115.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	115.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	104.	(74.0 - 128.)
Toluene-d8	NAP-8260	115.	(53.4 - 163.)

M = Method	Method-Description
M1	EPA 8260
M2	EPA 8270
M3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
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STATE	GEL	EPA
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10982
TN	02936	02994

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 04, 1996 |

Sample ID	: SPORT0217-6
Lab ID	: 9610513-06
Matrix	: GroundH2O
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/l	1.0	RMB	10/30/96	1126	93002	1
Ethylbenzene	U	0.00	1.00	2.00	ug/l	1.0					
Toluene	U	0.00	1.00	2.00	ug/l	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/l	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/l	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene		13.3	6.25	12.5	ug/l	1.0	JCB	10/30/96	1711	92829	2
Acenaphthylene	U	0.00	6.25	12.5	ug/l	1.0					
Anthracene	U	0.00	6.25	12.5	ug/l	1.0					
Benzo(a)anthracene	U	0.00	6.25	12.5	ug/l	1.0					
Benzo(a)pyrene	U	0.00	6.25	12.5	ug/l	1.0					
Benzo(b)fluoranthene	U	0.00	6.25	12.5	ug/l	1.0					
Benzo(ghi)perylene	U	0.00	6.25	12.5	ug/l	1.0					
Benzo(k)fluoranthene	U	0.00	6.25	12.5	ug/l	1.0					
Chrysene	U	0.00	6.25	12.5	ug/l	1.0					
Dibenzo(a,h)anthracene	U	0.00	6.25	12.5	ug/l	1.0					
Fluoranthene	U	0.00	6.25	12.5	ug/l	1.0					
Fluorene	U	0.00	6.25	12.5	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	6.25	12.5	ug/l	1.0					
Naphthalene	U	0.00	6.25	12.5	ug/l	1.0					
Phenanthrene	U	0.00	6.25	12.5	ug/l	1.0					
Pyrene	U	0.00	6.25	12.5	ug/l	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds

GWL 10/24/96 2140 92829 3

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87745
NC	233	
SC	10120	10002
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 04, 1996 |

Sample ID : SPORT0217-6

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	78.0	(43.0 - 108.)
Nitrobenzene-d5	M610	70.4	(35.0 - 111.)
p-Terphenyl-d14	M610	64.0	(33.0 - 125.)
Bromofluorobenzene	BTEX-8260	89.6	(80.0 - 128.)
Dibromofluoromethane	BTEX-8260	97.6	(67.7 - 135.)
Toluene-d8	BTEX-8260	88.0	(76.8 - 122.)
Bromofluorobenzene	NAP-8260	89.6	(80.0 - 128.)
Dibromofluoromethane	NAP-8260	97.6	(67.7 - 135.)
Toluene-d8	NAP-8260	88.0	(76.8 - 122.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3510

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Karen Blakeney
Reviewed By

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CHAIN OF CUSTODY RECORD

Page 1 of 1

9610513

Client Name/Facility Name: SPORTSENYDETCHASN

Collected by/Company: B.MURRAY SPORTSENYDETCHASN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 23882

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrate/Nitrite	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX & NAPH	PAH	Remarks
01	SPORT0217-1	10/23/96	0930				X	3 (W)																1		UST657 TANK2 (MAI) VOA TRIP BLANK
02	SPORT0217-2	10/23/96	0930		X		X	2																X	X	UST657-2-1 SOIL
03	SPORT0217-3	10/23/96	0940		X		X	2																X	X	UST657-2-2 SOIL
04	SPORT0217-4	10/23/96	0955		X	X	X	2																X	X	UST657-2-3 SOIL
05	SPORT0217-5	10/23/96	1005		X	X		2																X	X	UST657-2-4 SOIL
06	SPORT0217-6	10/23/96	0945				X	5																1	X	UST657-2-5 GW
																										1D BTEX & NAPTH & MTBE

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	10/23/96	1420	[signature]	[signature]	10/24/96	1340	[signature]
[signature]	10/24/96	1435	Received by lab by: [signature]	Date: 10-24-96	Time: 1935 1435	Remarks: DG	

White = sample collector Yellow = file Pink = with report

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Laboratory Certifications

STATE	CHL	EPA
FL	E87156/87294	E87472/87451
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID	: SPORT0218-1
Lab ID	: 9610514-01
Matrix	: Soil
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JG52	10/29/96	1706	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	164	330	ug/kg	1.0	JCB	10/30/96	1216	92827	2
Acenaphthylene	U	0.00	164	330	ug/kg	1.0					
Anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	164	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	164	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Chrysene	U	0.00	164	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	164	330	ug/kg	1.0					
Fluoranthene	U	0.00	164	330	ug/kg	1.0					
Fluorene	U	0.00	164	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	164	330	ug/kg	1.0					
Naphthalene	U	0.00	164	330	ug/kg	1.0					
Phenanthrene	U	0.00	164	330	ug/kg	1.0					
Pyrene	U	0.00	164	330	ug/kg	1.0					

The following prep procedures were performed:
CC/MS Base/Neutral Compounds TNF 10/24/96 2:00 92827 3

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87498
NC	253	
SC	10120	10583
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID : SPORT0218-1

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	72.9	(30.0 - 115.)
Nitrobenzene-d5	M610	68.3	(23.0 - 120.)
p-Terphenyl-d14	M610	82.9	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	112.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	104.	(74.0 - 128.)
Toluene-d8	BTEX-8260	114.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	112.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	104.	(74.0 - 128.)
Toluene-d8	NAP-8260	114.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87284	E87472/87
NC	223	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 04, 1996 |

Sample ID	: SPORT0218-2
Lab ID	: 9610514-02
Matrix	: Soil
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JGS2	10/29/96	1736	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	662	1320	ug/kg	4.0	BDG	10/31/96	1655	92827	2
Acenaphthylene	U	0.00	662	1320	ug/kg	4.0					
Anthracene	U	0.00	662	1320	ug/kg	4.0					
Benzo(a)anthracene		4750	662	1320	ug/kg	4.0					
Benzo(a)pyrene		3200	662	1320	ug/kg	4.0					
Benzo(b)fluoranthene		4500	662	1320	ug/kg	4.0					
Benzo(ghi)perylene	J	1010	662	1320	ug/kg	4.0					
Benzo(k)fluoranthene		2120	662	1320	ug/kg	4.0					
Chrysene		4850	662	1320	ug/kg	4.0					
Dibenzo(a,h)anthracene	U	0.00	662	1320	ug/kg	4.0					
Fluoranthene		12600	662	1320	ug/kg	4.0					
Fluorene	U	0.00	662	1320	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	J	1240	662	1320	ug/kg	4.0					
Naphthalene	U	0.00	662	1320	ug/kg	4.0					
Phenanthrene	J	1150	662	1320	ug/kg	4.0					
Pyrene		9590	662	1320	ug/kg	4.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds TNF 10/24/96 2100 92827 3

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87483
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID : SPORT0218-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

Comments:
Volatile Organics contained matrix interferences.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	84.2	(30.0 - 115.)
Nitrobenzene-d5	M610	59.4	(23.0 - 120.)
p-Terphenyl-d14	M610	91.5	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	107.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	101.	(74.0 - 128.)
Toluene-d8	BTEX-8260	99.2	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	107.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	101.	(74.0 - 128.)
Toluene-d8	NAP-8260	99.2	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPA
FL	E87156/87284	E87472/87474
NC	220	
SC	10120	10982
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 04, 1996 |

Sample ID : SPORT0218-2

M = Method | Method Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87284	E87472/87483
NC	233	
SC	10120	10002
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: November 04, 1996

Sample ID : SPORT0218-3
Lab ID : 9610514-03
Matrix : Soil
Date Collected : 10/23/96
Date Received : 10/24/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	5.00	10.0	ug/kg	5.0	JGS2	10/29/96	1807	92999	1
Ethylbenzene	U	0.00	5.00	10.0	ug/kg	5.0					
Toluene	U	0.00	5.00	10.0	ug/kg	5.0					
Xylenes (TOTAL)	U	0.00	5.00	10.0	ug/kg	5.0					
Naphthalene		186	5.00	10.0	ug/kg	5.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	1350	1650	3300	ug/kg	10.	BDG	10/30/96	1921	92827	2
Acenaphthylene	U	0.00	1650	3300	ug/kg	10.					
Anthracene	U	0.00	1650	3300	ug/kg	10.					
Benzo(a)anthracene	J	3270	1650	3300	ug/kg	10.					
Benzo(a)pyrene	J	2380	1650	3300	ug/kg	10.					
Benzo(b)fluoranthene		4030	1650	3300	ug/kg	10.					
Benzo(ghi)perylene	U	858	1650	3300	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	1650	3300	ug/kg	10.					
Chrysene		3560	1650	3300	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1650	3300	ug/kg	10.					
Fluoranthene		12800	1650	3300	ug/kg	10.					
Fluorene	U	0.00	1650	3300	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	990	1650	3300	ug/kg	10.					
Naphthalene	U	0.00	1650	3300	ug/kg	10.					
Phenanthrene	J	2110	1650	3300	ug/kg	10.					
Pyrene		7660	1650	3300	ug/kg	10.					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds

