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RAPID ASSESSMENT REPORT FOR SITE 1 BUILDING NS-71 ZONE H CNC CHARLESTON SC

08/01/1999

TETRA TECH INC

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RAPID ASSESSMENT REPORT
FOR
SITE 1, BUILDING NS-71

01164

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
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
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PREPARED UNDER THE SUPERVISION OF:

Paul E. Calligan

PAUL E. CALLIGAN, P.G.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

Debbie Wroblewski

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment (RA) for Site 1 (Building NS 71) which includes an aboveground storage tank (AST) which supplied fuel oil to Building NS 71 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 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, evaluate public and private potable wells, locate utilities, locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed the previously prepared Aboveground Storage Tank Assessment Report for AST NS 71 to determine soil boring locations and monitoring well placements;
- Conducted a site survey to identify utilities and to construct a site plan;
- Performed a direct push investigation to collect soil samples for field screening using an organic vapor analyzer and collect soil and groundwater samples for mobile lab screening analysis for benzene, toluene, ethyl benzene, total xylenes (BTEX), and diesel range organics;
- Installed shallow permanent monitoring wells to approximately 12 feet below land surface (bls);
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260 and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270;
- Performed groundwater natural attenuation sampling;
- Collected soil samples for laboratory analysis for BTEX, and naphthalene using USEPA Method 8260, PAHs using USEPA Method 8270, total organic carbon (TOC) using USEPA Method 415.1, total recoverable petroleum hydrocarbon (TRPH) using USEPA Method 9071, and grain size analysis using sieve and hydrometer methods; and
- Surveyed monitoring well top of casing elevations and collected depth to groundwater measurements to evaluate the groundwater flow direction.

Conclusion

Benzene was the only Chemical of Concern (CoC) detected in the onsite soils at concentrations that exceed the SCDHEC Risk Based Screening Levels (RBSLs) for clay-rich soils. Benzene was detected in two soil samples, 01SLB0202 at 5.55 µg/kg, and 01SLB1501 at 5.26 µg/kg. These concentrations slightly exceeded the RBSL of 5 µg/kg for clay-rich soils. A Site-Specific Target Level (SSTL) was calculated for the subsurface soil for benzene leaching to groundwater. The soil leaching SSTL calculated for benzene is 767 µg/kg, which is well above the maximum benzene concentration detected (5.55 µg/kg).

Only one of the groundwater CoCs, MTBE was detected above method detection limits in the groundwater samples. The detected concentration (9.53 µg/l) was less than the RBSL for groundwater of 40 µg/l.

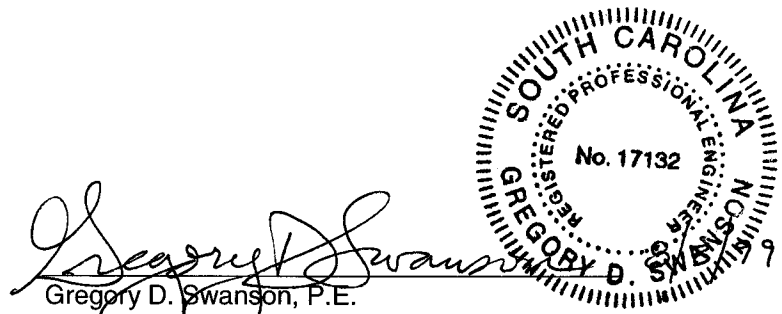
Recommendation

Since there is no groundwater contamination above the SCDHEC RBSLs, and CoCs detected in onsite soils was below the SSTL, no further action is recommended for this site.

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.

Approved By:



Gregory D. Swanson, P.E.
South Carolina Registration No. 17132
SCDHEC UST Site Rehabilitation Contractor Class I & II No. 24

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1.0 INTRODUCTION

Facility NS-71 (Site 1) is a closed aboveground storage tank (AST) 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 approval letter dated November 4, 1998. Fieldwork necessary to complete the RA was performed January 13-27, February 5-21, and March 18-24, 1999, by TtNUS.

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 is "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, current utilities, and vicinity surface drainage, is included as Figure 2.

Site 1 consists of a closed AST previously located inside a shrubbery-rimmed earthen berm approximately 90 feet from Building NS-71 (see Figure 3). The AST was a steel 2,200-gallon heating oil tank installed in 1987 to replace an 8,000-gallon AST formerly occupying the same location. Building NS-71 was constructed in 1963 to serve as a facility mess hall. At the time of base closure, the building functioned as a mini-mart and liquor packaging store. The AST was last used in March 1996 [Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston (SPORTENDETCHASN), 1998).

The Site 1 area has also been designated an Area of Concern (AOC) by the RCRA investigation of the facility. AOC 656 was identified based on a petroleum spill located between Buildings 602 and NS-71 and was proposed for a RCRA Facility Investigation (RFI). A passive soil gas investigation was completed as part of the initial Focused Field Investigation. The passive soil gas investigation utilized the PETREX technology and indicated relatively high soil gas responses for acetone, BTEX compounds and other oil compounds (EnSafe/Allen & Hoshall (E/A&H), 1996).

1.2 SITE HISTORY

In 1901, the U.S. Navy acquired 2,250 acres near Charleston to a build a 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 homeport for combatant ships and submarines of the U.S. Atlantic Fleet (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 Closure and Realignment 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 AST at Building NS-71 was removed on July 8, 1998.

AST NS-71 was installed in 1987 to replace Structure 602, an 8,000 gallon AST formerly occupying the same location. The AST was last used in March 1996. Between May and July 1998, the AST was removed, cleaned, and recycled as scrap metal. At the time of removal the tank was reported to be in good condition without corrosion, pitting, or visible holes. The supply and return piping for the AST were removed at the same time as the tank. The AST piping consisted of ¾ inch steel lines enclosed in plastic sheathing. At the time of removal the piping was in sound condition with the exception of where it exited the ground near the tank and building. At these locations corrosions and pitting were severe. However,

no holes were visible (SPORTENDETCHASN, 1998). The Underground Storage Tank Assessment Report for AST NS-71 is included in Appendix A.

Initially, soil excavation took place near Building NS-71 to remove soils containing heavy petroleum staining and strong petroleum odors. During the excavation 36 cubic yards of impacted soil were removed. A second expanded soil excavation was completed inside the berm to remove impacted soil near the AST foundation. During the excavation; corroded, open-ended, 2-inch diameter steel piping was discovered approximately 6 to 8 inches below the AST NS-71 piping. The abandoned piping was presumably from the removal of Structure 602. It was observed during the removal that fuel oil had drained via gravity flow from the piping and collected around the base of the AST. Approximately 9 cubic yards of soil were removed during the excavation (SPORTENDETCHASN, 1998).

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 AST location. Specific information concerning the depth of utilities below land surface (bls) is currently unavailable. However, according to facility personnel, utility lines are typically located approximately 2 to 6 feet bls (SPORTENVDETCHASN, 1999). The following utility receptors were located:

- Water utility, sanitary sewer utility: A sanitary sewer line originates at the former Structure 602 and flows north-northeast. Water and sanitary sewer lines are located along the southern edge of Bordelon Avenue and along the eastern edge of Strong and Proteus Streets. The nearest downgradient line is located approximately 70 feet south of the AST area.

- Natural gas utility: A natural gas line extends along the entire northern edge of Bordelon Avenue. The line is situated approximately 50 feet south of the former AST location in a downgradient direction.

- Storm sewer utility: Storm Sewer Utility lines extend along the western edges of Strong and Proteus Streets. The nearest line is approximately 230 feet southeast of the former AST location in a downgradient direction.

- Electrical utility: 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.

A survey of groundwater users within a seven-mile radius of CNC was performed for the Final RCRA Facility Investigation Report for Zone H (A/E&H, 1996). According to this report, a survey of groundwater users within a seven-mile radius of CNC was conducted by the South Carolina Water Resources Commission to ascertain the extent of any shallow groundwater usage. Results of the water use investigation revealed that no drinking water wells, which utilize the shallow aquifer, are located within a four-mile radius of CNC. Irrigation wells were not identified within 1,000 feet of the site. Numerous monitoring wells are located within 1,000 feet of the site. The nearest surface water body to the site is shipyard creek located approximately 1,000 feet 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 was 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 Ashely 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. Transmissitivey in the Pleistocene aquifer are 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

Twenty-three direct push soil borings were advanced at Site 1 under the supervision of a TtNUS geologist between January 13, 1999 and January 21, 1999 (Figure 3). These borings ranged in depth from 2 to 12 feet bls and provided soil samples to characterize the subsurface lithology. On February 16 through February 19, 1999, two monitoring wells were installed onsite. Lithologic samples were collected using split spoon samplers and recorded during the drilling process to provide vertical delineation of soils from land surface to a depth of 27 feet bls.

Based on lithologic descriptions from the above soil borings and monitoring wells and lithologic descriptions from monitoring wells NBCH-656-001, NBCH-656-002, and NBCH-656-003 installed during the RFI, it appears that the subsurface soil consist of interbedded sandy clays, clayey sands, and sand units (see Figures 4 and 5). The clay units identified at the site were general less than 18 inches thick and were described as non-plastic. A lithologic description of the soil samples from 24 feet bls in monitoring well CHC01-02 indicated a sticky muck with organic plant materials. Boring logs are presented in Appendix B.

2.1.2 Site Hydrogeology

Three previously existing shallow monitoring wells are present at the site (see Figure 3). The three wells were installed on August 25, 1994 as part of the RFI investigation of AOC 656. The three monitoring wells designated NBCH-656-001, NBCH-656-002, and NBCH-656-003 were all completed to a total depth of 15 feet bls with screen intervals of 3.5 to 13.5 feet, 4 to 14 feet, and 5 to 15 feet; respectively. The monitoring wells are constructed of Schedule 40 polyvinyl chloride (PVC) casing and were installed to bracket the water table.

Two additional monitoring wells, CNC01-M01 and CNC01-M02, were installed as part of this RA investigation (see Figure 3). Monitoring well CNC01-M01 was completed as a shallow monitoring well to a depth of 12 feet bls. The monitoring well was completed using 10 feet of 0.01-inch machine slotted PVC well screen that bracketed the water table. Monitoring well CNC01-M02 was completed as a Type III monitoring well with 6-in diameter PVC surface casing grouted to a depth of 20 feet bls. After the grout for

the surface casing cured for 24 hours, the borehole was advanced to a depth of 27 feet and a 2-in. diameter PVC monitoring well was installed with a 5-foot, 0.01-in. machine slotted PVC screen. At the completion of the well installations, a South Carolina registered professional surveyor surveyed each monitoring well location and the top of casing elevation. Well construction logs for the RA monitoring wells are 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 21, 1999 and March 18, 1999. The recorded water-level data are presented in Table 1. Figure 6 presents the groundwater potentiometric surface during the March 1999 field event. The groundwater potentiometric surface for the February 21, 1999 measuring event was similar and is therefore not presented. Based on the potentiometric map, it appears that groundwater flow is toward the south-southeast toward Bordelon Avenue.

As part of the Final RFI 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. During the tidal study water levels were recorded in 19 wells throughout Zone H over a period of four days. Measurements were recorded every hour using data loggers. The four day period spanned nine high and nine low tide cycles.

Results of the tidal survey identified a maximum fluctuation in shallow monitoring wells of 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 Cooper River). The report concluded that the minimal fluctuations in the groundwater levels were 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

Twenty-three soil borings were completed as part of the screening portion of the soil investigation at Site 1. Four of the soil borings CNC01-B11, CNC01-B12, CNC01-B13 and CNC01-B14 encountered the water table within 1 foot bls and therefore were discontinued. Eight soil borings were completed to collect soil samples for analysis at a fixed base laboratory to confirm the Chemicals of Concern (CoC). The soil borings for screening evaluation were completed using a Direct Push Technology (DPT) rig. Samples were collected to evaluate subsurface soil vapors, soil contaminant concentration (via a mobile laboratory), and groundwater contaminant concentrations (via a mobile laboratory). The soil samples

were collected from a maximum depth of 4 feet bls. The soil and groundwater samples collected for mobile laboratory screening were analyzed for benzene, toluene, ethyl benzene, xylenes (BTEX), and diesel range organics.

Soil samples collected for fixed base laboratory analysis were analyzed for BTEX, and naphthalene using 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 SCDHEC guidance document "Standard Limited Assessment" (June 1997). Lithologic logs for each soil boring are presented in Appendix B. The soil boring locations are shown on Figure 3 and the assessment results are presented in Section 2.4.1.

A comprehensive groundwater monitoring event was conducted on March 18 and 19, 1999. Groundwater sampling was conducted using a peristaltic pump and low flow, quiescent techniques. The monitoring well were sampled in accordance with SCDHEC's guidance document "South Carolina Risk-Based Corrective Action for Petroleum Releases" (January 1998). Each well was purged of three to six well volumes or 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, MTBE, and naphthalene using EPA Method 8260 and polynuclear aromatic hydrocarbons (PAHs) using EPA method 8270. Three of the groundwater samples were also analyzed for the following natural attenuation parameters: dissolved oxygen, alkalinity, carbon dioxide, sulfide, ferrous iron, nitrite, manganese, nitrogen/nitrate, sulfate, and methane. The natural attenuation parameters are summarized in Table 3.

2.3 FIELD SCREENING ASSESSMENT

2.3.1 Soil Vapor Assessment

Each of the twenty-three soil borings completed were evaluated for soil vapors as part of the soil screening assessment at Site 1. OVA headspace measurements were recorded at 1-foot intervals to the top of the water table. Three of the soil borings CNC01-B12, CNC01-B13 and CNC01-B14 encountered the water table within 1 feet of land surface and therefore soil vapor samples were not collected. Table 4 summarizes the soil vapor screening results. Figure 3 presents the soil boring locations.

Soil vapor concentrations ranged from not detected to 6,000 parts per million (ppm). Thirteen of the soil borings were reported to contain soil vapor concentrations exceeding 100 ppm. Nine of the soil borings contained soil vapors exceeding 500 ppm. With the exception of soil borings CNC01-B01 and CNC01-B02, 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. Soil borings CNC01-B01 and CNC01-B02 were reported to contain elevated soil vapor concentrations in three of four and four of four samples, respectively. In addition, the soil sample collected at a depth of four feet bls in soil boring CNC01-B23 was described as saturated with petroleum product.

The soil vapor assessment was used 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 this data.

2.3.2 Soil Mobile Lab Results

One soil sample collected from each soil boring was analyzed in a mobile laboratory for benzene, toluene, ethyl benzene, total xylenes and diesel range organics using USEPA Method 8260. The soil samples were selected based on the soil vapor screening results with the additional criteria that the samples originate in the vadose zone above the water table. Table 5 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 5, benzene was not detected in any of the mobile laboratory soil samples. Toluene was detected in one sample (CNC01-B17) and both ethylbenzene and total xylene were detected in four samples (CNC01-B02, CNC01-B17, CNC01-B18, and CNC01-B19). Diesel range organics were detected in four samples (CNC01-B02, CNC01-B07, CNC01-B19, and CNC01-B23). The concentration of diesel range organics, 92 parts per billion (ppb), detected in soil boring CNC01-B23 corresponds with the soil vapor screening results, which indicated the presence of petroleum product.

The mobile laboratory soil analysis was used 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 and monitoring well locations were determined in part based on this data.

2.3.3 Groundwater Mobile Lab Results

Twenty-three groundwater screening samples were collected, one from each soil boring, and analyzed in a mobile laboratory for benzene, toluene, ethyl benzene, total xylenes and diesel range organics using USEPA method 8260. Table 6 presents a summary of the analytical data from the mobile laboratory. As indicated in Table 6, ethyl benzene and total xylenes detected in sample CNC01-B16 at concentrations of 3.1 and 13.9 ppb, respectively, were the only analytes detected above instrument detection limits.

The mobile laboratory groundwater analysis was used as a screening method to assist in identifying locations for permanent monitoring wells for the collection of groundwater samples for fixed base laboratory analysis

2.4 CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER

2.4.1 Chemicals of Concern in Soil

Eight subsurface soil samples (plus 1 duplicate sample) were collected at Site 1 for fixed base laboratory analysis. The soil boring locations are shown on Figure 3 and Table 7 summarizes the CoCs detected in the soil samples. All of the soil CoCs with the exception of dibenzo(a,h)anthracene, were detected in one or more of the soil samples. However, benzene was the only analyte detected at concentrations above the Risk Based Screening Levels (RBSL). Benzene was detected in samples 01SLB0202 (5.55 µg/kg) and 01SLB1501 (5.26 µg/kg) at concentrations that slightly exceeded the RBSL of 5 µg/kg for clay-rich soils. The RBSL for clay rich soils was used based on a grain size analysis completed on sample 01SLB1501 indicating a clayey sand matrix (Appendix D). Figure 7 shows the detected benzene concentrations and the approximate isoconcentrations.

Because of the previously completed tank closure for AST NS-71 and associated soil removal, a soil boring and soil sample was not collected from the area under the former AST location. The AST Closure Report is included in Appendix A.

2.4.2 Chemicals of Concern in Groundwater

Groundwater analytical data sheets for the March 1999 field event are presented in Appendix C. Table 8 presents the analytical results for CoCs detected in the groundwater samples. Only one of the groundwater CoCs, MTBE was detected above method detection limits in the groundwater samples. The detected concentration (9.53 µg/l) was less than the RBSL for groundwater of 40 µg/l. Figure 8 presents

the detected concentration of MTBE for the March 1999 sampling event. None of the CoCs were detected above method detection limits in the onsite deep monitoring well CNC01-M02.

2.5 ANALYTICAL DATA

All analytical data from the 1998 Aboveground Storage Tank Assessment Report for AST NS-71 are presented in Appendix A. Soil analytical data generated during this RA are summarized in Table 7. Groundwater analytical data generated during this RA are summarized in Table 8. The soil and groundwater analytical reports for this RA are included in Appendix D.

2.6 AQUIFER CHARACTERISTICS AND EVALUATION

Groundwater levels were measured on February 21, 1999 and March 18, 1999. Water level contour plotted on Figure 6 indicate that the groundwater flows to the south-southeast, with a hydraulic gradient of ranging from 0.0026 to 0.0038 feet per foot between monitoring wells NBCH-656-001 and NBCH-656-002.

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 was 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 1. 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 at Site 1 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 1. The geometric mean of the rising and falling head conductivities 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 = 0.42
(from sieve results of 68.9% sand & 30.0% clay and Figure C1 in SCDHEC, 1998)

i = average hydraulic gradient = 0.0038 ft/ft

therefore:

$$V = \left(\frac{0.435\ ft/day}{0.42}\right) x\ 0.0038\ ft/ft$$

$$V = 0.0039\ ft/day$$

In summary, the seepage velocity of the surficial aquifer was calculated to be approximately $1.08x10^{-5}$ 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 groundwater concentrations exceeded the SCDHEC RBSLs, therefore fate and transport modeling is not required.

2.8 PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN

The two most recent groundwater gauging events show that groundwater flow is primarily toward the south-southeast. Based on the most recent groundwater sampling event, only one monitoring well exhibited CoC concentrations greater than laboratory detection limits. Monitoring well, NBCH-656-001, contained 9.53 µg/l of MTBE, which is below the RSBL and located hydraulically upgradient from NS-71.

Since fate and transport modeling was not performed, prediction and attenuation of chemicals of concern was not evaluated.

3.0 TIER 2 EVALUATION

3.1 COMPARISON OF ANALYTICAL RESULTS WITH RBSLs

Soil samples were collected on January 27, 1999. The samples were analyzed for BTEX and PAH. Benzene was detected in the soil sample from soil boring CNC01-B02 at a concentration of 5.55 µg/kg. This is slightly above the SCDHEC RBSL for clay-rich soils of 5 µg/kg. Toluene, ethylbenzene, and xylenes were also detected in several subsurface soil samples, however none of the detected concentrations exceeded their respective RBSLs. Five PAH compounds (naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene) were detected in the subsurface soil at the site. No PAH analyte concentration exceeded its RBSL for clayey soil less than 5 feet above groundwater.

Groundwater sampling was conducted on March 18, 1999. The samples were analyzed for BTEX, MTBE, and PAH. MTBE was detected in monitoring well NBCH-656-001 at 9.53 µg/l. This concentration is below the SCDHEC RBSL of 40 µg/l. A comparison of soil and groundwater concentrations to RBSLs is summarized in Table 9.

3.2 EXPOSURE SETTING CHARACTERIZATION

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. Building NS-71 served as a mini-mart and liquor packaging store at the time of base closure. 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 AST Closure in 1998 did not reveal the presence of any water supply wells within 1,000 feet of the site (SPORTENDETCHAS, 1998).

The nearest surface water to Building NS-71 is the backwater of Shipyard Creek located approximately 1,000 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. Tables 10 and 11 present the exposure pathway assessments for current and future use scenarios.

3.3.1 On-Site Commercial Worker

An on-site commercial worker is defined as a gas station attendant or another business employee who works in a commercial capacity at the site. Commercial use of the site in the future is a possibility; therefore, an on-site commercial worker was considered as a potential receptor. Incidental ingestion and dermal contact with impacted soil are expected to be negligible for commercial workers because they are located inside a building. Groundwater at the site is not impacted above the RBSLs, therefore no groundwater pathways are complete. It is unlikely that any additional exposure pathways will exist for future on-site workers; therefore, no complete pathways exist for either current or future commercial workers.

3.3.2 On-Site Visitor

An on-site visitor is defined as any person other than a worker who might come on site. Such a visitor would probably be a customer of the facility located at the site. On-site visitors would have the same exposure pathways as commercial workers, but their exposure duration would be much shorter. This receptor does not have to be quantified because a potential on-site visitor's chemical intake would not drive risk or cleanup levels at the site.

3.3.3 On-Site Construction Worker

An on-site construction worker is defined as a laborer who would be involved in intrusive activities in the soil on or around the site, particularly in the area of subsurface utilities. On-site construction workers could be exposed to constituents in soil by the following pathways: dermal contact with soil, and incidental ingestion of soil. The maximum concentration of benzene in the soil is below the RBSL for ingestion and dermal contact. There are no complete pathways for this receptor, therefore the on-site construction worker was not considered further.

3.3.4 On-Site Resident

An on-site resident is defined as any person making his or her home at the site. This site is expected to remain a commercial facility because the land is zoned for highway commercial use; therefore, the on-site resident receptor was not considered further.

3.3.5 Off-Site Resident

An off-site resident is defined as any person making his or her home near the site. This receptor's location is either an actual current residence near the site or is a vacant lot or property on which a residence could be built. The site is located in an area that will likely be used for commercial and industrial purposes, therefore this potential receptor was not considered further.

3.3.6 Surface Water

The nearest surface water body is the backwater of Shipyard Creek located approximately 1,000 feet south-southwest of the site. Since there is no groundwater impact this receptor was not considered.

3.4 IDENTIFICATION OF DATA REQUIREMENTS

No additional data is required to calculate site specific target levels (SSTLs) for the site.

3.5 SITE-SPECIFIC TARGET LEVELS

A SSTL was calculated for the subsurface soil for benzene leaching to groundwater using the SCDHEC Soil Leachability Model. Input parameters for the model were determined using the figures in the SCDHEC South Carolina Risk Based Corrective Action for Petroleum Releases (January 1998). The soil leaching SSTL calculated for benzene is 767 µg/kg, which is well above the maximum benzene concentration detected (5.55 µg/kg).

3.6 RECOMMENDATIONS

Since there is no groundwater contamination above the SCDHEC RBSLs, and soil contamination is below the RBSLs or SSTL, no further action is recommended for this site.

4.0 REFERENCES

Brown & Root Environmental, Inc., 1998. Site Assessment Plan Zone H – UST, Charleston Naval Complex, Charleston, South Carolina submitted to Southern Division NAVFACENGCOM, September 1998.

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), 1998. Above Ground Storage Tank (AST) Assessment Report for AST NS71, Charleston Naval Base Complex, North Charleston, South Carolina, October 4, 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.

TABLES

TABLE 1

GROUNDWATER ELEVATIONS
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well No.	Total Depth of Well (ft)	Top of Casing Elevation (ft MSL)	Date Measured	Depth to Water (ft BTOC)	Groundwater Elevation (ft MSL)
NBCH-656-001	13.5	11.23	2/21/99	4.12	7.11
			3/18/99	4.16	7.07
NBCH-656-002	14	10.77	2/21/99	3.88	6.89
			3/18/99	4.02	6.75
NBCH-656-003	15	10.94	2/21/99	3.94	7.00
			3/18/99	4.18	6.76
CNC01-M01	12	8.77	2/21/99	1.83	6.94
			3/18/99	1.89	6.88
CNC01-M02	27	8.84	2/21/99	NM	NM
			3/18/99	1.43	7.41

Notes:
MSL - Mean Sea Level
BTOC - Below Top of Casing
NM - Not Measured
ft - feet

TABLE 2

GROUNDWATER FIELD MEASUREMENTS
SITE 1, BUILDING NS-71
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)*
NBCH-656-001	3/18/99	PP	9.0	16.9	6.99	2.83	26	0.49
NBCH-656-002	3/18/99	PP	9.0	18.1	6.72	3.85	11	0.70
NBCH-656-003	3/18/99	PP	9.0	20.4	6.52	31.50	4	0.40
CNC01-M01	3/18/99	PP	8.0	16.9	6.95	3.24	29	0.39
CNC01-M02	3/18/99	PP	4.0	19.5	11.35	16.80	>999	1.15

Notes:

(° C) - Degrees Celcius
PP - Peristaltic pump, low flow technique.
uMHOS/cm - Micro HOS per centimeter.
NTU - Nephelometric turbidity units.
mg/l - milligrams per liter.
* measurement a result of instrument meter reading.

TABLE 3

GROUNDWATER NATURAL ATTENUATION FIELD MEASUREMENTS
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well I.D.	Date Sampled	Dissolved Oxygen (mg/l)	Akalinity (mg/l)	Carbon Dioxide (mg/l)	Sulfide (mg/l)	Ferrous Iron (mg/l)	Nitrite (mg/l)	Manganese (mg/l)	Nitrogen/ Nitrate (mg/l)*	Sulfate (mg/l)*	Methane (ug/l)
NBCH656 001	3/18/99	0.10	630	340	0.01	0.81	0.047	0.0	ND	0.451	9,300
NBCH656 003	3/18/99	0.00	1,800	280	0.07	2.09	0.079	2.8	ND	3.450	2,000

Notes:

% - Percent

mg/l - milligrams per liter

ug/l - micrograms per liter

* Fixed base laboratory analysis

TABLE 4

SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
PAGE 1 OF 2

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (PPM)
CNC01-B01	01SSB0101	1	ND
	01SSB0102	2	250
	01SSB0103	3	580
	01SSB0104	4	1100
CNC01-B02	01SSB0201	1	90
	01SSB0202	2	700
	01SSB0203	3	700
	01SSB0204	4	1050
CNC01-B03	01SSB0301	1	ND
	01SSB0302	2	ND
	01SSB0303	3	7
	01SSB0304	4	400
CNC01-B04	01SSB0401	1	ND
	01SSB0402	2	ND
	01SSB0403	3	200
	01SSB0404	4	1200
CNC01-B05	01SSB0501	1	ND
	01SSB0502	2	ND
	01SSB0503	3	2
	01SSB0504	4	450
CNC01-B06	01SSB0601	1	20
	01SSB0602	2	60
	01SSB0603	3	1500
	01SSB0604	4	1050
CNC01-B07	01SSB0701	1	ND
	01SSB0702	2	2
	01SSB0703	3	200
	01SSB0704	4	6000
CNC01-B08	01SSB0801	1	ND
	01SSB0802	2	1
	01SSB0803	3	90
	01SSB0804	4	200
CNC01-B09	01SSB0901	1	ND
	01SSB0902	2	ND
	01SSB0903	3	ND
	01SSB0904	4	600
CNC01-B10	01SSB1001	1	ND
	01SSB1002	2	ND
	01SSB1003	3	ND
	01SSB1004	4	ND
CNC01-B11	01SSB1101	1	ND
	01SSB1102	2	NS
	01SSB1103	3	NS

TABLE 4 (CONTINUED)

SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
PAGE 2 OF 2

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration
CNC01-B15	01SSB1501	1	ND
	01SSB1502	2	ND
	01SSB1503	3	ND
	01SSB1504	4	2000
CNC01-B16	01SSB1601	1	ND
	01SSB1602	2	ND
	01SSB1603	3	ND
	01SSB1604	4	200
CNC01-B17	01SB1701	1	ND
	01SSB1702	2	ND
	01SSB1703	3	ND
	01SSB1704	4	1125
CNC01-B18	01SSB1801	1	7
	01SSB1802	2	6
	01SSB1803	3	4
	01SSB1804	4	ND
CNC01-B19	01SSB1901	1	15
	01SSB1902	2	4
	01SSB1903	3	1
	01SSB1904	4	ND
CNC01-B20	01SSB2001	1	ND
	01SSB2002	2	2
	01SSB2003	3	2
CNC01-B21	01SSB2101	1	3
	01SSB2102	2	7
	01SSB2103	3	5
CNC01-B22	01SSB2201	1	ND
	01SSB2202	2	29
	01SSB2203	3	1800
CNC01-B23	01SSB2301	1	3
	01SSB2302	2	4
	01SSB2303	3	16
	01SSB2304	4	saturated with product

NOTES:
OVA - Organic vapor analyzer equipped with a flame ionization detector
PPM - Parts per million
ND - Not detected
NS - Not sampled