TNF 10/24/96 2100 92827 3

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87284	E87472/87485
NC	288	
SC	10120	10583
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 04, 1996 |

Sample ID : SPOKT0218-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	116.*	(30.0 - 115.)
Nitrobenzene-d5	M610	64.0	(23.0 - 120.)
p-Terphenyl-d14	M610	112.	(37.5 - 128.)
Bromofluorobenzene	BTEX-8260	112.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	105.	(74.0 - 128.)
Toluene-d8	BTEX-8260	110.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	112.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	105.	(74.0 - 128.)
Toluene-d8	NAP-8260	110.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10302
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID	: SPORT0218-4
Lab ID	: 9610514-04
Matrix	: Soil
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	J	11.0	10.0	20.0	ug/kg	10.	JGS2	10/29/96	1837	92999	1
Ethylbenzene		278	10.0	20.0	ug/kg	10.					
Toluene		250	10.0	20.0	ug/kg	10.					
Xylenes (TOTAL)		5950	100	200	ug/kg	100	JGS2	10/30/96	1303	92999	1
Naphthalene		8130	100	200	ug/kg	100					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1640	3280	ug/kg	10.	BDG	11/01/96	0125	92866	2
Acenaphthylene	U	0.00	1640	3280	ug/kg	10.					
Anthracene	U	0.00	1640	3280	ug/kg	10.					
Benzo(a)anthracene	U	0.00	1640	3280	ug/kg	10.					
Benzo(a)pyrene	U	0.00	1640	3280	ug/kg	10.					
Benzo(b)fluoranthene	U	0.00	1640	3280	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	1640	3280	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	1640	3280	ug/kg	10.					
Chrysene	U	0.00	1640	3280	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1640	3280	ug/kg	10.					
Fluoranthene	U	0.00	1640	3280	ug/kg	10.					
Fluorene	U	0.00	1640	3280	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	1640	3280	ug/kg	10.					
Naphthalene		5540	1640	3280	ug/kg	10.					
Phenanthrene		6860	1640	3280	ug/kg	10.					
Pyrene	U	0.00	1640	3280	ug/kg	10.					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds

GWL 10/25/96 2030 92866 3

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	E87472/87451
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: November 04, 1996

Sample ID : SPORT0218-4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	0.00*	(30.0 - 115.)
Nitrobenzene-d5	M610	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610	0.00*	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	91.3	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	95.3	(74.0 - 128.)
Toluene-d8	BTEX-8260	100.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	91.3	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	95.3	(74.0 - 128.)
Toluene-d8	NAP-8260	100.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	E87472/87451
NC	233	
SC	10120	10192
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWCD0196

Report Date: November 04, 1996

Sample ID	: SPORT0218-5
Lab ID	: 9610514-05
Matrix	: Ground H2O
Date Collected	: 10/23/96
Date Received	: 10/24/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 Items											
Benzene	U	0.00	1.00	2.00	ug/l	1.0	RMB	10/30/96	1056	93003	1
Ethylbenzene	U	0.00	1.00	2.00	ug/l	1.0					
Toluene	U	0.00	1.00	2.00	ug/l	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/l	1.0					
Methyl Tert Butyl Ether	U	0.00	1.00	2.00	ug/l	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/l	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 Items											
Acenaphthene	U	0.00	5.00	10.0	ug/l	1.0	JCB	10/30/96	1744	92829	2
Acenaphthylene	U	0.00	5.00	10.0	ug/l	1.0					
Anthracene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(a)anthracene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(a)pyrene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(b)fluoranthene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(ghi)perylene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(k)fluoranthene	U	0.00	5.00	10.0	ug/l	1.0					
Chrysene	U	0.00	5.00	10.0	ug/l	1.0					
Dibenzo(a,h)anthracene	U	0.00	5.00	10.0	ug/l	1.0					
Fluoranthene		11.9	5.00	10.0	ug/l	1.0					
Fluorene	U	0.00	5.00	10.0	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	5.00	10.0	ug/l	1.0					
Naphthalene	U	0.00	5.00	10.0	ug/l	1.0					
Phenanthrene	U	0.00	5.00	10.0	ug/l	1.0					
Pyrene	J	8.90	5.00	10.0	ug/l	1.0					

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10542
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 04, 1996

Sample ID : SPORT0218-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:
GC/MS Base/Neutral Compounds GWL 10/24/96 2140 92829 3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	71.2	(43.0 - 108.)
Nitrobenzene-d5	M610	69.8	(35.0 - 111.)
p-Terphenyl-d14	M610	47.8	(33.0 - 125.)
Bromofluorobenzene	BTEX-8260	90.0	(80.0 - 128.)
Dibromofluoromethane	BTEX-8260	102.	(67.7 - 135.)
Toluene-d8	BTEX-8260	88.0	(76.8 - 122.)
Bromofluorobenzene	MTBE-8260	90.0	(80.0 - 128.)
Dibromofluoromethane	MTBE-8260	102.	(67.7 - 135.)
Toluene-d8	MTBE-8260	88.0	(76.8 - 122.)
Bromofluorobenzene	NAP-8260	90.0	(80.0 - 128.)
Dibromofluoromethane	NAP-8260	102.	(67.7 - 135.)
Toluene-d8	NAP-8260	88.0	(76.8 - 122.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3510

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	239	
SC	10120	10982
TX	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

ec: NPWC00196 | Report Date: November 04, 1996 |

Sample ID : SPORT0218-5

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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2040 Savage Road
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CHAIN OF CUSTODY RECORD

961514

Page 1 of 1

Client Name/Facility Name: SPORTSENVDET CHASN

Collected by/Company: B. MURRAY SPORTSENVDET CHASN

SAMPLE ANALYSIS REQUIRED (s) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 23881

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX & NAPTH	PAH	Remarks	
01	SPORT0218-1	10/23/96	1030		X		X	2																X	X	UST 657-1-1	SOIL
02	SPORT0218-2	10/23/96	1040		X		X	2																X	X	UST 657-1-2	SOIL
03	SPORT0218-3	10/23/96	1100		X	X		2																X	X	UST 657-1-3	SOIL
04	SPORT0218-4	10/23/96	1110		X		X	2																X	X	UST 657-1-4	SOIL
05	SPORT0218-5	10/23/96	1050				X	5	P,O 5-32 oz															1	X	UST 657-1-5	GW
																										12 BTEX & NAPTH & MTBE	

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	10/23/96	1440	W.R. Hiers, Jr.	W.R. Hiers, Jr.	10/24/96	1341	[signature]
[signature]	10/24/96	4:35	Received by lab by: [signature]	Date: 10-24-96	Time: 1435	Remarks:	

White = sample collector Yellow = file Pink = with report

✓ 1657

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	E87472/87458
NC	239	
SC	10120	10512
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 06, 1996

Sample ID	: SPORT0222-1
Lab ID	: 9610546-01
Matrix	: Soil
Date Collected	: 10/25/96
Date Received	: 10/25/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JGS2	10/30/96	1202	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	167	333	ug/kg	1.0	WAM	11/04/96	1901	93147	2
Acenaphthylene	U	0.00	167	333	ug/kg	1.0					
Anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	167	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	167	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Chrysene	U	0.00	167	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	167	333	ug/kg	1.0					
Fluoranthene	U	0.00	167	333	ug/kg	1.0					
Fluorene	U	0.00	167	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	167	333	ug/kg	1.0					
Naphthalene	U	0.00	167	333	ug/kg	1.0					
Phenanthrene	U	0.00	167	333	ug/kg	1.0					
Pyrene	U	0.00	167	333	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds GWL 11/01/96 1500 93147 3

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9610546-01

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NOV.-06.'96(WED) 17:55 GEN. ENGINEERING TEL:803-852-5812 P.002

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87284	E87472/87450
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 06, 1996

Sample ID : SPORT0222-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

Comments:
Volatile Organics contained matrix interferences.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	58.3	(30.0 - 115.)
Nitrobenzene-d5	M610	51.1	(23.0 - 120.)
p-Terphenyl-d14	M610	71.9	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	110.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	99.8	(74.0 - 128.)
Toluene-d8	BTEX-8260	108.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	110.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	99.8	(74.0 - 128.)
Toluene-d8	NAP-8260	108.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87284	E87472/87451
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

ec: NPWC00196

Report Date: November 06, 1996

Sample ID : SPORT0222-1

M = Method

Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney

Reviewed By

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/E87284	E87472/E87473
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 06, 1996