TABLE 5

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOIL
SITE 1, BUILDING NS - 71
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
CNC01-B01	01SFB0103	3	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B02	01SFB0203	3	<50	<50	90	453	1350
CNC01-B03	01SFB0302	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B04	01SFB0402	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B05	01SFB0502	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B06	01SFB0602	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B07	01SFB0702	2	<1.0	<1.0	<1.0	<1.0	56
CNC01-B08	01SFB0802	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B09	01SFB0902	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B10	01SFB1002	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B15	01SFB1502	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B16	01SFB1602	2	<1.0	<1.0	3.4	15	<50
CNC01-B17	01SFB1702	2	<1.0	5.2	17.5	76.9	<50
CNC01-B18	01SFB1801	1	<1.0	<1.0	1.6	9.7	<50
CNC01-B19	01SFB1901	1	<1.0	<1.0	6.9	47	73
CNC01-B20	01SFB2002	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B21	01SFB2102	2	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B22	01SFB2203	3	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B23	01SFB2303	3	<1.0	<1.0	<1.0	<1.0	92
CNC01-B24	01SFB2401	1	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B25	01SFB2501	1	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B26	01SFB2601	1	<1.0	<1.0	<1.0	<1.0	<50
CNC01-B27	01SFB2701	1	<1.0	<1.0	<1.0	<1.0	<50

NOTES:
[1]Mobile 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 MOBILE LABORATORY SCREENING RESULTS FOR GROUNDWATER
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Boring Sample Location	Sample Identification	Mobile Laboratory Screening Data (PPB) [1]				
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel Range Organics
CNC01-B01	01GFB01	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B02	01GFB02	<1.0	<1.0	<1.0	<1.0	<50*
CNC01-B03	01GFB03	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B04	01GFB04	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B05	01GFB05	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B06	01GFB06	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B07	01GFB07	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B08	01GFB08	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B09	01GFB09	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B10	01GFB10	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B11	01GFB11	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B12	01GFB12	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B13	01GFB13	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B14	01GFB14	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B15	01GFB15	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B16	01GFB16	<1.0	<1.0	3.1	13.9	<10
CNC01-B17	01GFB17	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B18	01GFB18	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B19	01GFB19	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B20	01GFB20	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B21	01GFB21	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B22	01GFB22	<1.0	<1.0	<1.0	<1.0	<10
CNC01-B23	01GFB23	<1.0	<1.0	<1.0	<1.0	<10

NOTES:
[1] Mobile 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
* Detection limit raised due to low sample amount

TABLE 7

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
SITE 1, BUILDING NS-71
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	364	52	478	11119	17687	7042	5593	21265	3146	
CNC01-B02/ 01SLB-0202	27-Jan-99	**5.55**	2.74 [J]	0.91[J]	2.81 [J]	0.79 [J]	1310 [J]	ND	ND	ND	1420 [J]	NA
CNC01-B03/ 01SLB-0301	27-Jan-99	2.49 [J]	0.72 [J]	ND	ND	ND	ND	ND	ND	ND	317 [J]	NA
CNC01-B15/ 01SLB-1501	27-Jan-99	**5.26**	2.28 [J]	ND	2.33 [J]	0.58 [J]	422 [J]	ND	ND	ND	453 [J]	9240
CNC01-B20/ 01SLB-2001	27-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC01-B20/ 01SLB-2001D[2]	27-Jan-99	1.08 [J]	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC01-B21/ 01SLB-2101	27-Jan-99	1.04 [J]	ND	ND	1.23 [J]	ND	ND	ND	ND	ND	ND	NA
CNC01-B24/ 01SLB-2401	27-Jan-99	1.73 [J]	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC01-B26/ 01SLB-2601	27-Jan-99	4.16 [J]	5.44	ND	ND	ND	1200 [J]	1240 [J]	970 [J]	ND	1380 [J]	NA
CNC01-B27/ 01SLB-2701	27-Jan-99	3.53 [J]	1.13 [J]	ND	1.72 [J]	ND	ND	ND	ND	ND	287 [J]	NA
ZHTL01001[3]	27-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).

NA - Not analyzed. * Concentration in milligrams per kilograms Bold Value - Concentration exceeded RBSLs.

ND - Not detected

Sample 01SLB0202 was also analyzed for total recoverable petroleum hydrocarbons and contained 98.4 J milligrams/kilograms.

[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] Duplicate

[3] Trip blank

[4] Equipment blank

[J] Indicates the presence of an analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 8

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
SITE 1, BUILDING NS-71
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
CHC01M-01 / 01GLM-0101	18-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHC01M-02 / 01GLM-0201	18-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NBCH-656-001/ NBCH-656001	18-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.53
NBCH-656-002/ NBCH-656002	18-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NBCH-656-003/ NBCH656003	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

All concentrations are in ug/l.

ND - Not detected.

NA - 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

[4] Equipment blank

TABLE 9

COMPARISON OF MAXIMUM CONCENTRATIONS TO RBSLs
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Concern	Maximum Concentration (Soil) (ug/kg)	RBSLs (Soil) (ug/kg)[(a)]	Maximum Concentration (GW) (ug/L)	RBSLs (GW) (ug/L)[(b)]
Benzene	**5.55**	5	ND	5
Toluene	2.81 J	478	ND	1000
Ethylbenzene	5.44	364	ND	700
Xylenes	0.79 J	1119	ND	10000
MTBE	NA	NA	9.52	40
Naphthalene	0.91 J	52	ND	10
Benzo(a)anthracene	1310 J	17687	ND	10
Benzo(b)fluoranthene	1240 J	7042	ND	10
Benzo(k)fluoranthene	970 J	5593	ND	10
Chrysene	1420 J	3146	ND	10

(a) - From Risk-Based Corrective Action for Petroleum Releases, Table B4, Depth to GW - <5 ft, SCDHEC RBCA Guidelines, 1998.
(b) - From Risk-Based Corrective Action for Petroleum Releases, Table B1, SCDHEC RBCA Guidelines, 1998.
GW - Groundwater
RBSLs - Risk Based Screening Levels
Bold Value indicates the concentration exceeded the RBSL.

TABLE 10

EXPOSURE PATHWAY ASSESSMENT - CURRENT USE
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

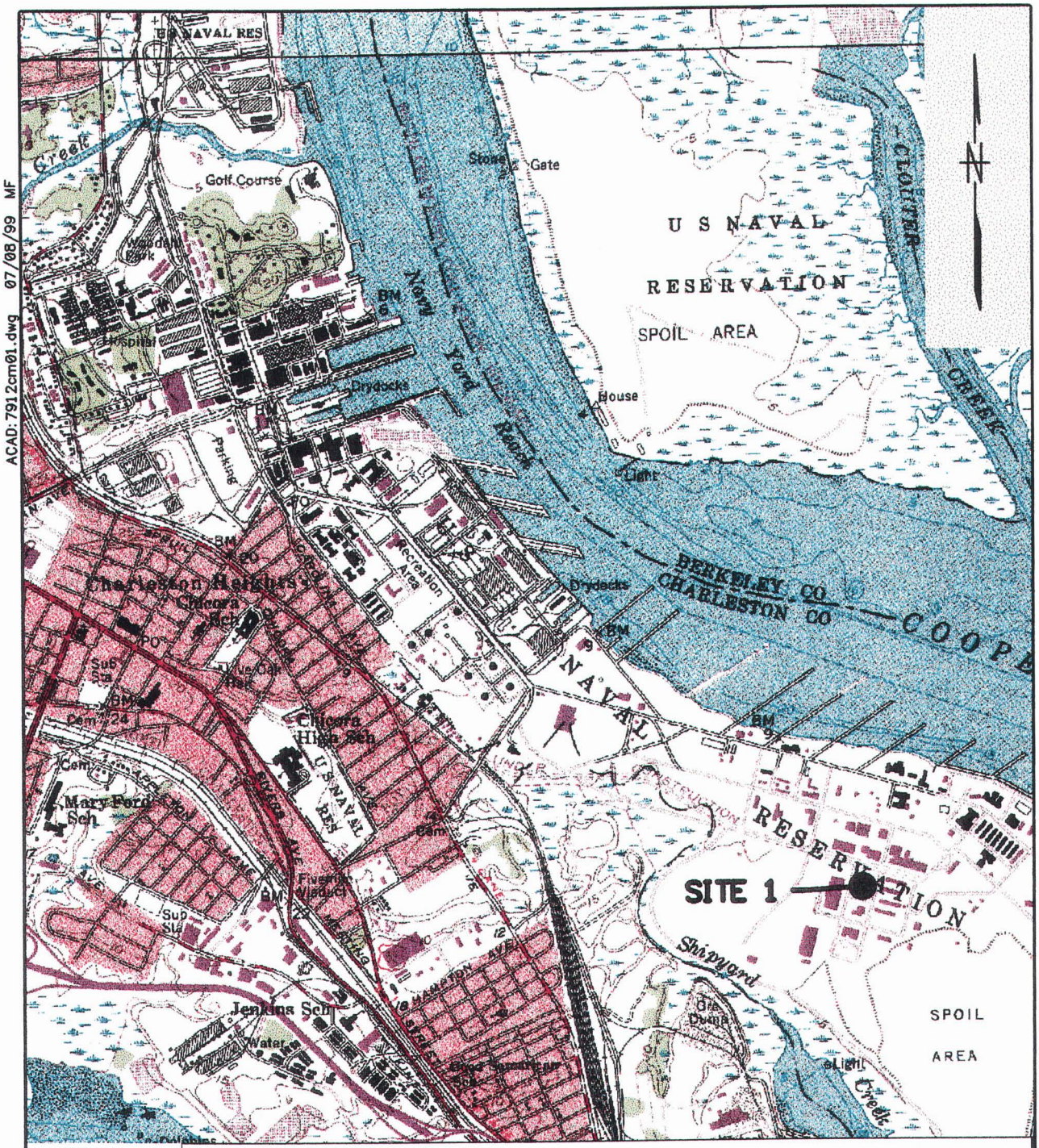
Media	Exposure Route	Pathway Selected for Evaluation? (Yes or No)	Exposure point or Reason for Non-Selection	Data Requirements (If pathway selected)
Air	Inhalation	No	No volatilization to enclosed space.	
	Explosion Hazard	No	No explosion hazard.	
Groundwater	Ingestion	No	No groundwater contamination above RBSLs.	
	Dermal contact	No		
	Inhalation	No		
Surface Water	Ingestion	No	No groundwater contamination above RBSLs.	
	Dermal contact	No		
	Inhalation	No		
Surficial Soil	Ingestion	No	No impacted surface soil	
	Dermal contact	No		
	Inhalation	No		
Subsurface Soil	Ingestion	No	No subsurface soil with BTEX above above SSTLs	
	Dermal contact	No		
	Inhalation	No		

TABLE 11

EXPOSURE PATHWAY ASSESSMENT - FUTURE USE
SITE 1, BUILDING NS-71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Media	Exposure Route	Pathway Selected for Evaluation? (Yes or No)	Exposure point or Reason for Non-Selection	Data Requirements (If pathway selected)
Air	Inhalation	No	No volatilization to enclosed space. No explosion hazard.	
	Explosion Hazard	No		
Groundwater	Ingestion	No	No groundwater contamination above RBSLs	
	Dermal contact	No		
	Inhalation	No		
Surface Water	Ingestion	No	No surface water bodies within 1,000 ft	
	Dermal contact	No		
	Inhalation	No		
Surficial Soil	Ingestion	No	No impacted surface soil	
	Dermal contact	No		
	Inhalation	No		
Subsurface Soil	Ingestion	No	No subsurface soil with BTEX above above SSTLs.	
	Dermal contact	No		
	Inhalation	No		

FIGURES



ACAD: 7912cm01.dwg 07/08/99 MF

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

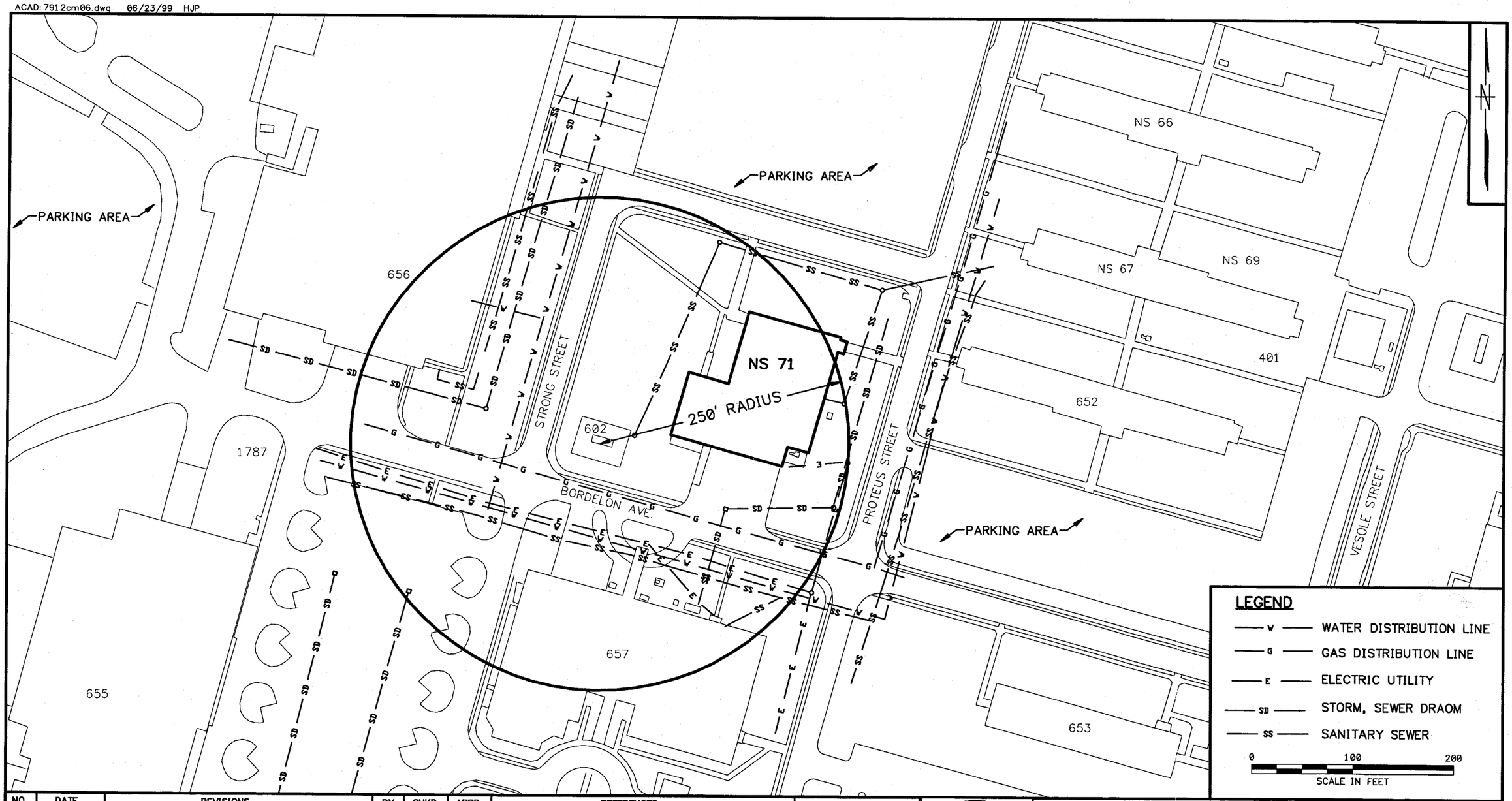
QUADRANGLE LOCATION

0 2000 4000
SCALE IN FEET

DRAWN BY HJP DATE 5/18/99	DEPARTMENT OF THE NAVY ★ SOUTHERN DIV FACILITIES ENGINEERING COMMAND ★	SITE LOCATION MAP SITE 1, BUILDING NS71, ZONE H CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SC	CONTRACT NO. 7912
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED–AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 0

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

ACAD: 7912cm06.dwg 06/23/99 HJP



LEGEND

- W — WATER DISTRIBUTION LINE
- G — GAS DISTRIBUTION LINE
- E — ELECTRIC UTILITY
- SD — STORM, SEWER DRAOM
- SS — SANITARY SEWER

0 100 200

SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY KW DATE 5/24/99

CHECKED BY DATE

COST/SCHED–AREA

SCALE AS NOTED

DEPARTMENT OF THE NAVY SOUTHDIV FACILITIES ENGINEERING COMMAND

SITE VICINITY MAP
SITE 1, BUILDING NS–71
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912

APPROVED BY DATE

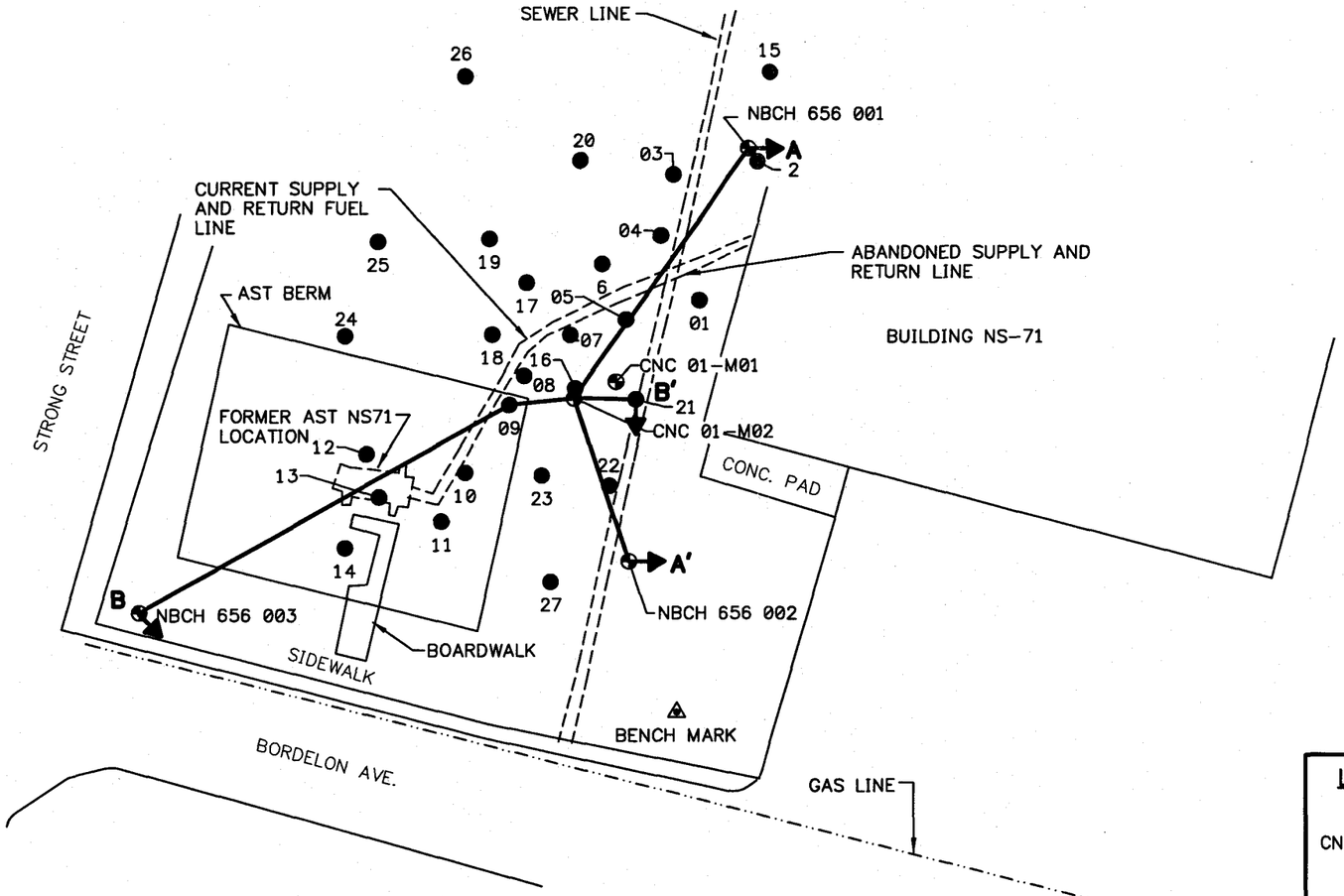
APPROVED BY DATE

DRAWING NO. FIGURE 2

REV. 0

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

ACAD: 7912GM04.dwg 06/23/99 HJP



LEGEND:

- CNC01-M01 — MONITORING WELL LOCATION AND DESIGNATION
- 01 — SOIL BORING LOCATION AND DESIGNATION (CNC 01 B01)
- A A' — GEOLOGIC CROSS SECTION LOCATION A TO A'

0 30 60
SCALE IN FEET

SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC., APRIL 26, 1999.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DLT DATE 5/4/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE MAP AND SAMPLING LOCATIONS
SITE 1 BUILDING NS-71
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

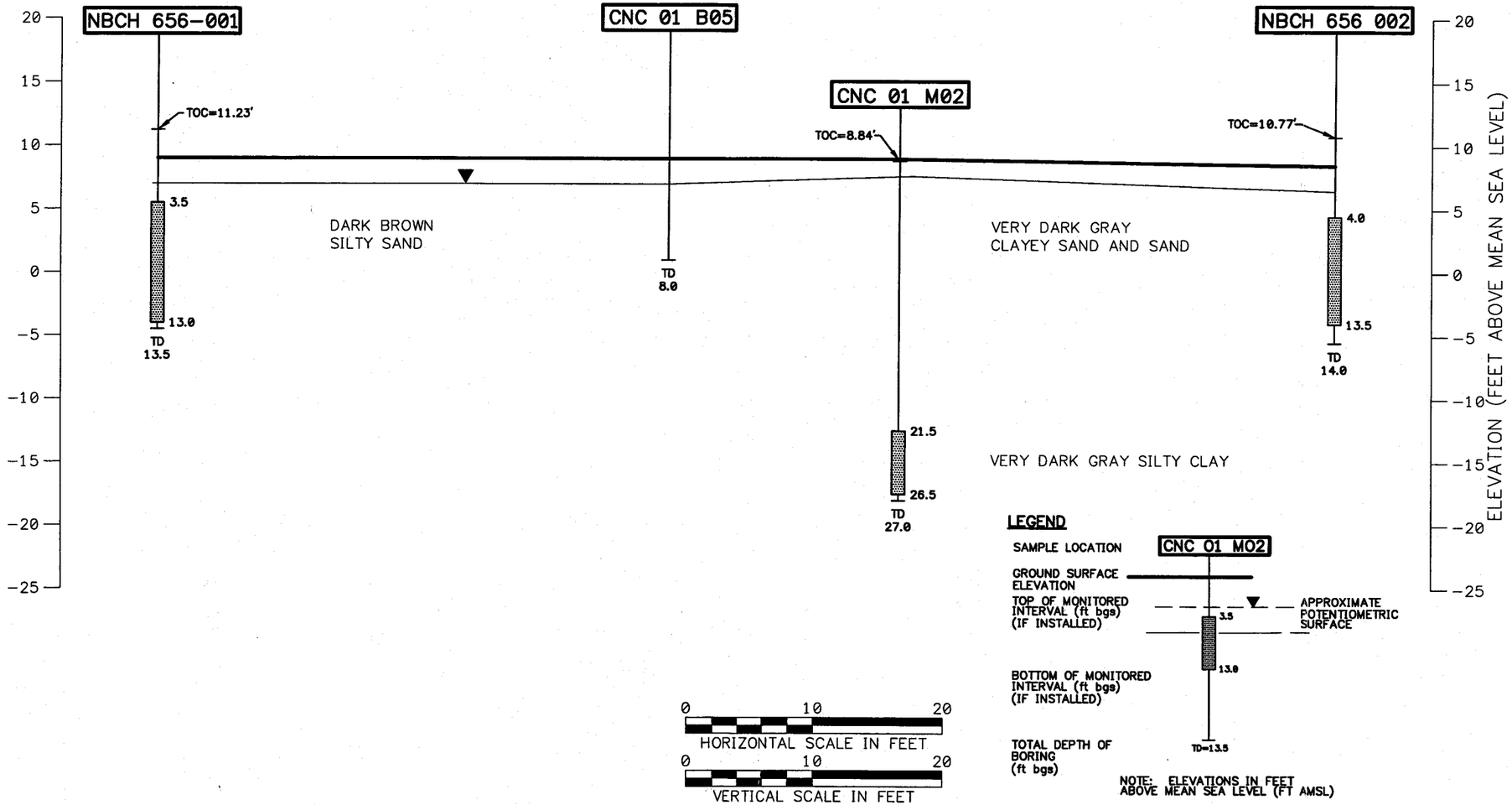
CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3
REV. 0

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

ACAD: 7912gx01.dwg 05/25/99 HJP

NORTH
A

SOUTH
A'



LEGEND

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 5/25/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

DEPARTMENT OF THE NAVY · NAVAL FACILITIES ENGINEERING COMMAND · SOUTHERN DIV

GEOLOGIC CROSS SECTION
A-A'
SITE 1 BUILDING NS-71
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

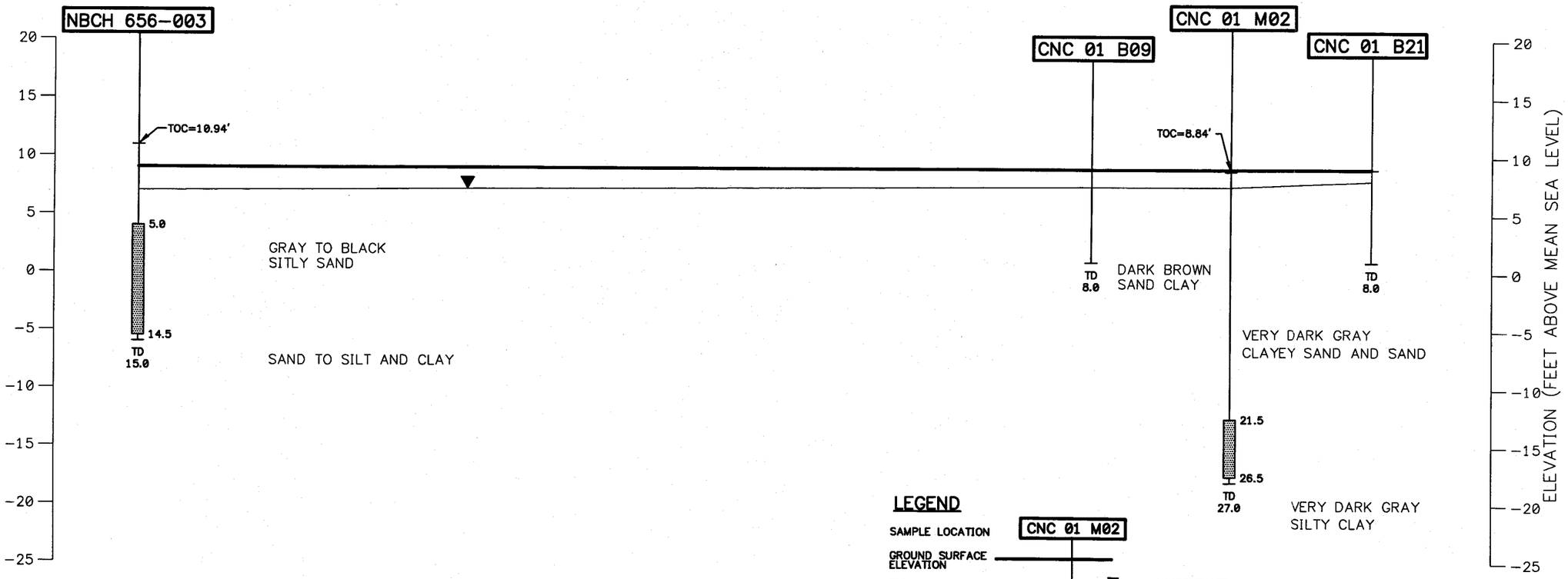
CONTRACT NO. 7173
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4
REV. 0

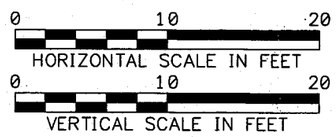
FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

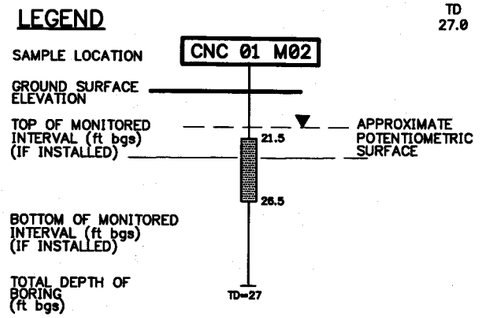
ACAD: 7912gx02.dwg 06/23/99 HJP

WEST
B

EAST
B'







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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