Sample ID	: SPORT0222-2
Lab ID	: 9610546-02
Matrix	: Soil
Date Collected	: 10/25/96
Date Received	: 10/25/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JGS2	10/29/96	1938	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.900	1.00	4.00	ug/kg	1.0					
Naphthalene		5.51	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	166	331	ug/kg	1.0	WAM	11/04/96	1932	93147	2
Acenaphthylene	U	0.00	166	331	ug/kg	1.0					
Anthracene	U	66.2	166	331	ug/kg	1.0					
Benzo(a)anthracene	J	255	166	331	ug/kg	1.0					
Benzo(a)pyrene	J	192	166	331	ug/kg	1.0					
Benzo(b)fluoranthene		387	166	331	ug/kg	1.0					
Benzo(ghi)perylene	U	99.3	166	331	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	166	331	ug/kg	1.0					
Chrysene	J	215	166	331	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	29.5	166	331	ug/kg	1.0					
Fluoranthene		490	166	331	ug/kg	1.0					
Fluorene	U	20.9	166	331	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	86.1	166	331	ug/kg	1.0					
Naphthalene	U	36.4	166	331	ug/kg	1.0					
Phenanthrene	J	218	166	331	ug/kg	1.0					
Pyrene		391	166	331	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds GWL 11/01/96 1500 93147 3

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9610546-02

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87284	E87472/87498
NC	233	
SC	10120	10583
VA	00094	00094

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 06, 1996

Sample ID : SPORT0222-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

Comments:
Volatile Organics contained matrix interferences.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	56.8	(30.0 - 115.)
Nitrobenzene-d5	M610	43.9	(23.0 - 120.)
p-Terphenyl-d14	M610	76.6	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	108.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	104.	(74.0 - 128.)
Toluene-d8	BTEX-8260	115.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	108.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	104.	(74.0 - 128.)
Toluene-d8	NAP-8260	115.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10982
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NFWC00196 Report Date: November 06, 1996

Sample ID : SPORT0222-2

M = Method Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney

Reviewed By

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10002
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 06, 1996

Sample ID	: SPORT0222-3
Lab ID	: 9610546-03
Matrix	: Soil
Date Collected	: 10/25/96
Date Received	: 10/25/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JGS2	10/29/96	2009	92999	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	166	331	ug/kg	1.0	WAM	11/04/96	2003	93147	2
Acenaphthylene	U	0.00	166	331	ug/kg	1.0					
Anthracene	U	20.9	166	331	ug/kg	1.0					
Benzo(a)anthracene	U	43.0	166	331	ug/kg	1.0					
Benzo(a)pyrene	U	53.0	166	331	ug/kg	1.0					
Benzo(b)fluoranthene	U	156	166	331	ug/kg	1.0					
Benzo(ghi)perylene	U	25.5	166	331	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	166	331	ug/kg	1.0					
Chrysene	U	0.00	166	331	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	166	331	ug/kg	1.0					
Fluoranthene	U	109	166	331	ug/kg	1.0					
Fluorene	U	16.9	166	331	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	166	331	ug/kg	1.0					
Naphthalene	U	0.00	166	331	ug/kg	1.0					
Phenanthrene	U	0.00	166	331	ug/kg	1.0					
Pyrene	U	0.00	166	331	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds

GWL 11/01/96 1500 93147 3

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Laboratory Certifications

STATE	CERT.	EPA
FL	E87156/87294	E87472/87487
NC	233	
SC	10120	10582
TN	02094	02094

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 06, 1996

Sample ID : SPORT0222-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	46.5	(30.0 - 115.)
Nitrobenzene-d5	M610	38.1	(23.0 - 120.)
p-Terphenyl-d14	M610	69.6	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	101.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	90.5	(74.0 - 128.)
Toluene-d8	BTEX-8260	105.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	101.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	90.5	(74.0 - 128.)
Toluene-d8	NAP-8260	105.	(53.4 - 163.)

M = Method	Method-Description
M1	EPA 8260
M2	EPA 8270
M3	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87451
NC	220	
SC	10120	10582
TN	02994	02994

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hien

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: November 01, 1996

Sample ID	: SPORT0222-4
Lab ID	: 9610546-04
Matrix	: GroundH2O
Date Collected	: 10/24/96
Date Received	: 10/25/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/l	1.0	RMB	10/29/96	2124	93002	1
Ethylbenzene	U	0.00	1.00	2.00	ug/l	1.0					
Toluene	U	0.00	1.00	2.00	ug/l	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/l	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	91.6	(80.0 - 128.)
Dibromofluoromethane	BTEX-8260	106.	(67.7 - 135.)
Toluene-d8	BTEX-8260	93.2	(76.8 - 122.)
Bromofluorobenzene	NAP-8260	91.6	(80.0 - 128.)
Dibromofluoromethane	NAP-8260	106.	(67.7 - 135.)
Toluene-d8	NAP-8260	93.2	(76.8 - 122.)

M = Method	Method-Description
M 1	EPA 8260

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion
SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 | Report Date: November 01, 1996 |

Sample ID : SPORT0222-4

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Reviewed By

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NPWC 00196

CHAIN OF CUSTODY RECORD

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Charleston, South Carolina 29414
P.O. Box 30712
Charleston, South Carolina 29417
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Page 1 of 1

9610546

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: SPORTENVDETCHASN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 23907

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX + NAPTHALENE	PAH	Remarks
-01	SPORTØZZZ-1	10/25/96	Ø9ØØ		X		X	2																X	X	UST657-1-6 Soil
-02	SPORTØZZZ-2	10/25/96	1ØØØ		X		X	2																X	X	UST657-1-7 Soil
-03	SPORTØZZZ-3	10/25/96	11ØØ		X		X	2																X	X	UST657-2-6 Soil
-04	SPORTØZZZ-4	10/24/96	113Ø				X	3																X		UST657 YOA TRIP BLANK

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	10/25/96	1236	W. R. Hiers, Jr.	W. R. Hiers, Jr.	10/25/96	1452	[signature]
Relinquished by: [signature]	Date: 10/25/96	Time: 1574	Received by lab by: [signature]	Date: 10/25	Time: 1515	Remarks:	

Yellow = file Pink = with report

Attachment III

Certificate of Disposal (tank)

UST Certificate of Disposal

CONTRACTOR

Supervisor of Shipbuilding, Conversion and Repair, USN
Portsmouth, VA
Environmental Detachment Charleston
1899 North Hobson Avenue
North Charleston 29405-2106

Telephone (803) 743-6482

TANK ID & LOCATION

UST 657-1; Charleston Naval Base, Bldg 657, Bordelon Ave., N. Charleston, SC

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

TYPE OF TANK	SIZE (GAL)
Fuel oil	5,000 gal.

CLEANING/DISPOSAL METHOD

The tank was cut open on both ends, cleaned with a steam cleaner, cut into sections, and disposed of as recyclable scrap metal.

DISPOSAL CERTIFICATION

I certify that the above tank has been properly cleaned and disposed of as recyclable scrap metal.

Sidney C. Ladson 15 FEB 97

(Name) (Date)

Sidney C. Ladson

UST Certificate of Disposal

CONTRACTOR

Supervisor of Shipbuilding, Conversion and Repair, USN
Portsmouth, VA
Environmental Detachment Charleston
1899 North Hobson Avenue
North Charleston 29405-2106

Telephone (803) 743-6482

TANK ID & LOCATION

UST 657-2; Charleston Naval Base, Bldg 657, Bordelon Ave., N. Charleston, SC

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

TYPE OF TANK	SIZE (GAL)
Fuel oil	2,000 gal.

CLEANING/DISPOSAL METHOD

The tank was cut open on both ends, cleaned with a steam cleaner, cut into sections, and disposed of as recyclable scrap metal.

DISPOSAL CERTIFICATION

I certify that the above tank has been properly cleaned and disposed of as recyclable scrap metal.

15 FEB 97

(Name) (Date)

Sidney C. Ladson

APPENDIX B

GEOLOGIC BORING LOGS

SOUTHNAVFAC

LOG OF BORING CNC10-B01

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/22/99
DRILLING COMPANY: U.S. PROBE	SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH / Hand Auger	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
	1-2 FT	↑	ND						Sand, light brown, well graded, medium grained,	
*	2-3 FT	Hand Auger	26						Clayey Sand, Gray, Rock/Gravel	
5		↓								
		E.O.B	—							
10										
									Field Screening Data	
									* Collect 10SFB0103	
20									Collect 10CFB01	
25										
30										
35										

JCE NUMBER

SOUTHNAVFAC

LOG OF BORING CNC10-B02

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/22/99
DRILLING COMPANY: U S PROBE	SURFACE ELEVATION: Feet .—
DRILLING METHOD: DIRECT PUSH/ Hand Auger	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
	1-2FT	↑	ND						Clayey Sand, light brown, ~80% Sand	
*	2-3FT	Hand Auger	123							
	3-4FT		40						Sand, black, fine grained, moist	
5										
	E	O.B								
10										
									Field Screening Data	
15									* Collect 10SFB0203	
									Collect 10GFB02	
20										
25										
30										
35										
40										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC10-B03

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/22/99
DRILLING COMPANY: U S PROBE	SURFACE ELEVATION: Feet .—
DRILLING METHOD: DIRECT PUSH / Hand Auger	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
									Top soil 0-1'	
	1-2 FT		20						Sandy Clay (~50% Sand) brown 1-3'	
	2-3 FT	Hand Auger	90							
*	3-4 FT		500						Sandy Clay, (approx 20% Sand) gray, somewhat stiff, cohesive fuel odor.	
5										
10										
20										
25										
30										
35										

Field Screening Data

* Collect 10SFB0304

Collect CNC10GFP0101

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING (NC10-B04)