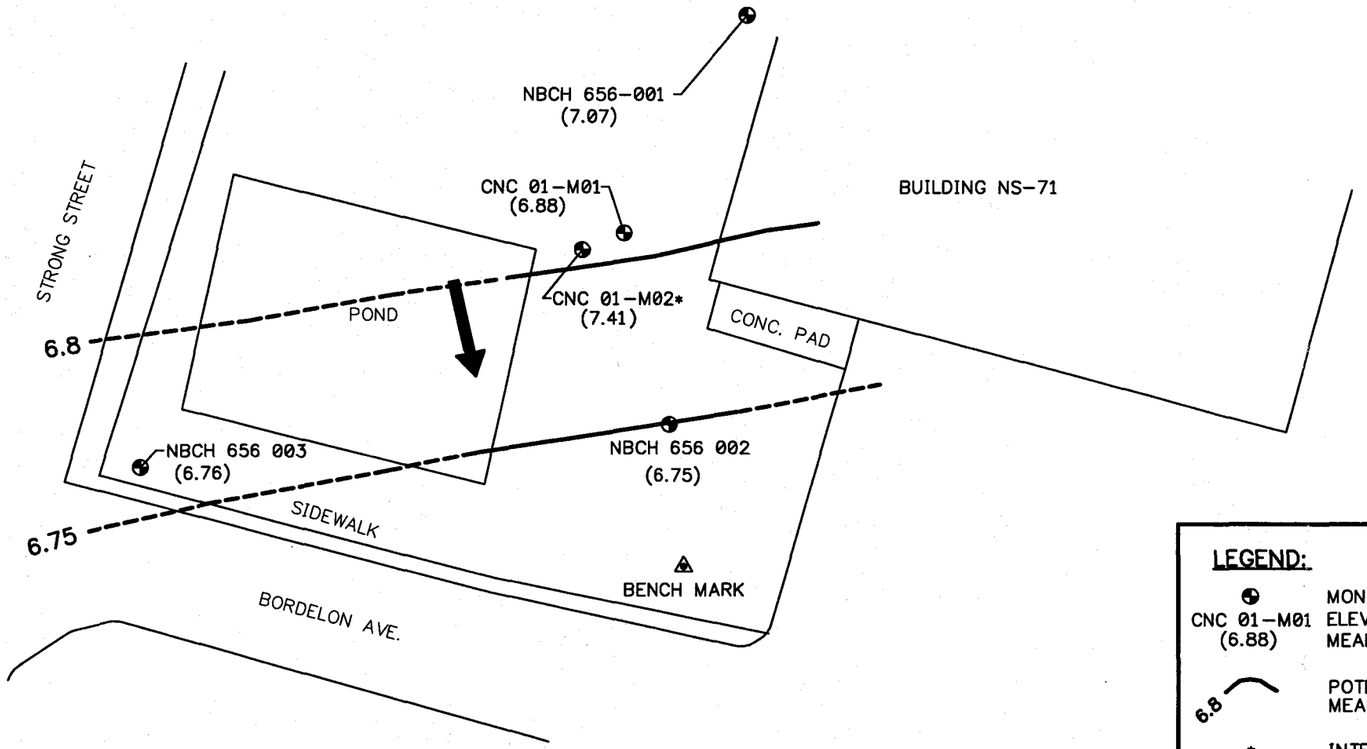
DRAWN BY DATE: HJP 5/25/99
CHECKED BY DATE:
COST/SCHED-AREA:
SCALE: AS NOTED

GEOLOGIC CROSS SECTION
B-B'
SITE 1 BUILDING NS-71
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 5
REV. 0

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

ACAD: 7912GM01.dwg 06/23/99 HJP



LEGEND:

- CNC 01-M01 (6.88) — MONITORING WELL LOCATION AND GROUNDWATER ELEVATION MEASUREMENT IN FEET MEAN SEA LEVEL
- 6.8 — POTENTIOMETRIC SURFACE CONTOUR FT. MEAN SEA LEVEL (DASHED WHERE INFERRED)
- * — INTERMEDIATE DEPTH MONITORING WELL NOT INCLUDED IN CONTOUR PLOT
- GROUNDWATER FLOW DIRECTION

0 30 60
SCALE IN FEET

SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC., APRIL 26, 1999.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DLT DATE 5/4/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

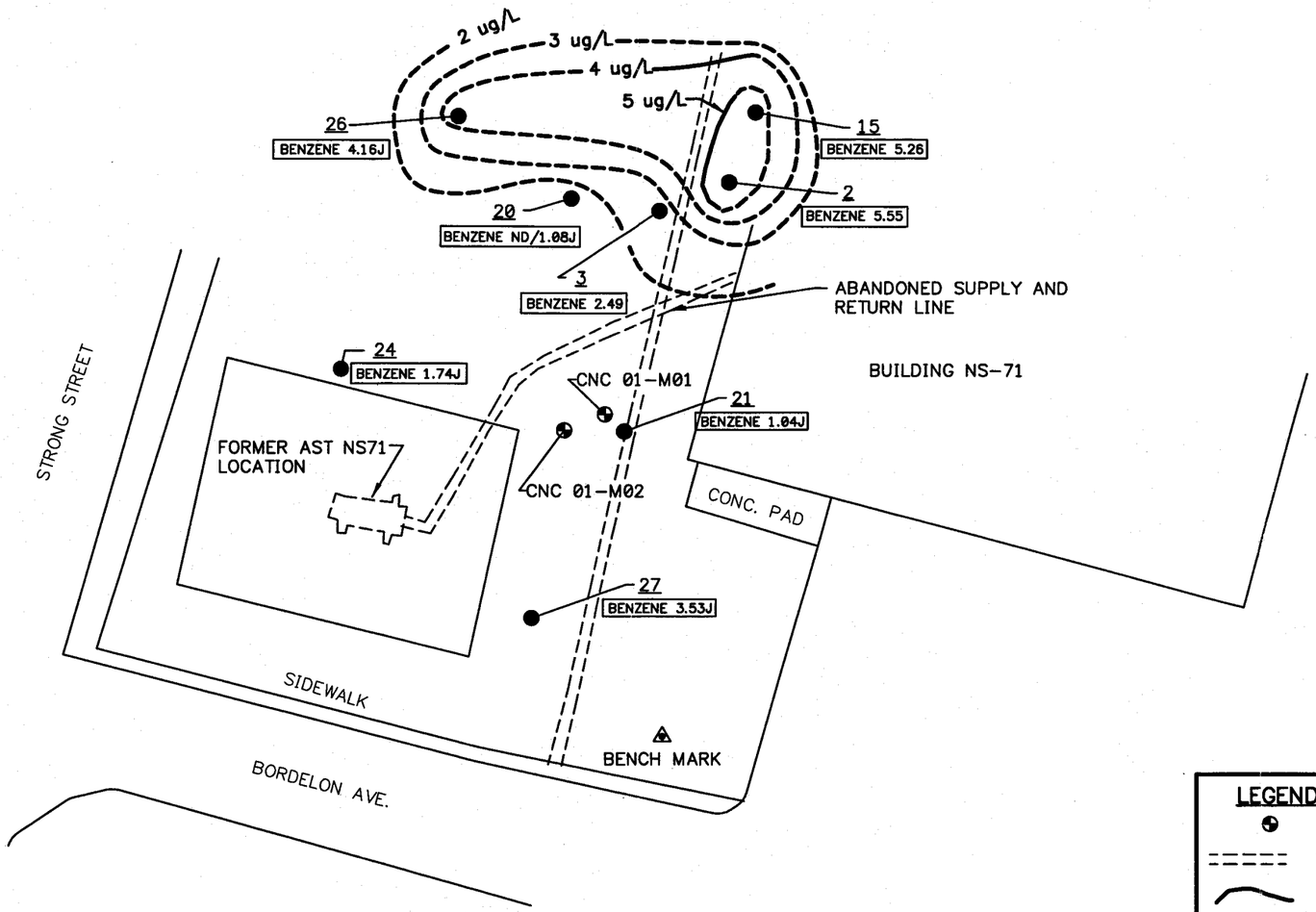
DEPARTMENT OF THE NAVY SOUTHERN DIV FACILITIES ENGINEERING CHAS SC

GROUNDWATER POTENTIOMETRIC MAP
MARCH 18, 1999
SITE 1 BUILDING NS-71
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 6
REV. 0

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

ACAD: 7912GM02.dwg 06/23/99 HJP



LEGEND:

- MONITORING WELL
- SEWER LINE
- BENZENE CONCENTRATION ISOCON IN ug/kg (DASHED WHERE APPROXIMATE)
- 2 / BENZENE 1.04 — BORING LOCATION AND DESIGNATION AND DETECTED CONCENTRATION OF BENZENE IN ug/kg

0 30 60
SCALE IN FEET

SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC., APRIL 26, 1999.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DLT DATE 5/4/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

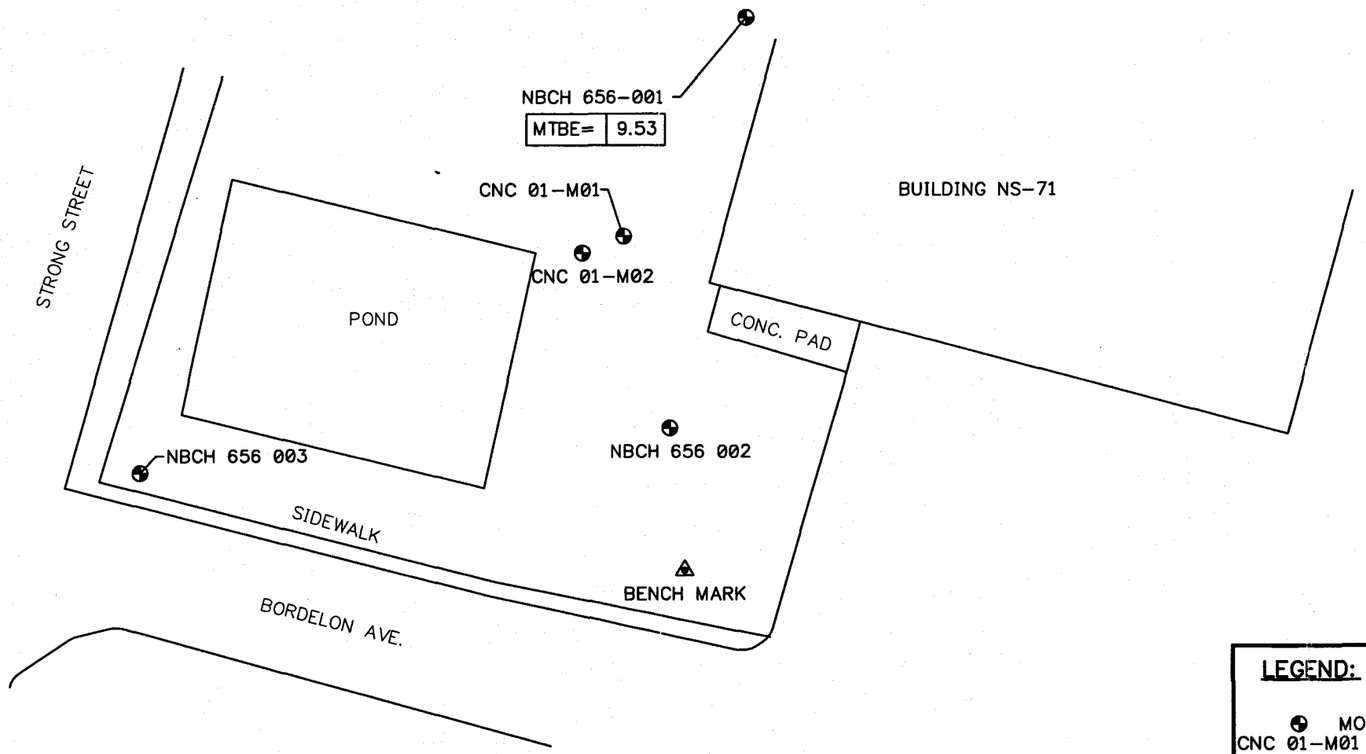
DEPARTMENT OF THE NAVY · SOUTHERN DIVISION · NAVAL FACILITIES ENGINEERING COMMAND

ISO CONCENTRATION MAP FOR BENZENE IN SOILS SITE 1 BUILDING NS-71 ZONE H CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 7
REV. 0

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

ACAD: 7912GM03.dwg 05/25/99 HJP



LEGEND:

● MONITORING WELL LOCATION AND DESIGNATION CNC 01-M01

9.53 DETECTED GROUNDWATER CONTAMINANT OF CONCERN AND REPORTED CONCENTRATION IN ug/L

0 30 60
SCALE IN FEET

SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC., APRIL 26, 1999.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DLT DATE 5/4/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

DEPARTMENT OF THE NAVY - NAVFAC - SOUTHERN DIV. FACILITIES ENGINEERING

CONTAMINANTS OF CONCERN IN GROUNDWATER SITE 1 BUILDING NS-71 ZONE H CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 8
REV. 0

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

APPENDIX A

ABOVEGROUND STORAGE TANK ASSESSMENT REPORT - AST NS-71

UNOFFICIAL COPY

ASSESSMENT REPORT NOT APPROVED AS OF 9 AUG 98

Aboveground Storage Tank (AST) Assessment Report

Date Received State Use Only

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

I. OWNERSHIP OF AST(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: 843 Telephone Number: 743-9985 Contact Person: Henry N. Shepard II, P. E.

II. SITE IDENTIFICATION AND LOCATION

Site I.D. #: Unregulated AST NS71 (Site 1)

Facility Name: Charleston Naval Base Complex, NS 71

Street Address: Bordelon Avenue

City: North Charleston, 29405-2413 County: Charleston

III. CLOSURE INFORMATION

Closure Started: 19 May 1998 Closure Completed: 8 July 1998

Number of ASTs Closed: 1

N/A — Consultant

SPORTENVDETCHASN — AST 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.

Henry Shepard II, P. E.
Name (Type or Print)

Signature

- Occupied Building
- Appears to extend under building

V. AST INFORMATION

		Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A.	Product.....	Fuel oil					
B.	Capacity.....	2,200 gal					
C.	Age.....	1987					
D.	Construction Material.....	Steel					
E.	Month/Year of Last Use.....	3/96					
F.	Spill Prevention Equipment Y/N.....	N					
G.	Overfill Prevention Equipment Y/N....	N					
H.	Method of Closure Removed/Filled..	R					
I.	Visible Corrosion or Pitting Y/N.....	N					
J.	Visible Holes Y/N.....	N					

L. Method of disposal for any ASTs removed.

AST NS71 was removed, drained, cut open at both ends, and cleaned with a steam cleaner. It was 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 ASTs.

The residual fuel oil, waste water, and sludge from NS71 were recycled.

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

AST NS71 was in very good condition. No corrosion, pitting, or holes were found in the tank.

VI. PIPING INFORMATION

		Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A.	Construction Material.....	Steel					
B.	Distance from AST to Dispenser.....	~90' see note 1					
C.	Number of Dispensers.....	1 see note 1					
D.	Type of System P/S.....	S					
E.	Was Piping Removed Y/N.....	Y					
F.	Visible Corrosion or Pitting Y/N.....	Y					
G.	Visible Holes Y/N.....	N					
H.	Age.....	1987					

Note 1: AST NS71 provided heating fuel oil to the boiler of building NS71.

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

AST NS71 utilized 3/4" steel supply and return piping encased in plastic sheathing. This piping was in sound condition throughout its run, with the exceptions being where it exited the ground near the tank and at the building. In both locations corrosion and pitting were severe, but no holes were found.

VII. BRIEF SITE DESCRIPTION AND HISTORY

Facility NS-71 was constructed in 1963 to serve as a mess hall. It functioned as a mini-mart and liquor packaging store at the time of base closure. This site has been designated Area of Concern (AOC) 656 by the Resource Conservation and Recovery Act (RCRA) Facility Investigation.

Above ground storage tank NS71 provided heating fuel oil to building NS-71 at base closure. AST NS71 occupied the same location as structure 602, an 8,000 gallon above ground storage tank which AST NS71 replaced in 1987. The ASTs were situated inside a shrubbery-rimmed earthen berm approximately 90 feet from the building. This site has been designated AOC 656 because of a ruptured fuel line associated with structure 602.