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/22/99
DRILLING COMPANY: U S PROBE	SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH / HAND AUGER	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
									Top soil 0-1'	
*	1-2 FT	HAND AUGER	10						Sand, light brown, medium grained, well graded, 1-4'	
	2-3 FT		20							
	3-4 FT		8							
	E.O.B		—						Clayey Sand, brown, ~30% clay (wet)	
5										
10									Field Screening Data	
15									* Collect 10SFB0403	
									Collect CNC10GFP0301	
20										
25										
30										
35										
40										

WELL NUMBER:

SOUTHNAVFAC

LOG OF BORING CNC10-B05

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/22/99
DRILLING COMPANY: U S PROBE	SURFACE ELEVATION: Feet .—
DRILLING METHOD: DIRECT PUSH/Hand Auger	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
	1-2 FT	No Pushes	4						Top Soil 0-1 FT	
	* 2-3 FT		18						Sand, Dark Gray to Black, fine grained, (approx 20% clay) 1-2 FT	
5	3-4 FT		15						Clay and Sand, (Approx 50% Clay), Gray to Brown, 2-3 FT	
10									Sandy Clay, Gray, 60% Clay, moist and very cohesive, 3-4 FT	
									Field Screening Data	
20									* Collect 10SFB0503	
									Collect CNC10GFP0201	
25										
30										
35										
40										

ICE NUMBER

SOUTHNAVFAC

LOG OF BORING CNC10-B06

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/22/99
DRILLING COMPANY: U.S. PROBE	SURFACE ELEVATION: Feet .—
DRILLING METHOD: DIRECT PUSH	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
	1-2 FT	None Auger	ND						Top soil crushed rock 0-1 FT	
	2-3 FT		ND						Sand, light brown, fine grained 1-2 FT	
5	3-4 FT		ND						Sandy Clay, Gray (~ 70-80% clay) moist, 2-3 FT	
10									Sandy Clay, Gray, root material (as above) wet, 3-4 FT	
	E.O.B.									
15									Field Screening Data	
20									* Collect 10SFB0604	
									Collect 10GFB06	
25										
30										
35										
40										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC10-B07

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/22/99
DRILLING COMPANY: U S PROBE	SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH / Hand Auger	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
*	1-2 FT	HAND AUGER	ND						Sand, brown to black, med. to fine grained, 1-2 FT	
	2-3 FT		2							
	3-4 FT		22						Sand, brown, medium grained, some clay, 2-3 FT	
5									Sandy Clay, Gray (approx. 30% Sand)	
10										
									Field Screening Data	
									* Collect 10SFB0704	
20										
25										
30										
35										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC10-B08

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/23/99
DRILLING COMPANY: U S PROBE	SURFACE ELEVATION: Feet .—
DRILLING METHOD: DIRECT PUSH	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
	1-2 FT	HAND AUGER	ND						Asphalt and crushed rock 0 to 2'	
*	2-3 FT		30						Sandy marine deposits and shell material, wet 2-3 FT	
5										
10									Field Screening Data	
15									* Collect 10SFB0803 Collect 10GFB08	
20										
25										
30										
35										
40										

SOUTHNAVFAC

LOG OF BORING CNC10-B09

PROJECT NO: 7912	PROJECT NAME: SITE 10 BUILDING 657
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/23/99
DRILLING COMPANY: U S PROBE	SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH/Hand Auger	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
	1-2 FT	Hand Auger	ND						Top soil 0-1 FT	
	2-3 FT		22						Sandy Clay, light brown, (approx. 60% Clay, 1-3 FT	
	3-4 FT		80							
5										
									Sandy Clay light gray, approx. 80% clay, damp 3-4 FT	
10										
									Field Screening Data	
20									*Collect 10SFB0904	
									Collect 10GFB09	
25										
30										
35										

JOB NUMBER

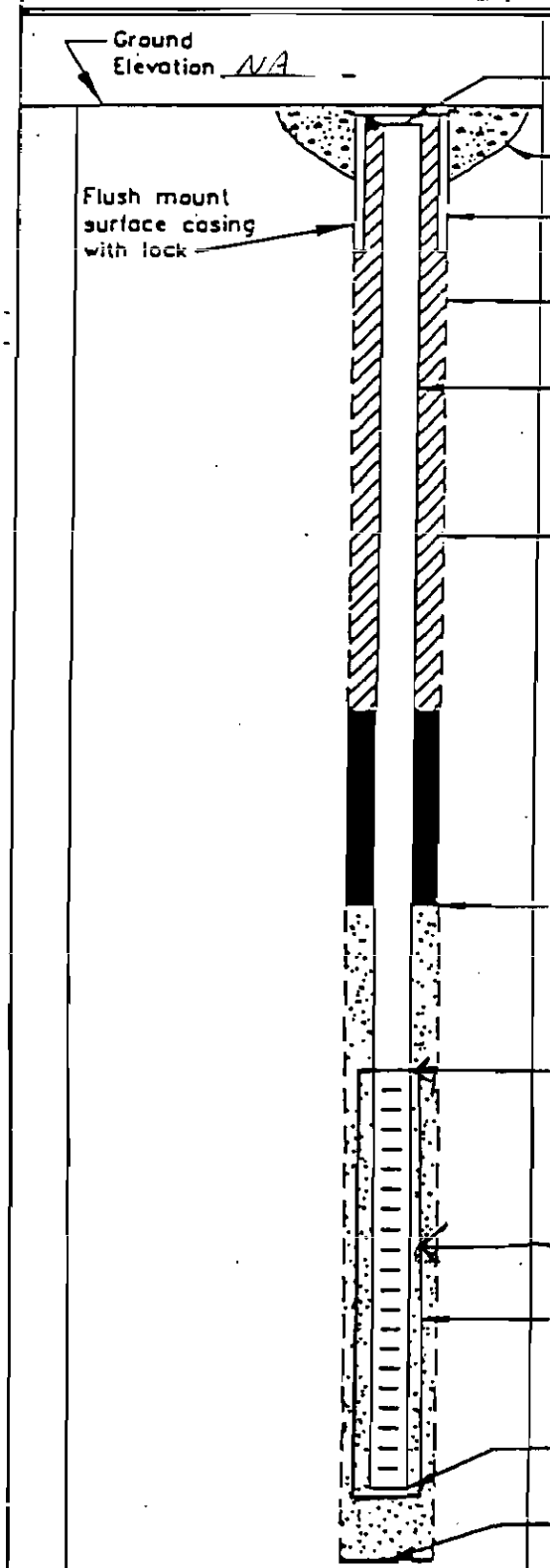
BORING NO.: _____

MONITORING WELL SHEET

PROJECT CNC Zone 14
PROJECT NO. CTO 0068/7912
ELEVATION T.O.C. 98.03
FIELD GEOLOGIST Pam Jackson

LOCATION Site 10, Building 657
BORING CNC10-P04
DATE 1/25/99

DRILLER Gatlin
DRILLING METHOD 2.25" ID - Hollow Stem Augers
DEVELOPMENT METHOD over Pumping



ELEVATION TOP OF RISER: 98.03 Relative Elevation

TYPE OF SURFACE SEAL: Concrete mix

TYPE OF PROTECTIVE CASING: 8" Steel Manhole

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 4"

TYPE OF RISER PIPE: 1.25" ID

RISER PIPE I.D.: SCH. 80 Riser

TYPE OF BACKFILL/SEAL: Sand 20/30 Silica Sand to approx. 1 FT BLS

DEPTH/ELEVATION TOP OF SAND: 1 FT/BLS

DEPTH/ELEVATION TOP OF SCREEN: 3 FT/BLS

TYPE OF SCREEN: SCH 80 PVC Screen (1.25" ID)

SLOT SIZE x LENGTH: 0.010 x 10 Feet

2" ID SCH. 80 SCREEN (SLOT 0.010) CASING WITH 20/30 SILICA SAND

TYPE OF SAND PACK: 20/30 Standard Silica Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 13 FT/BLS

DEPTH/ELEVATION BOTTOM OF SAND: 13 FT/BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 13 FT/BLS

BACKFILL MATERIAL BELOW SAND: 13 FT BLS

FILE: U:\70\CEQ\CNC10P04.DWG

APPENDIX C

FIELD SAMPLING DATA SHEETS

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 10
Project No.: 7912

[ ] Domestic Well Data
[✓] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: 10GLP0401
Sample Location: CNC10 – P04
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Date: 3/18/99								
Time: 1620								
Method: Peristaltic								

PURGE DATA

Date: 3/18/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	initial	7.23	2.93	17.1	185	1.42	.14	@ 300ml/min
Monitor Reading (ppm):	1	7.15	2.77	16.7	11	.95	.13	1 G
Well Cesing Diameter: 1"	2	7.11	2.84	17.1	7	.84	.12	2 G
Well Casing Material: PVC	3	7.17	2.90	16.8	3	1.24	.14	3 G
Total Well Depth (TD):		7.09	2.89	16.7	2	0.13	.14	4 G
Static Water Level (WL): 2.66'								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 4G								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOCs MTBE	HCl	(3) 40ml	✓
PAH	—	(2) 1000ml	✓

OBSERVATIONS / NOTES:

Circle if Applicable

MS/MSD	Duplicate ID No.:

Signature(s):

Gwsamp

APPENDIX D

SOIL AND GROUNDWATER LABORATORY ANALYTICAL DATA

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID	: ZHTL00901
Lab ID	: 9901831-06
Matrix	: Water
Date Collected	: 01/26/99
Date Received	: 01/26/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.300	5.00	ug/l	1.0	RMB	02/01/99	1657	141220	1
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0					
TOLUENE	U	ND	0.500	5.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	85.5	(60.2 - 139.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	102.	(70.6 - 152.)
Toluene-d8	BTEX/NAP/MTBE-8260B	88.7	(68.4 - 135.)

M = Method	Method-Description
M 1	SW846 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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9901831-06

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client:	Tetra Tech NUS, Inc. 794 South Military Trail Deerfield Beach, Florida 33442
Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : ZHTL00901

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Valerie S Davis

Reviewed By

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 08, 1999

Sample ID : ZHRL00201
Lab ID : 9901644-02
Matrix : Water
Date Collected : 01/20/99
Date Received : 01/20/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.300	5.00	ug/l	1.0	MAP	01/30/99	1534	141130	1
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0					
TOLUENE	U	ND	0.500	5.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.27	10.3	ug/l	1.0	TSD	01/23/99	0058	140430	2
ACENAPHTHYLENE	U	ND	1.34	10.3	ug/l	1.0					
ANTHRACENE	U	ND	2.37	10.3	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.88	10.3	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.06	10.3	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.84	10.3	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.58	10.3	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.68	10.3	ug/l	1.0					
CHRYSENE	U	ND	2.27	10.3	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.27	10.3	ug/l	1.0					
FLUORANTHENE	U	ND	3.19	10.3	ug/l	1.0					
FLUORENE	U	ND	2.16	10.3	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.50	10.3	ug/l	1.0					
PHENANTHRENE	U	ND	1.85	10.3	ug/l	1.0					
PYRENE	U	ND	2.58	10.3	ug/l	1.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	ND	1.22	2.00	mg/l	1.0	AAT	02/01/99	1000	141158	3

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 08, 1999

Sample ID : ZHRL00201

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	ES	01/22/99	1300	140430	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	66.0	(43.0 - 108.)
Nitrobenzene-d5	M610-TETR	58.6	(35.0 - 111.)
p-Terphenyl-d14	M610-TETR	78.1	(33.0 - 125.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	126.	(60.2 - 139.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	107.	(70.6 - 152.)
Toluene-d8	BTEX/NAP/MTBE-8260B	126.	(68.4 - 135.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	SW846 8270C
M 3	SW-846 9070
M 4	EPA 3510

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID	: 10SLB0203
Lab ID	: 9901831-02
Matrix	: Soil
Date Collected	: 01/26/99
Date Received	: 01/26/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	D	0.536	5.00	ug/kg	1.0	MAP	02/02/99	1351	141247	1
ETHYLBENZENE	U	D	0.321	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		D	0.190	5.95	ug/kg	1.0					
NAPHTHALENE	U	D	0.726	5.00	ug/kg	1.0					
TOLUENE	U	D	1.12	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	D	0.298	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		24.0	1.00	1.00	wt%	1.0	GJ	01/27/99	1545	140900	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	D	843	1760	ug/kg	4.0	TSD	01/31/99	2349	140821	3
ACENAPHTHYLENE	U	D	774	1760	ug/kg	4.0					
ANTHRACENE	U	D	462	1760	ug/kg	4.0					
BENZO(A)ANTHRACENE		1930	360	1760	ug/kg	4.0					
BENZO(A)PYRENE		2080	378	1760	ug/kg	4.0					
BENZO(B)FLUORANTHENE	J	1700	748	1760	ug/kg	4.0					
BENZO(G,H,I)PERYLENE	J	957	428	1760	ug/kg	4.0					
BENZO(K)FLUORANTHENE	J	1450	695	1760	ug/kg	4.0					
CHRYSENE		1990	288	1760	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	D	437	1760	ug/kg	4.0					
FLUORANTHENE		4180	344	1760	ug/kg	4.0					
FLUORENE	U	D	602	1760	ug/kg	4.0					
INDENO(1,2,3-CD)PYRENE	J	1320	423	1760	ug/kg	4.0					
PHENANTHRENE	J	446	316	1760	ug/kg	4.0					
PYRENE		3640	379	1760	ug/kg	4.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		211	66.0	132	mg/kg	1.0	AAT	02/11/99	1100	141864	4

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0203

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:

Volatiles 8260 High Level	MAP	02/05/99	1050	141247	5
GC/MS Base/Neutral Compounds	CPU	01/27/99	1800	140821	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
Fluorobiphenyl	M610-TETR	50.9	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	43.9	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	70.0	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	119.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	94.2	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	118.	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 3550
M 3	EPA 8270C
M 4	SW846 9071A
M 5	EPA 5035

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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NC	233	
SC	10120	10582
TN	02934	02934

Client:	Tetra Tech NUS, Inc. 794 South Military Trail Deerfield Beach, Florida 33442
Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0203

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Valerie S Davis

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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0203D
Lab ID : 9901831-03
Matrix : Soil
Date Collected : 01/26/99
Date Received : 01/26/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.698	5.00	ug/kg	1.0	MAP	02/02/99	1424	141247	1
ETHYLBENZENE	U	ND	0.419	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.248	7.75	ug/kg	1.0					
NAPHTHALENE	U	ND	0.946	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.46	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.388	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		36.0	1.00	1.00	wt%	1.0	GJ	01/27/99	1545	140900	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	1000	2080	ug/kg	4.0	TSD	02/01/99	0022	140821	3
ACENAPHTHYLENE	U	ND	919	2080	ug/kg	4.0					
ANTHRACENE	U	ND	548	2080	ug/kg	4.0					
BENZO(A)ANTHRACENE	U	ND	427	2080	ug/kg	4.0					
BENZO(A)PYRENE	U	ND	448	2080	ug/kg	4.0					
BENZO(B)FLUORANTHENE	U	ND	888	2080	ug/kg	4.0					
BENZO(G,H,I)PERYLENE	U	ND	508	2080	ug/kg	4.0					
BENZO(K)FLUORANTHENE	U	ND	825	2080	ug/kg	4.0					
CHRYSENE	U	ND	342	2080	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	ND	519	2080	ug/kg	4.0					
FLUORANTHENE	U	ND	408	2080	ug/kg	4.0					
FLUORENE	U	ND	715	2080	ug/kg	4.0					
INDENO(1,2,3-CD)PYRENE	U	ND	502	2080	ug/kg	4.0					
PHENANTHRENE	U	ND	375	2080	ug/kg	4.0					
PYRENE	U	ND	450	2080	ug/kg	4.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		156	78.0	156	mg/kg	1.0	AAT	02/12/99	1500	142225	4

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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0203D

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:

Volatiles 8260 High Level	MAP	02/05/99	1050	141247	5
GC/MS Base/Neutral Compounds	CPU	01/27/99	1800	140821	2

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	52.6	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	42.1	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	83.0	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	121.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	94.4	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	124.	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 3550
M 3	EPA 8270C
M 4	SW846 9071A
M 5	EPA 5035

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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NC	233	
SC	10120	10582
TN	02934	02934

Client:	Tetra Tech NUS, Inc. 794 South Military Trail Deerfield Beach, Florida 33442
Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0203D

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID	: 10SLB0803
Lab ID	: 9901831-04
Matrix	: Soil
Date Collected	: 01/26/99
Date Received	: 01/26/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.545	5.00	ug/kg	1.0	MAP	02/02/99	1458	141247	1
ETHYLBENZENE	U	ND	0.327	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.194	6.05	ug/kg	1.0					
NAPHTHALENE	U	ND	0.738	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.14	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.303	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		25.0	1.00	1.00	wt%	1.0	GJ	01/27/99	1545	140900	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	213	444	ug/kg	1.0	TSD	02/01/99	0054	140821	3
ACENAPHTHYLENE	U	ND	196	444	ug/kg	1.0					
ANTHRACENE	U	ND	117	444	ug/kg	1.0					
BENZO(A)ANTHRACENE	U	ND	91.0	444	ug/kg	1.0					
BENZO(A)PYRENE	U	ND	95.5	444	ug/kg	1.0					
BENZO(B)FLUORANTHENE	U	ND	189	444	ug/kg	1.0					
BENZO(G,H,I)PERYLENE	U	ND	108	444	ug/kg	1.0					
BENZO(K)FLUORANTHENE	U	ND	176	444	ug/kg	1.0					
CHRYSENE	U	ND	72.8	444	ug/kg	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	111	444	ug/kg	1.0					
FLUORANTHENE	U	ND	87.0	444	ug/kg	1.0					
FLUORENE	U	ND	152	444	ug/kg	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	107	444	ug/kg	1.0					
PHENANTHRENE	U	ND	79.9	444	ug/kg	1.0					
PYRENE	U	ND	95.9	444	ug/kg	1.0					

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SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0803