An expanded soil excavation took place near building NS-71, where heavy petroleum staining and a strong petroleum odor were present. Approximately 36 cubic yards of impacted soil was removed.

A second expanded excavation took place inside the berm to remove impacted soil near the AST foundation. During the excavation, a set of severely corroded, abandoned, open-ended, 2" steel supply and return pipes for structure 602 were discovered buried 6-8" below AST NS71's piping. Also, fuel oil was found to have drained by gravity flow from the abandoned piping and collected at the base of the AST. Approximately 9 cubic yards of impacted soil was removed.

All excavated soil was disposed of at Chambers Oakridge Landfill, a subtitle "D" landfill. Oakridge is located at 2183 Highway 78, PO Box 145, Dorchester, SC, 29437.

VIII. SITE CONDITIONS

		Yes	No	Unk
A.	Were any petroleum-stained or contaminated soils found near the AST?	X		
B.	Were any petroleum odors detected? If yes, indicate location on site map and describe the odor (strong, mild, etc.) **[strong]**	X		

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 0697-2	Beneath 3/4" piping	Soil	3'	5/27/98 0900	W. Nesbit	4,077 ppm
SPORT 0697-3	Beneath 3/4" piping	Soil	3'	5/27/98 0930	W. Nesbit	227 ppm
SPORT 0697-4	Beneath 3/4" piping	Soil	3'	5/27/98 0954	W. Nesbit	1,120 ppm
SPORT 0697-5	Beneath 3/4" piping	Soil	4'	5/27/98 1025	W. Nesbit	119 ppm
SPORT 0697-6	Beneath 3/4" piping	Soil	1'	5/27/98 1049	W. Nesbit	746 ppm
SPORT 0703-2	Expanded bldg excavation	Soil	5'	5/29/98 0929	W. Nesbit	2,097 ppm
SPORT 0703-3	Expanded bldg excavation	Soil	5'	5/29/98 1000	W. Nesbit	2,190 ppm
SPORT 0703-4	Expanded bldg excavation	Soil	5'	5/29/98 1028	W. Nesbit	3,156 ppm
SPORT 0703-5	Expanded bldg excavation	Soil	5'	5/29/98 1105	W. Nesbit	3,004 ppm
SPORT 0703-6	Expanded bldg excavation	Soil	5'	5/29/98 1138	W. Nesbit	2,250 ppm
SPORT 0707-2	Beneath 2" piping, bldg end	Soil	4'	6/2/98 1030	W. Nesbit	254 ppm
SPORT 0707-3	Beneath 2" piping, berm end	Soil	4'	6/3/98 1300	W. Nesbit	425 ppm
SPORT 0707-4	Dirt pile	Soil	-	6/3/98 1400	W. Nesbit	Not Taken
SPORT 0707-5	Dirt pile	Soil	-	6/3/98 1420	W. Nesbit	Not Taken

* = 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 AST NS71, soil samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were taken under the piping at the mechanical connections, and at strategic points in the expanded excavations to characterize the sites.

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

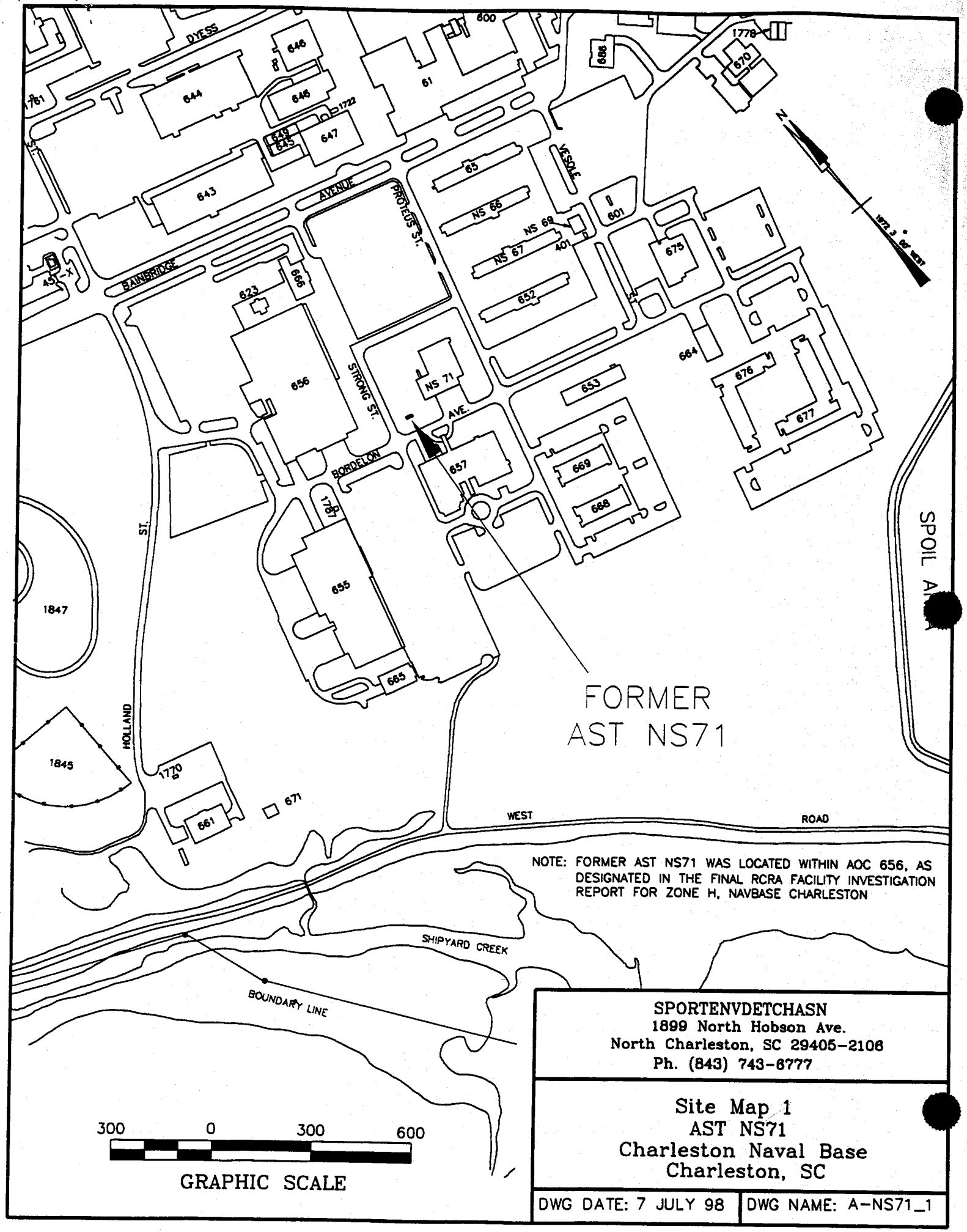
		Yes	No
A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the AST system? If yes, indicate type of receptor, distance, and direction on site map.		X
B.	Are there any public, private, or irrigation water supply wells within 1000 feet of the AST system? If yes, indicate type of well, distance, and direction on site map.		X
C.	Are there any underground structures (e.g., basements) located within 100 feet of the AST 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 AST system that could potentially come in contact with the contamination? If yes, indicate the type of utility, distance, and direction on the site map. **[sewer]**	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 through 4
Photographs 1 through 7

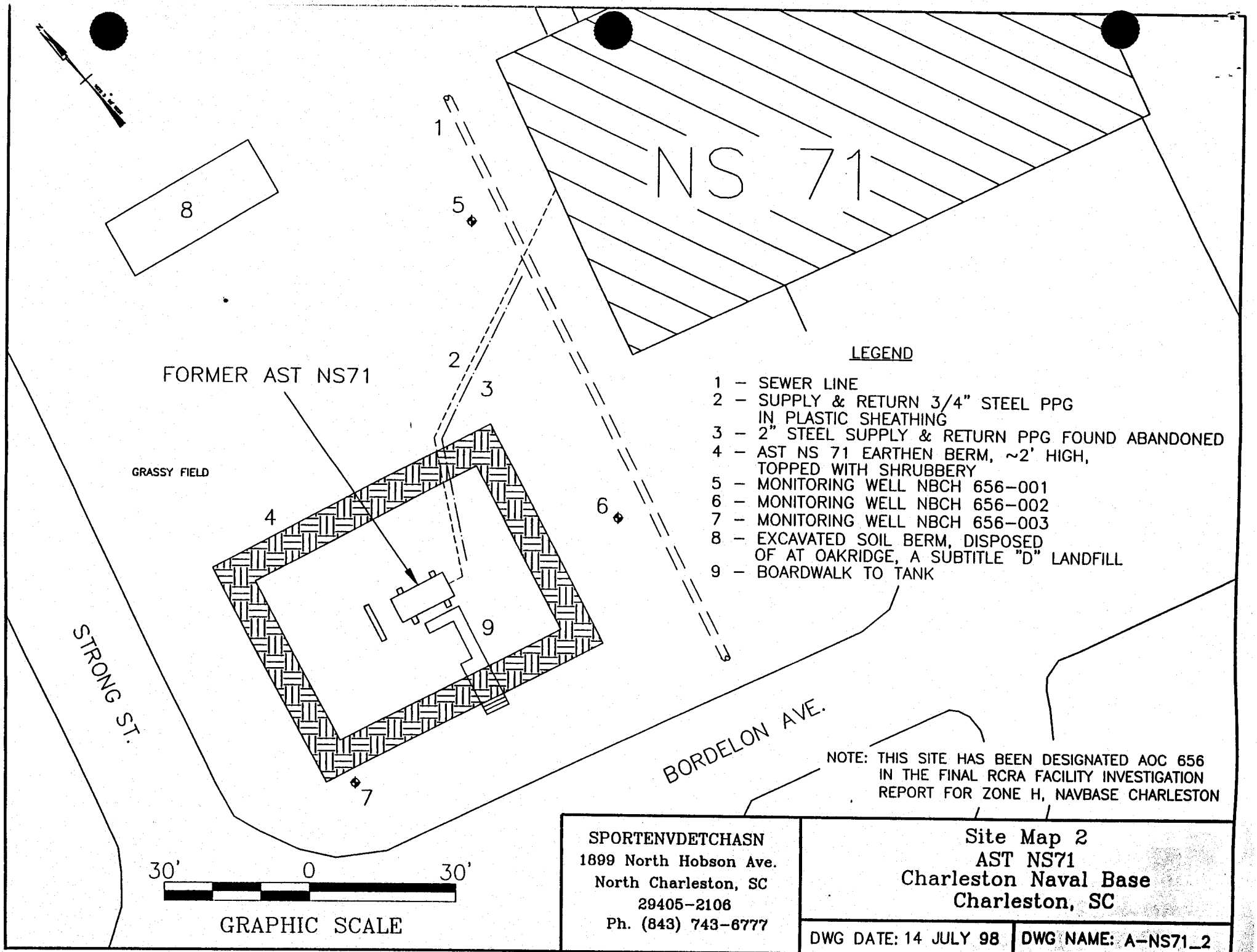


NOTE: FORMER AST NS71 WAS LOCATED WITHIN AOC 656, AS DESIGNATED IN THE FINAL RCRA FACILITY INVESTIGATION REPORT FOR ZONE H, NAVBASE CHARLESTON

SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC 29405-2106
Ph. (843) 743-6777

Site Map 1
AST NS71
Charleston Naval Base
Charleston, SC

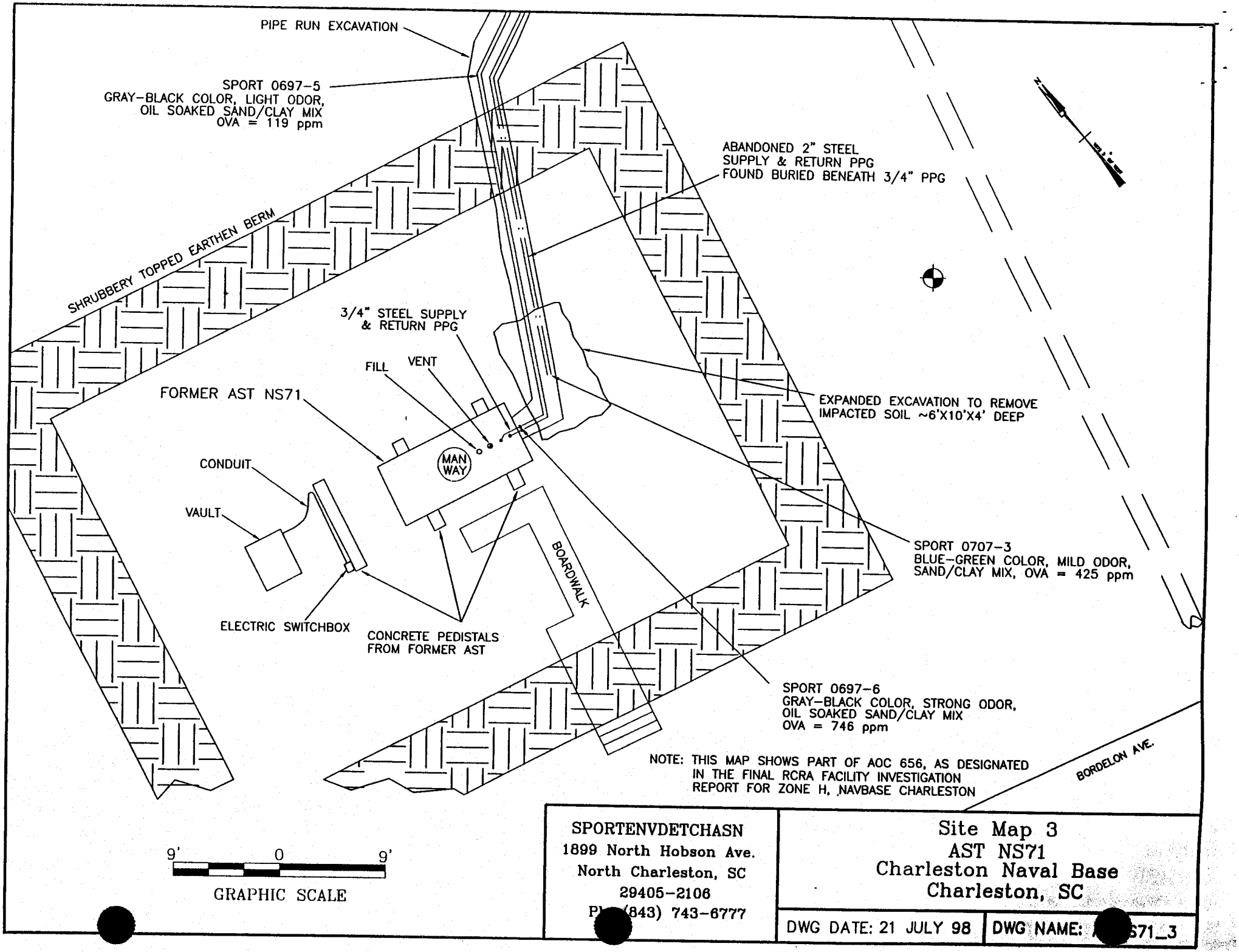
DWG DATE: 7 JULY 98 | DWG NAME: A-NS71_1



SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC
29405–2106
Ph. (843) 743–6777

Site Map 2
AST NS71
Charleston Naval Base
Charleston, SC

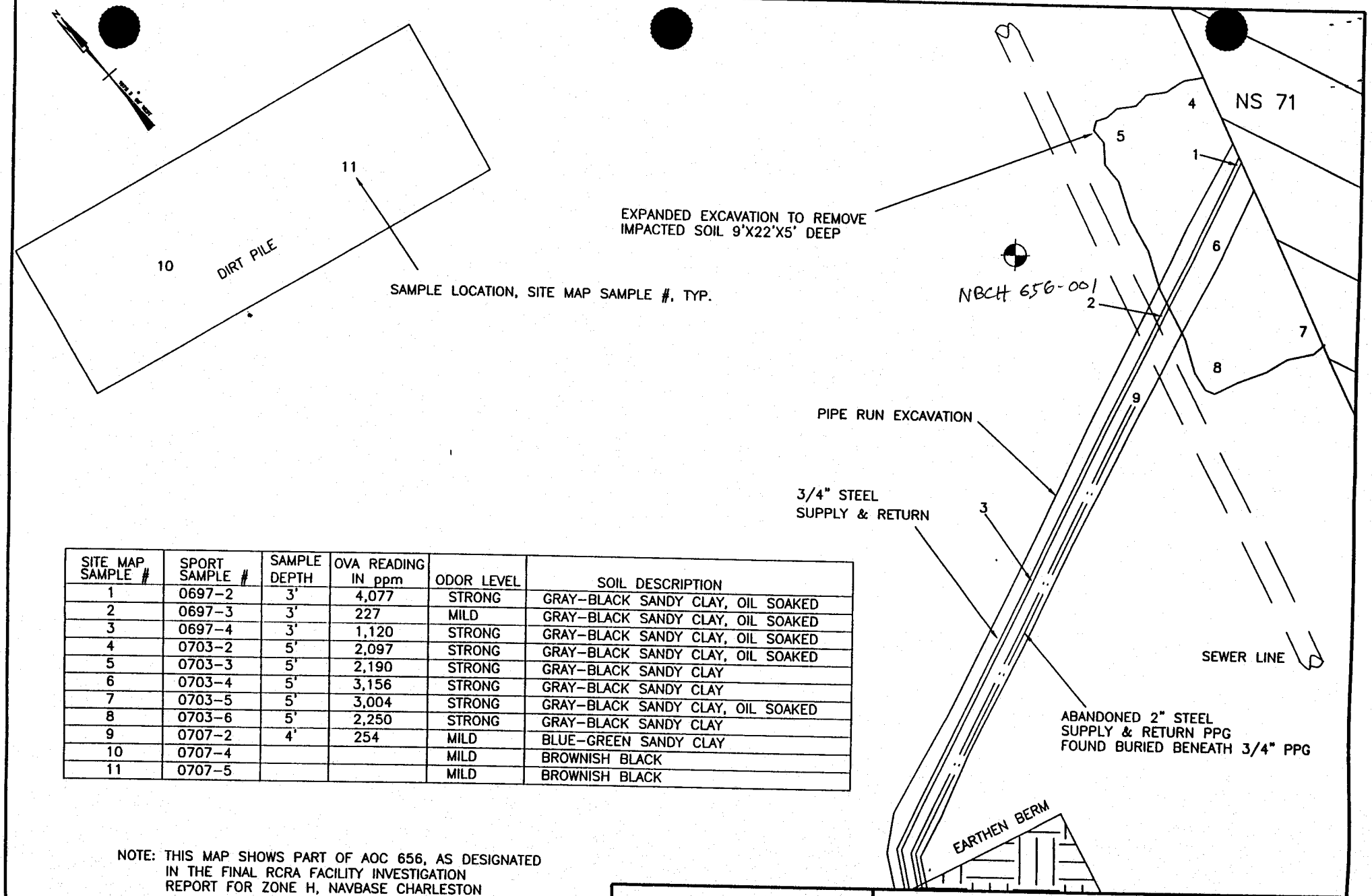
DWG DATE: 14 JULY 98 | DWG NAME: A–NS71_2



SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC
29405-2106
PH (843) 743-6777

Site Map 3
AST NS71
Charleston Naval Base
Charleston, SC

DWG DATE: 21 JULY 98 | DWG NAME: [illegible]S71_3



SITE MAP SAMPLE #	SPORT SAMPLE #	SAMPLE DEPTH	OVA READING IN ppm	ODOR LEVEL	SOIL DESCRIPTION
1	0697-2	3'	4,077	STRONG	GRAY-BLACK SANDY CLAY, OIL SOAKED
2	0697-3	3'	227	MILD	GRAY-BLACK SANDY CLAY, OIL SOAKED
3	0697-4	3'	1,120	STRONG	GRAY-BLACK SANDY CLAY, OIL SOAKED
4	0703-2	5'	2,097	STRONG	GRAY-BLACK SANDY CLAY, OIL SOAKED
5	0703-3	5'	2,190	STRONG	GRAY-BLACK SANDY CLAY
6	0703-4	5'	3,156	STRONG	GRAY-BLACK SANDY CLAY
7	0703-5	5'	3,004	STRONG	GRAY-BLACK SANDY CLAY, OIL SOAKED
8	0703-6	5'	2,250	STRONG	GRAY-BLACK SANDY CLAY
9	0707-2	4'	254	MILD	BLUE-GREEN SANDY CLAY
10	0707-4			MILD	BROWNISH BLACK
11	0707-5			MILD	BROWNISH BLACK

NOTE: THIS MAP SHOWS PART OF AOC 656, AS DESIGNATED IN THE FINAL RCRA FACILITY INVESTIGATION REPORT FOR ZONE H, NAVBASE CHARLESTON

9' 0 9'

GRAPHIC SCALE

SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC
29405-2106
Ph. (843) 743-6777

Site Map 4
AST NS71
Charleston Naval Base
Charleston, SC

DWG DATE: 17 JULY 98 | DWG NAME: A-NS71_4

AST NS71

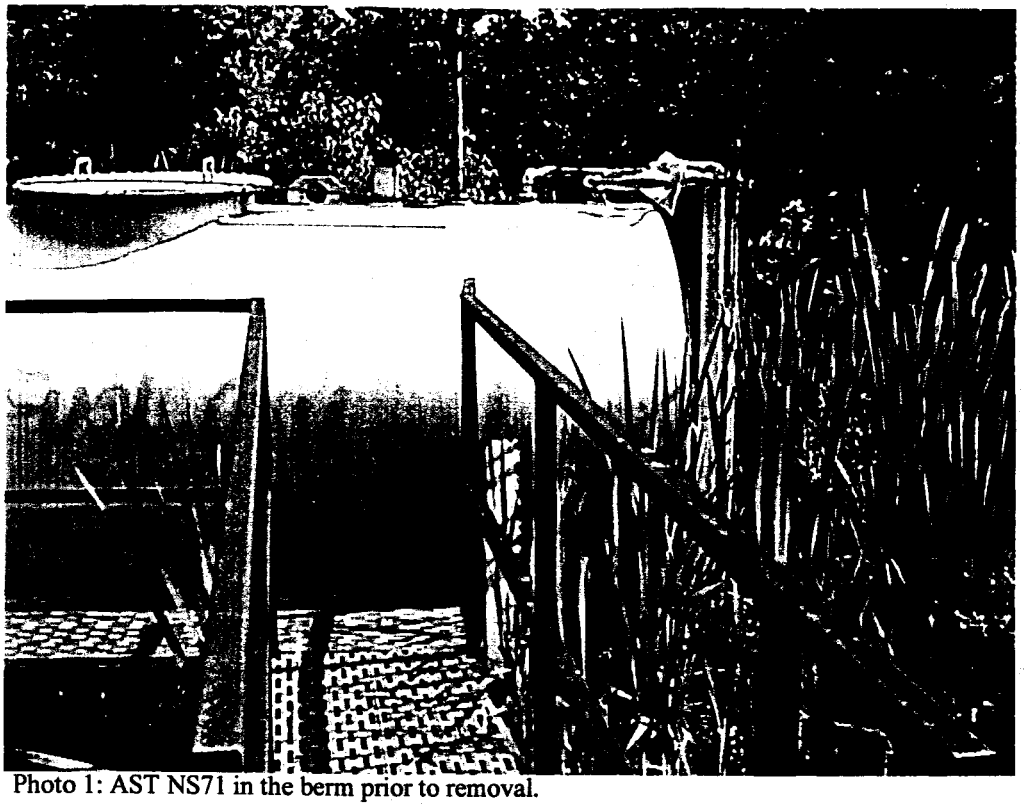


Photo 1: AST NS71 in the berm prior to removal.

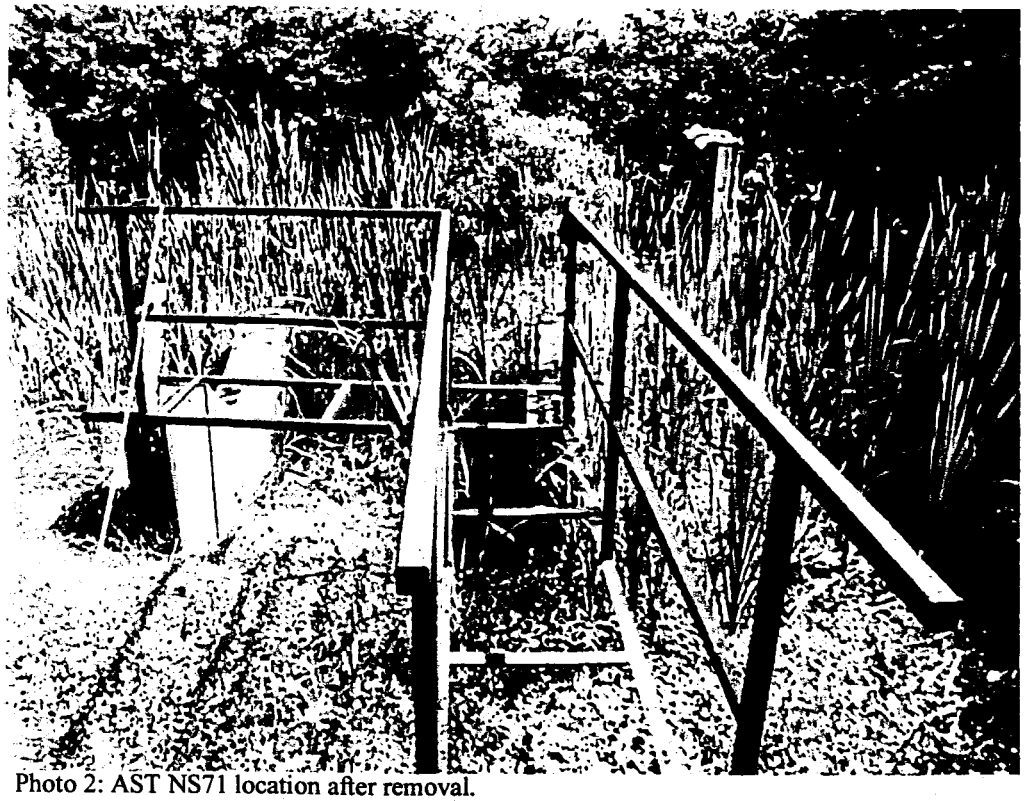


Photo 2: AST NS71 location after removal.

AST NS71

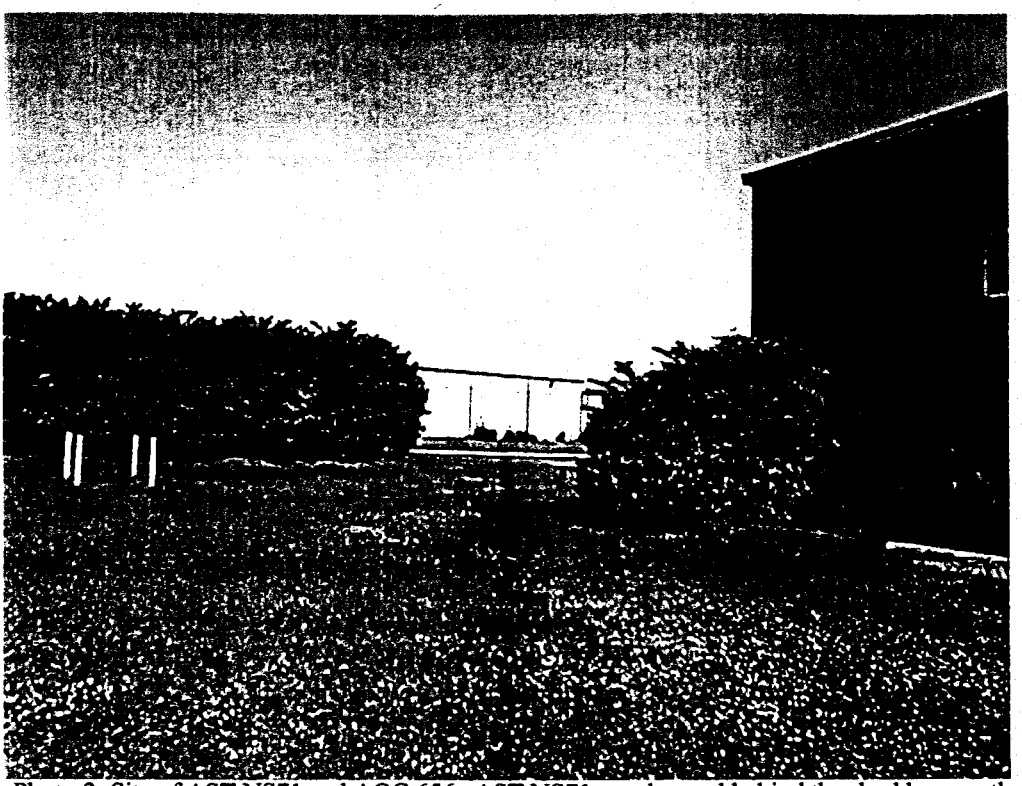


Photo 3: Site of AST NS71 and AOC 656. AST NS71 was located behind the shrubbery on the left. The corner of building NS71 is on the right.