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
The following prep procedures were performed:											
Volatiles 8260 High Level							MAP	02/05/99	1050	141247	4
GC/MS Base/Neutral Compounds							CPU	01/27/99	1800	140821	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	52.0	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	50.9	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	78.2	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	119.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	94.3	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	120.	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 3550
M 3	EPA 8270C
M 4	EPA 5035

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0803

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Valerie A Davis

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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID	: 10SLB0403
Lab ID	: 9901831-05
Matrix	: Soil
Date Collected	: 01/26/99
Date Received	: 01/26/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.621	5.00	ug/kg	1.0	MAP	02/02/99	1532	141247	1
ETHYLBENZENE	U	ND	0.373	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.221	6.90	ug/kg	1.0					
NAPHTHALENE	U	ND	0.842	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.30	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.345	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		29.0	1.00	1.00	wt%	1.0	GJ	01/27/99	1545	140900	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	225	469	ug/kg	1.0	TSD	02/01/99	0127	140821	3
ACENAPHTHYLENE	U	ND	207	469	ug/kg	1.0					
ANTHRACENE	U	ND	123	469	ug/kg	1.0					
BENZO(A)ANTHRACENE	U	ND	96.1	469	ug/kg	1.0					
BENZO(A)PYRENE	U	ND	101	469	ug/kg	1.0					
BENZO(B)FLUORANTHENE	U	ND	200	469	ug/kg	1.0					
BENZO(G,H,I)PERYLENE	U	ND	114	469	ug/kg	1.0					
BENZO(K)FLUORANTHENE	U	ND	186	469	ug/kg	1.0					
CHRYSENE	U	ND	76.9	469	ug/kg	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	117	469	ug/kg	1.0					
FLUORANTHENE	U	ND	91.9	469	ug/kg	1.0					
FLUORENE	U	ND	161	469	ug/kg	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	113	469	ug/kg	1.0					
PHENANTHRENE	U	ND	84.4	469	ug/kg	1.0					
PYRENE	U	ND	101	469	ug/kg	1.0					
General Chemistry											
Total Organic Carbon		21000	365	846	mg/kg	1.0	LS	02/08/99	1507	141409	/

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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0403

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:

Volatiles 8260 High Level	MAP	02/05/99	1050	141247	5
GC/MS Base/Neutral Compounds	CPU	01/27/99	1800	140821	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	47.1	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	39.3	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	86.7	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	143.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	104.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	137.	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 3550
M 3	EPA 8270C
M 4	EPA 415.1 Modified
M 5	EPA 5035

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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NC	233	
SC	10120	10582
TN	02934	02934

Client:	Tetra Tech NUS, Inc. 794 South Military Trail Deerfield Beach, Florida 33442
Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0403

M = Method **Method-Description**

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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0603
Lab ID : 9901831-07
Matrix : Soil
Date Collected : 01/26/99
Date Received : 01/26/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.540	5.00	ug/kg	1.0	MAP	02/02/99	1606	141247	1
ETHYLBENZENE	U	ND	0.324	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.192	6.00	ug/kg	1.0					
NAPHTHALENE	U	ND	0.732	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.13	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.300	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		18.0	1.00	1.00	wt%	1.0	GJ	01/27/99	1545	140900	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	781	1630	ug/kg	4.0	TSD	01/31/99	2243	140821	3
ACENAPHTHYLENE	U	ND	718	1630	ug/kg	4.0					
ANTHRACENE	U	ND	428	1630	ug/kg	4.0					
BENZO(A)ANTHRACENE	U	ND	334	1630	ug/kg	4.0					
BENZO(A)PYRENE	U	ND	350	1630	ug/kg	4.0					
BENZO(B)FLUORANTHENE	U	ND	694	1630	ug/kg	4.0					
BENZO(G,H,I)PERYLENE	U	ND	397	1630	ug/kg	4.0					
BENZO(K)FLUORANTHENE	U	ND	645	1630	ug/kg	4.0					
CHRYSENE	U	ND	267	1630	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	ND	405	1630	ug/kg	4.0					
FLUORANTHENE	U	ND	319	1630	ug/kg	4.0					
FLUORENE	U	ND	558	1630	ug/kg	4.0					
INDENO(1,2,3-CD)PYRENE	U	ND	392	1630	ug/kg	4.0					
PHENANTHRENE	U	ND	293	1630	ug/kg	4.0					
PYRENE	U	ND	352	1630	ug/kg	4.0					

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0603

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

The following prep procedures were performed:

Volatiles 8260 High Level	MAP	02/05/99	1050	141247	4
GC/MS Base/Neutral Compounds	CPU	01/27/99	1800	140821	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	66.3	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	60.8	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	89.6	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	119.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	93.8	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	119.	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 3550
M 3	EPA 8270C
M 4	EPA 5035

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client:	Tetra Tech NUS, Inc. 794 South Military Trail Deerfield Beach, Florida 33442
Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: February 15, 1999

Sample ID : 10SLB0603

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Valerie L Davis

Reviewed By

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GEOTECHNICAL ANALYSIS

GEOTECHNICAL SPREADSHEET

Project Number:	tetr00498	Depth:	UNKNOWN
Sample Number:	9901831-02	Tested By:	M. Yates
Boring Number:	NA	Date:	2/15/99
Location:	NA		

GRAIN-SIZE ANALYSIS

HYGROSCOPIC MOISTURE CONTENT DETERMINATION

weight of total air dried sample=	117.14
weight of container + air-dried soil=	33.9
weight of container + oven-dried soil=	32.99
weight of container=	7.2
weight of water=	0.91
weight of oven-dried soil=	25.79
weight of air-dried soil=	26.7
hygroscopic moisture correction factor=	0.97
weight of oven-dried sample for hydro. anal.=	113.63

SIEVE ANALYSIS

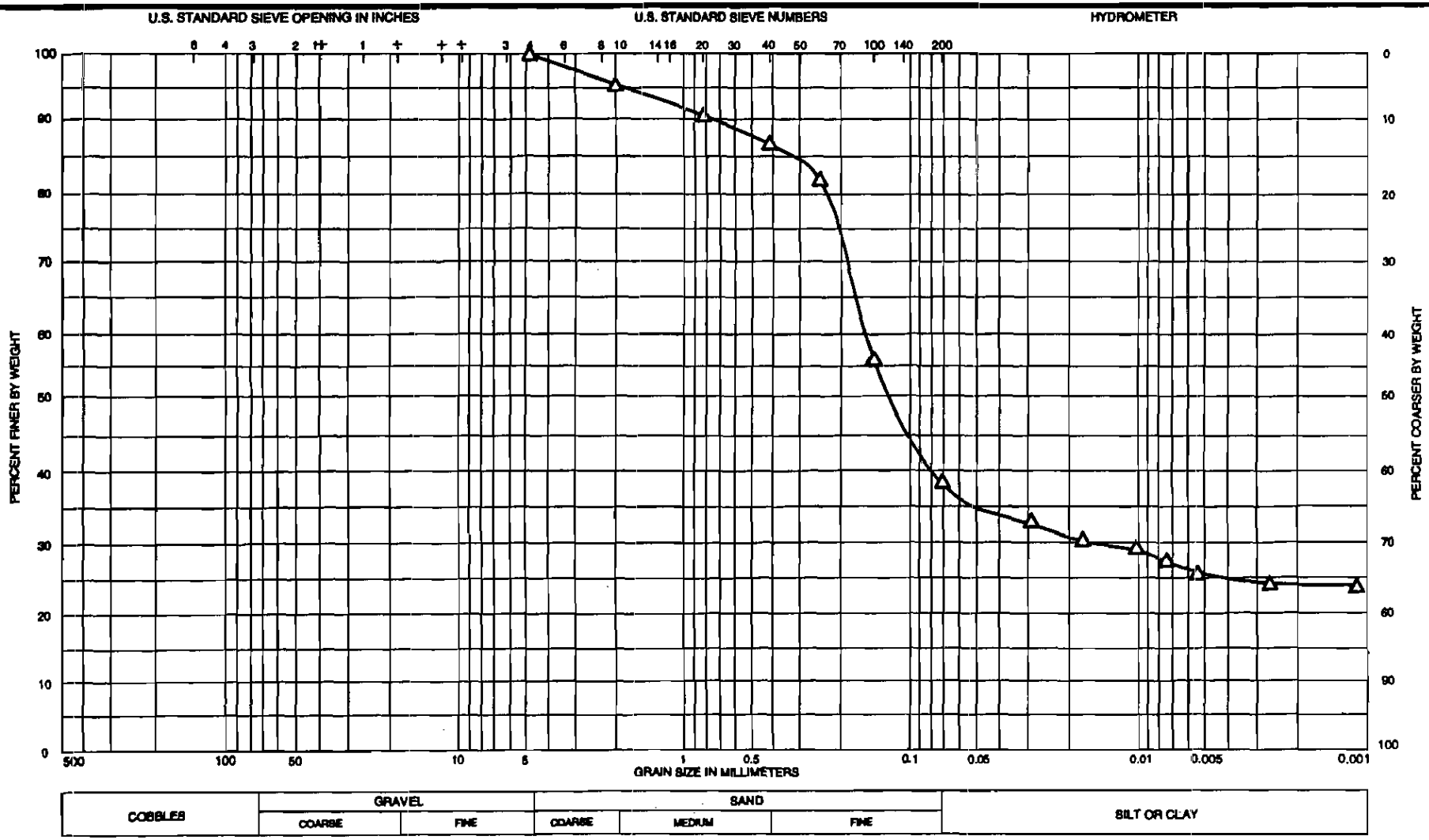
weight of oven-dried sample= 113.63

Sieve #	Weight Ret.	Weight Passed	% Passing
4	0	113.63	100.0
10	4.36	109.27	96.2
20	4.9	104.37	91.9
40	4.46	99.91	87.9
60	6.29	93.62	82.4
100	29.73	63.89	56.2
200	20.38	43.51	38.3
230	0.71	42.80	37.7
pan	0.09	42.71	37.6

HYDROMETER ANALYSIS

weight	113.63
SG	2.65

TIME	ACTUAL READING	TEMP.	COMPOSITE CORRECTION	R	LENGTH	K	DIAMETER	P
2	1.027	22	0.00325	1.02375	9.1	0.01332	.02848	33.6
5	1.025	22	0.00325	1.02175	9.7	0.01332	.01853	30.7
15	1.024	22	0.00325	1.02075	9.9	0.01332	.01084	29.3
30	1.023	22	0.00325	1.01975	10.2	0.01332	.00777	27.9
60	1.022	22	0.00325	1.01875	10.5	0.01332	.00556	26.5
250	1.021	21	0.00350	1.01750	10.7	0.01348	.00279	24.7
1440	1.02	21	0.00350	1.01650	11.0	0.01348	.00118	23.3



Sample No.	Specific Gravity	Classification	Nat w %	LL	PL	PI
9901831-02	—	SC	—			
		% GRAVEL = 0.0				
		% SAND = 61.7				
		% SILT = 12.8				
		% CLAY = 25.5				

GRADATION CURVES

GENERAL ENGINEERING
A Division of General Engineering Laboratories, Inc.

Project: tetr00498
Area: Tetra Tech, Inc.
Boring No.
Date: February 11, 1999

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of ____

9901831%

Client Name/Facility Name: Tetra Tech NUS / CNC

Collected by/Company: James R. Hill / TTNUS

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/[illegible]	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide PAH	Herbicide TPH	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Grain Size		Remarks	
-01	Ø4SLIDWØ3	1-26-99	0745		✓	✓		5						3		1	1										.1
-02	1ØSLBØ2Ø3	"	1055		✓	✓		8						3		1	1							3			.2
-03	1ØSLBØ2Ø3D	"	1055		✓	✓		5						3		1	1									Dupe	.1
-04	1ØSLBØ8Ø3	"	1135		✓	✓		4						3		1											.3
-05	1ØSLBØ4Ø3	"	1224		✓	✓		5		1				3		1											.4
-06	ZHTLØØ9Ø1	"	0930		✓	✓	✓	3						3												Trip Blank.	.5
-07	1ØSLBØ6Ø3	"	1445		✓	✓		4						3		1											.3
~~-08~~	1ØSLBØ6Ø3M	"	1445		✓	✓		4						3		1										MS	.3
~~-09~~	1ØSLBØ6Ø3S	"	1445		✓	✓		4						3		1										MSD	

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
[signature]	1-26-99	1620	Patricia [signature]	1/26/99	16:20	VOC-BTEX MTBE Standard Turnaround.

White = sample collector Yellow = file Pink = with report

3793

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 06, 1999

Sample ID : ZHTL01901
Lab ID : 9903742-01
Matrix : Water
Date Collected : 03/18/99
Date Received : 03/19/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/25/99	1626	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/25/99	1626	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/25/99	1626	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	J	1.48	1.20	5.00	ug/l	1.0					

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 06, 1999

Sample ID : ZHTL01901

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
TETRACHLOROETHYLENE	U	ND	0.700	1.00	ug/l	1.0					
TOLUENE	U	ND	0.500	5.00	ug/l	1.0	RMB	03/25/99	1626	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	EDB-8260B	87.2	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	94.2	(66.0 - 117.)
Toluene-d8	EDB-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	87.2	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	94.2	(66.0 - 117.)
Toluene-d8	MTBE-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	87.2	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	94.2	(66.0 - 117.)
Toluene-d8	NAP-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	87.2	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	94.2	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	80.4	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 8260

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client:	Tetra Tech NUS, Inc. 794 South Military Trail Deerfield Beach, Florida 33442
Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 06, 1999

Sample ID : ZHTL01901

M = Method	Method-Description

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 09, 1999

Sample ID : ZHRL00601 (RINSE BLANK)
Lab ID : 9903846-02
Matrix : Water
Date Collected : 03/22/99
Date Received : 03/24/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/29/99	1621	145472	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/29/99	1621	145472	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/29/99	1621	145472	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 09, 1999

Sample ID : ZHRL00601 (RINSE BLANK)

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
TETRACHLOROETHYLENE	U	ND	0.700	1.00	ug/l	1.0					
TOLUENE	U	ND	0.500	5.00	ug/l	1.0	RMB	03/29/99	1621	145472	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.18	10.0	ug/l	1.0	TSD	03/29/99	1407	145440	3
ACENAPHTHYLENE	U	ND	1.29	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.28	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.77	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	1.98	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.65	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.48	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.57	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.18	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.18	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.07	10.0	ug/l	1.0					
FLUORENE	U	ND	2.08	10.0	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.37	10.0	ug/l	1.0					
PHENANTHRENE	U	ND	1.78	10.0	ug/l	1.0					
PYRENE	U	ND	2.48	10.0	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds BMC 03/26/99 1230 145440 4

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	64.2	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	55.1	(35.3 - 108.)

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 09, 1999

Sample ID : ZHRL00601 (RINSE BLANK)

Surrogate Recovery	Test	Percent %	Acceptable Limits
p-Terphenyl-d14	M610-TETR	53.4	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	88.5	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	87.1	(66.0 - 117.)
Toluene-d8	EDB-8260B	78.6	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	88.5	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	87.1	(66.0 - 117.)
Toluene-d8	MTBE-8260B	78.6	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	88.5	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	87.1	(66.0 - 117.)
Toluene-d8	NAP-8260B	78.6	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	88.5	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	87.1	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	78.6	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 8260
M 3	SW846 8270C
M 4	EPA 3510

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client:	Tetra Tech NUS, Inc. 794 South Military Trail Deerfield Beach, Florida 33442
Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 09, 1999

Sample ID : ZHRL00601 (RINSE BLANK)

M = Method	Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 06, 1999

Sample ID	: 10GLP0401
Lab ID	: 9903742-07
Matrix	: Water
Date Collected	: 03/18/99
Date Received	: 03/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/25/99	1959	145387	1
RT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
APHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/25/99	1959	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/25/99	1959	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	J	1.84	1.20	5.00	ug/l	1.0					

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Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 06, 1999

Sample ID : 10GLP0401

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
TETRACHLOROETHYLENE	U	ND	0.700	1.00	ug/l	1.0					
TOLUENE	U	ND	0.500	5.00	ug/l	1.0	RMB	03/25/99	1959	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.20	10.0	ug/l	1.0	TSD	03/29/99	1935	145135	3
ACENAPHTHYLENE	U	ND	1.30	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.30	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.80	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.00	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.70	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.50	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.60	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.20	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.20	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.10	10.0	ug/l	1.0					
FLUORENE	U	ND	2.10	10.0	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.40	10.0	ug/l	1.0					
PHENANTHRENE	U	ND	1.80	10.0	ug/l	1.0					
PYRENE	U	ND	2.50	10.0	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds ES 03/23/99 1445 145135 4

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	77.1	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	69.6	(35.3 - 108.)

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Client: Tetra Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, Florida 33442
Contact: Mr. Arnold Lamb
Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 06, 1999

Sample ID : 10GLP0401

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	67.0	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	86.4	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	97.4	(66.0 - 117.)
Toluene-d8	EDB-8260B	82.7	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	86.4	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	97.4	(66.0 - 117.)
Toluene-d8	MTBE-8260B	82.7	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	86.4	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	97.4	(66.0 - 117.)
Toluene-d8	NAP-8260B	82.7	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	86.4	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	97.4	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	82.7	(73.0 - 122.)

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Contact:	Mr. Arnold Lamb
Project Description:	CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 06, 1999

Sample ID : 10GLP0401

M = Method **Method-Description**

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

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2040 Savage Road
Charleston, South Carol[illegible]9407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1

99037427

Client Name/Facility Name: Zone H, Charleston Naval Comp[illegible]

Collected by/Company: TT NUS

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	PAH	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Methane	Anions	Remarks	39165
01	ZHTL01901	3/18/99	0900					3						3												Trip Blank	.1
02	01GLM0101	3/18/99	1700	✓			✓	5			2			3													.2
03	01GLM0201	3/18/99	1720	✓			✓	5			2			3													.2
04	NBCH656001	3/18/99	1545/0845	✓			✓	9			2			3										3	1		.3
05	NBCH656002	3/18/99	1640	✓			✓	5			2			3													.2
06	NBCH656003	3/18/99	1610/0900	✓			✓	9			2			3										3	1		.3
07	10GLP0401	3/18/99	1620	✓			✓	5			2			3													.2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[illegible]	3/19/99	1230	[illegible]				

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			[illegible]	3/19/99	1230	VOC = 8260 w/ MTBE + Naphthalene PAH = 8270

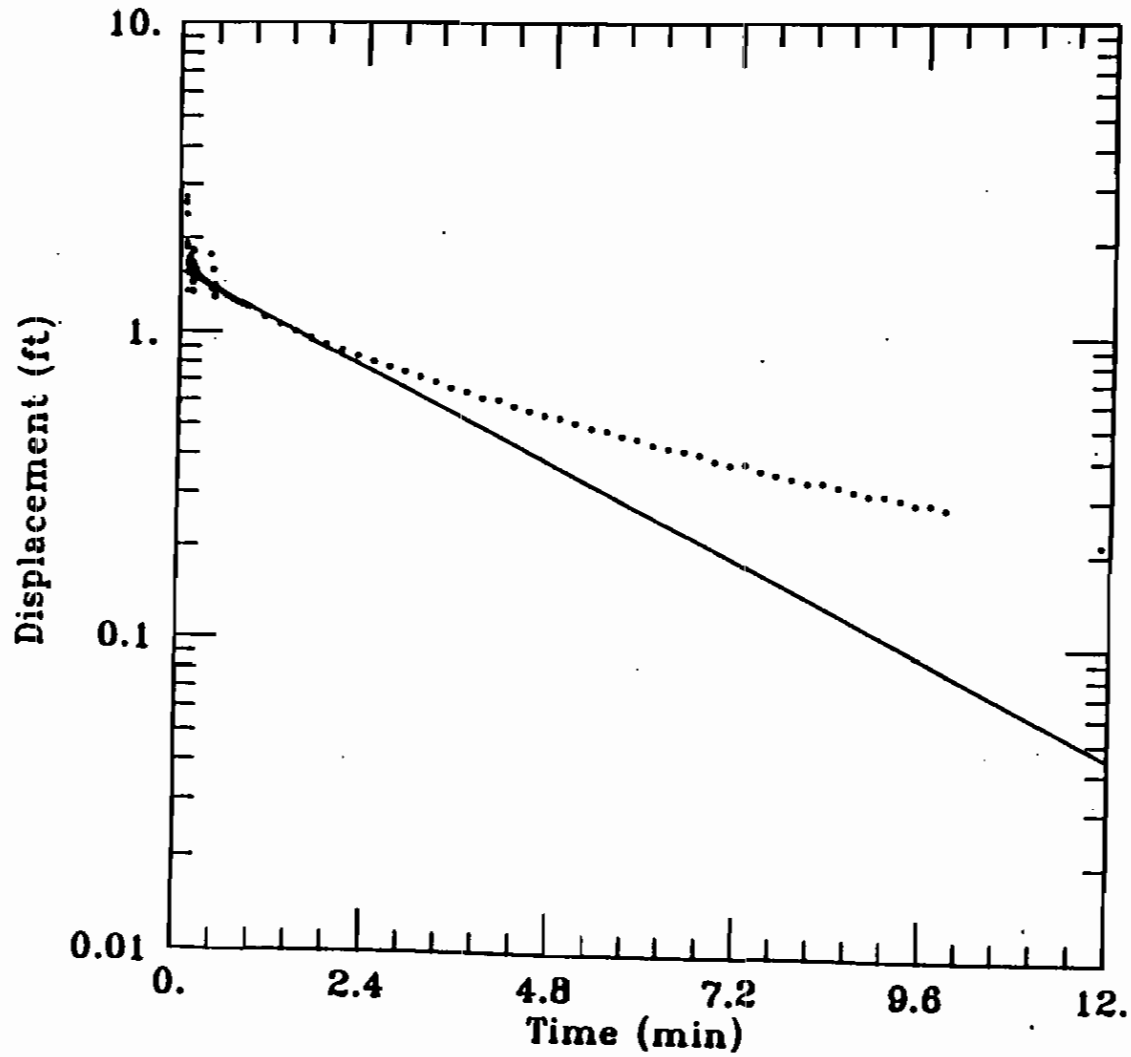
White = sample collector Yellow = file Pink = with report

APPENDIX E

AQUIFER CHARACTERIZATION GRAPHS

Client: **CLEAN**	Company: **E/A&H**
Location: **NAS CHARLESTON**	Project: **2908-08450**

NBCH656001 Falling Head Slug Test



DATA SET:
65601FAL.AQT
01/13/95

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

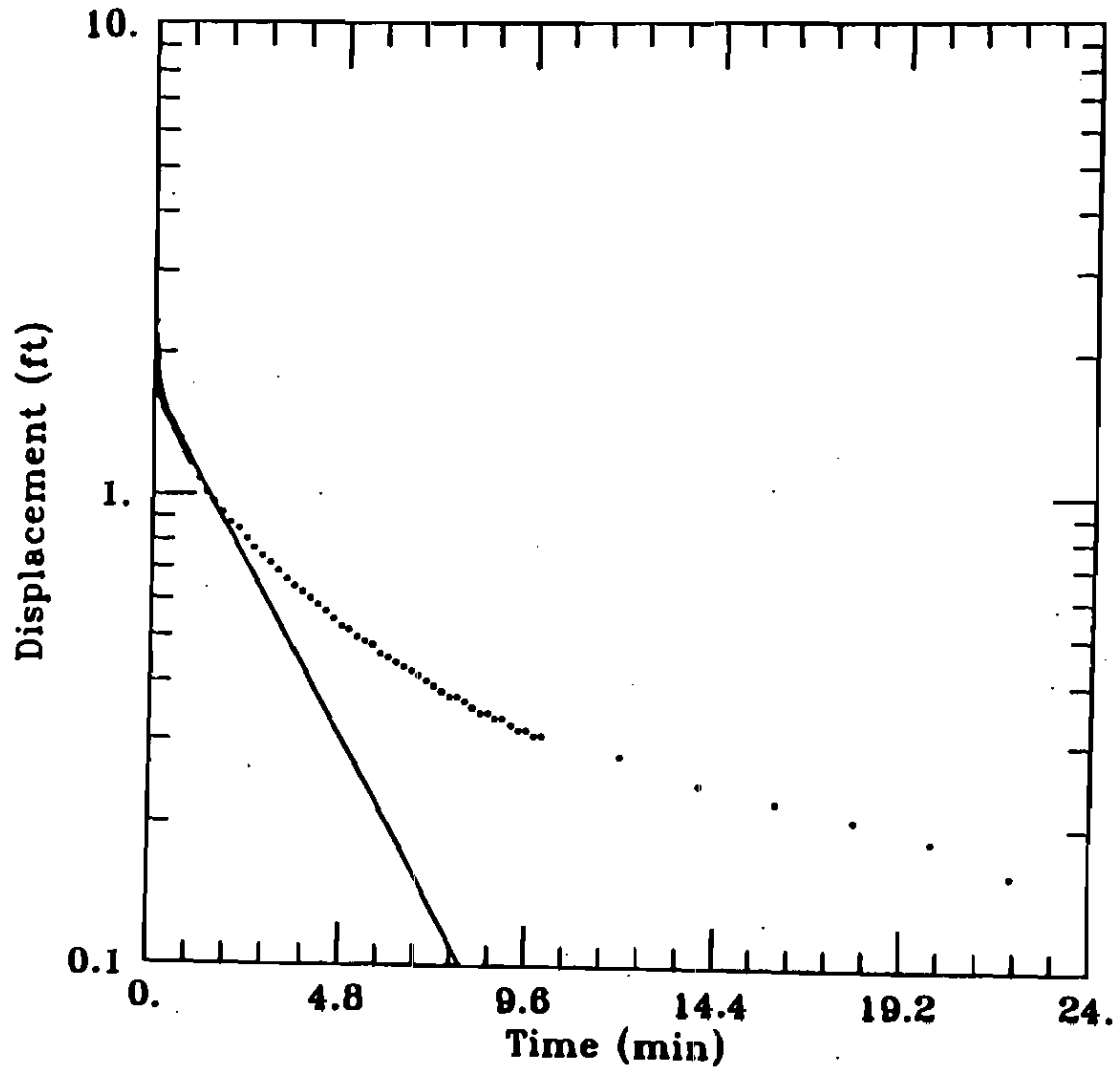
TEST DATA:
H0 = 0.5886 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 10. ft
b = 12. ft
H = 12. ft

PARAMETER ESTIMATES:
K = 0.0002763 ft/min
y0 = 1.57 ft

AQTESOLV

Client: **CLEAN**	Company: **E/A&H**
Location: **NAS CHARLESTON**	Project: **2908-08450**

NBCH656001 Rising Head Slug Test



DATA SET:
65601RIS.AQT
01/13/95

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
H0 = 1.8 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 10. ft
b = 12. ft
H = 12. ft

PARAMETER ESTIMATES:
K = 0.0003299 ft/min
y0 = 1.668 ft

AQTESOLV