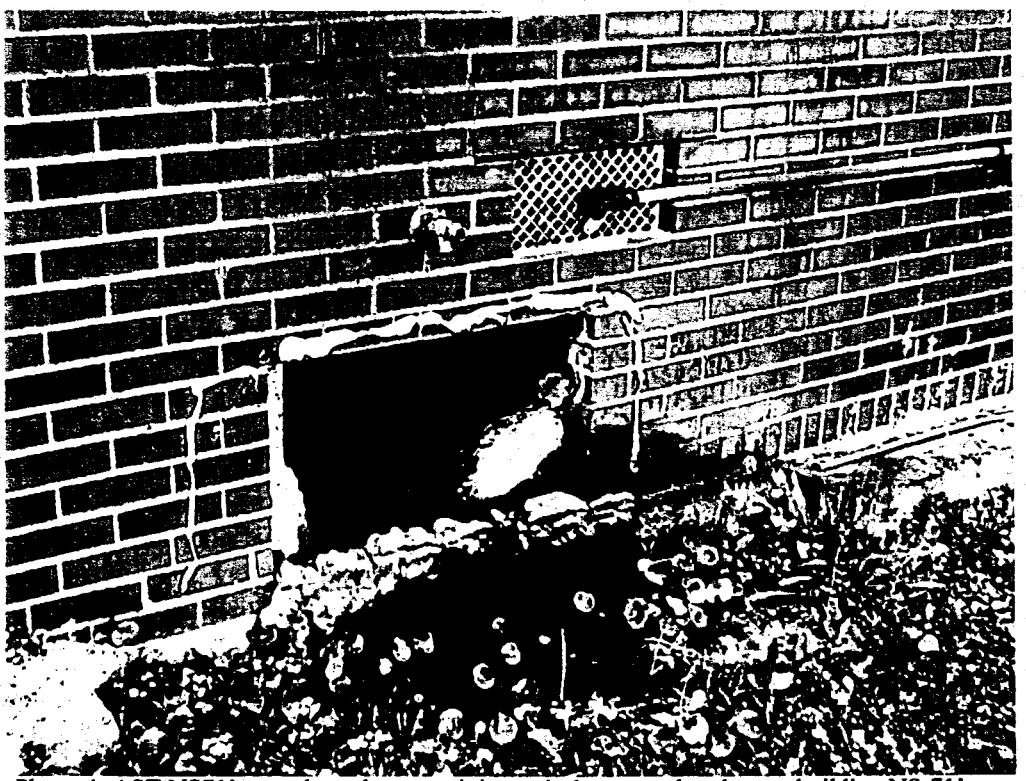


Photo 4: AST NS71's supply and return piping exit the ground and enter building NS-71's crawl space through this access.

AST NS71

Photo 5: AST NS71's supply and return piping.

AST NS71

Photo 6: AST NS71's expanded excavation site after completion of work.

Photo 7: AST NS71 after cleaning and cutting for scrap.

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	EPI
FL	E87156/87294	E87472/87459
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: NPWC00197 Report Date: June 08, 1998

Sample ID	: SPORT0697-1
Lab ID	: 9805745-01
Matrix	: Soil
Date Collected	: 05/27/98
Date Received	: 05/27/98
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	0.250	1.00	ug/kg	1.0	TCL	06/02/98	0043	123258	1
Ethylbenzene	U	0.00	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)	J	0.660	0.620	2.00	ug/kg	1.0					
Naphthalene	U	0.00	0.420	1.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	101.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	77.3	(63.4 - 136.)
Toluene-d8	BTEX-8260	72.2	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	101.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	77.3	(63.4 - 136.)
Toluene-d8	NAP-8260	72.2	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260

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9805745-01

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STATE	GEL	EPI
FL	E87156/87294	E87472/87457
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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-1

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	E87156/87294	E87472/8745[illegible]
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: NPWC00197 Report Date: June 08, 1998

Sample ID	: SPORT0697-2
Lab ID	: 9805745-02
Matrix	: Soil
Date Collected	: 05/27/98
Date Received	: 05/27/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
[illegible]nzene		128	2.50	10.0	ug/kg	10.	TCL	06/02/98	0112	123258	1
[illegible]ylbenzene		424	2.30	10.0	ug/kg	10.					
Toluene		43.5	2.20	10.0	ug/kg	10.					
Xylenes (TOTAL)		1860	62.0	200	ug/kg	100	TCL	06/05/98	1430	123258	1
Naphthalene		2700	42.0	100	ug/kg	100					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	346	1330	ug/kg	4.0	RLC	06/02/98	1506	123079	2
Acenaphthylene	U	0.00	373	1330	ug/kg	4.0					
Anthracene	U	0.00	253	1330	ug/kg	4.0					
Benzo(a)anthracene	U	0.00	240	1330	ug/kg	4.0					
Benzo(a)pyrene	U	0.00	226	1330	ug/kg	4.0					
Benzo(b)fluoranthene	U	0.00	413	1330	ug/kg	4.0					
Benzo(ghi)perylene	U	0.00	240	1330	ug/kg	4.0					
Benzo(k)fluoranthene	U	0.00	346	1330	ug/kg	4.0					
Chrysene	U	0.00	186	1330	ug/kg	4.0					
Dibenzo(a.h)anthracene	U	0.00	226	1330	ug/kg	4.0					
Fluoranthene	U	0.00	320	1330	ug/kg	4.0					
Fluorene	U	0.00	320	1330	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	559	1330	ug/kg	4.0					
Naphthalene	J	1200	306	1330	ug/kg	4.0					
Phenanthrene	J	1250	306	1330	ug/kg	4.0					
Pyrene	U	0.00	253	1330	ug/kg	4.0					

The following prep procedures were performed:

[illegible]MS Base/Neutral Compounds RDH 05/29/98 0800 123079 3

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9805745-02

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STATE	GEL	EPI
FL	E87156/87294	E87472/8745
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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-2

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

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	77.5	(30.0 - 115.)
Nitrobenzene-d5	M610	73.6	(23.0 - 120.)
p-Terphenyl-d14	M610	77.8	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	94.0	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	68.3	(63.4 - 136.)
Toluene-d8	BTEX-8260	73.6	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	94.0	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	68.3	(63.4 - 136.)
Toluene-d8	NAP-8260	73.6	(72.1 - 137.)

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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J indicates that the analyte was not detected at a concentration greater than the detection limit.
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FL	E87156/87294	E87472/8745
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: NPWC00197 Report Date: June 08. 1998

Sample ID : SPORT0697-2

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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STATE	GEL	EPI
FL	E87156/87294	E87472/8745
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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-3
Lab ID : 9805745-03
Matrix : Soil
Date Collected : 05/27/98
Date Received : 05/27/98
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	2.50	10.0	ug/kg	10.	TCL	06/05/98	1222	123258	1
Ethylbenzene	U	0.00	2.30	10.0	ug/kg	10.					
Toluene	U	0.00	2.20	10.0	ug/kg	10.					
Xylenes (TOTAL)	U	0.00	6.20	20.0	ug/kg	10.					
Naphthalene	U	0.00	4.20	10.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	86.3	332	ug/kg	1.0	RLC	06/02/98	1534	123079	2
Acenaphthylene	U	0.00	93.0	332	ug/kg	1.0					
Anthracene	U	0.00	63.1	332	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	59.8	332	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	56.4	332	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	103	332	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	59.8	332	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	86.3	332	ug/kg	1.0					
Chrysene	U	0.00	46.5	332	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	56.4	332	ug/kg	1.0					
Fluoranthene	U	0.00	79.7	332	ug/kg	1.0					
Fluorene	U	0.00	79.7	332	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	139	332	ug/kg	1.0					
Naphthalene	U	0.00	76.4	332	ug/kg	1.0					
Phenanthrene	U	0.00	76.4	332	ug/kg	1.0					
Pyrene	U	0.00	63.1	332	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds RDH 05/29/98 0800 123079 3

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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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	67.3	(30.0 - 115.)
Nitrobenzene-d5	M610	75.9	(23.0 - 120.)
p-Terphenyl-d14	M610	80.3	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	88.8	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	76.8	(63.4 - 136.)
Toluene-d8	BTEX-8260	85.2	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	88.8	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	76.8	(63.4 - 136.)
[illegible]luene-d8	NAP-8260	85.2	(72.1 - 137.)

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

Notes:
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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	EPI
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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: NPWC00197 Report Date: June 08, 1998

Sample ID	: SPORT0697-4
Lab ID	: 9805745-04
Matrix	: Soil
Date Collected	: 05/27/98
Date Received	: 05/27/98
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	2.50	10.0	ug/kg	10.	TCL	06/05/98	1254	123258	1
Ethylbenzene	U	0.00	2.30	10.0	ug/kg	10.					
Toluene	U	0.00	2.20	10.0	ug/kg	10.					
Xylenes (TOTAL)	U	0.00	6.20	20.0	ug/kg	10.					
Naphthalene	U	0.00	4.20	10.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	3430	13200	ug/kg	40.	RLC	06/02/98	1603	123079	2
Acenaphthylene	U	0.00	3700	13200	ug/kg	40.					
Anthracene	U	0.00	2510	13200	ug/kg	40.					
Benzo(a)anthracene	U	0.00	2380	13200	ug/kg	40.					
Benzo(a)pyrene	U	0.00	2240	13200	ug/kg	40.					
Benzo(b)fluoranthene	U	0.00	4090	13200	ug/kg	40.					
Benzo(ghi)perylene	U	0.00	2380	13200	ug/kg	40.					
Benzo(k)fluoranthene	U	0.00	3430	13200	ug/kg	40.					
Chrysene	U	0.00	1850	13200	ug/kg	40.					
Dibenzo(a,h)anthracene	U	0.00	2240	13200	ug/kg	40.					
Fluoranthene	U	0.00	3170	13200	ug/kg	40.					
Fluorene	U	0.00	3170	13200	ug/kg	40.					
Indeno(1,2,3-c,d)pyrene	U	0.00	5540	13200	ug/kg	40.					
Naphthalene	U	0.00	3040	13200	ug/kg	40.					
Phenanthrene	J	8090	3040	13200	ug/kg	40.					
Pyrene	U	0.00	2510	13200	ug/kg	40.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds RDH 05/29/98 0800 123079 3

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9805745-04

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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-4

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

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

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	179.*	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	80.2	(63.4 - 136.)
Toluene-d8	BTEX-8260	91.4	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	179.*	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	80.2	(63.4 - 136.)
Toluene-d8	NAP-8260	91.4	(72.1 - 137.)

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

Notes:
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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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-4

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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9805745-04

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Laboratory Certifications

STATE	GEL	EPI
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: NPWC00197 Report Date: June 08, 1998

Sample ID	: SPORT0697-5
Lab ID	: 9805745-05
Matrix	: Soil
Date Collected	: 05/27/98
Date Received	: 05/27/98
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	2.50	10.0	ug/kg	10.	TCL	06/05/98	1326	123258	1
Ethylbenzene	U	0.00	2.30	10.0	ug/kg	10.					
Toluene	U	0.00	2.20	10.0	ug/kg	10.					
Xylenes (TOTAL)		22.4	6.20	20.0	ug/kg	10.					
Naphthalene	U	0.00	4.20	10.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	J	2250	863	3320	ug/kg	10.	RLC	06/04/98	1024	123079	2
Acenaphthylene	U	0.00	930	3320	ug/kg	10.					
Anthracene		3640	631	3320	ug/kg	10.					
Benzo(a)anthracene		4800	598	3320	ug/kg	10.					
Benzo(a)pyrene		4130	564	3320	ug/kg	10.					
Benzo(b)fluoranthene		4350	1030	3320	ug/kg	10.					
Benzo(ghi)perylene	J	2130	598	3320	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	863	3320	ug/kg	10.					
Chrysene		5010	465	3320	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	564	3320	ug/kg	10.					
Fluoranthene		10800	797	3320	ug/kg	10.					
Fluorene	J	2380	797	3320	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	J	2030	1390	3320	ug/kg	10.					
Naphthalene	U	0.00	764	3320	ug/kg	10.					
Phenanthrene		10800	764	3320	ug/kg	10.					
Pyrene		8410	631	3320	ug/kg	10.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds RDH 05/29/98 0800 123079 3

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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-5

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

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

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	117.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	90.0	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	77.2	(63.4 - 136.)
Toluene-d8	BTEX-8260	87.6	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	90.0	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	77.2	(63.4 - 136.)
Toluene-d8	NAP-8260	87.6	(72.1 - 137.)

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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GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8745
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: NPWC00197

Report Date: June 08, 1998

Sample ID : SPORT0697-5

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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(803) 556-8171 • Fax (803) 766-1178

9805745-05

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 08, 1998

Sample ID	: SPORT0697-6
Lab ID	: 9805745-06
Matrix	: Soil
Date Collected	: 05/27/98
Date Received	: 05/27/98
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	2.50	10.0	ug/kg	10.	TCL	06/05/98	1358	123258	1
Ethylbenzene	J	7.28	2.30	10.0	ug/kg	10.					
Toluene		14.1	2.20	10.0	ug/kg	10.					
Xylenes (TOTAL)	J	18.2	6.20	20.0	ug/kg	10.					
Naphthalene	U	0.00	4.20	10.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	3440	13200	ug/kg	40.	RLC	06/02/98	1701	123079	2
Acenaphthylene	U	0.00	3710	13200	ug/kg	40.					
Anthracene	U	0.00	2520	13200	ug/kg	40.					
Benzo(a)anthracene	U	0.00	2380	13200	ug/kg	40.					
Benzo(a)pyrene	U	0.00	2250	13200	ug/kg	40.					
Benzo(b)fluoranthene	U	0.00	4100	13200	ug/kg	40.					
Benzo(ghi)perylene	U	0.00	2380	13200	ug/kg	40.					
Benzo(k)fluoranthene	U	0.00	3440	13200	ug/kg	40.					
Chrysene	U	0.00	1850	13200	ug/kg	40.					
Dibenzo(a,h)anthracene	U	0.00	2250	13200	ug/kg	40.					
Fluoranthene	U	0.00	3180	13200	ug/kg	40.					
Fluorene	U	0.00	3180	13200	ug/kg	40.					
Indeno(1,2,3-c,d)pyrene	U	0.00	5560	13200	ug/kg	40.					
Naphthalene	U	0.00	3050	13200	ug/kg	40.					
Phenanthrene	U	0.00	3050	13200	ug/kg	40.					
Pyrene	U	0.00	2520	13200	ug/kg	40.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds RDH 05/29/98 0800 123079 3

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9805745-06

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-6

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

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

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	121.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	81.4	(63.4 - 136.)
Toluene-d8	BTEX-8260	93.8	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	121.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	81.4	(63.4 - 136.)
Toluene-d8	NAP-8260	93.8	(72.1 - 137.)

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.

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874[illegible]
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: NPWC00197 Report Date: June 08, 1998

Sample ID : SPORT0697-6

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 D Blakeney
Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414

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9805745-06

VPWC 10197

Page 1 of 1

CHAIN OF CUSTODY RECORD

9805745%

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

Client Name/Facility Name: SPORT ENV DETCH IASN

Collected by/Company: SPORT ENV DETCH IASN

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

Q# 33809

	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/NAP	PAH	Remarks	
-01	SPORTØ697-1	5/27/98	0800		✓		✓	1			-														✓		ASTNS71-1 SOIL TRIP BLANK	-1
-02	SPORTØ697-2	5/27/98	0900		✓		✓	2																	✓	✓	ASTNS71-2	-2
-03	SPORTØ697-3	5/27/98	0930		✓		✓	2																	✓	✓	ASTNS71-3	
-04	SPORTØ697-4	5/27/98	0954 1025		✓		✓	2																	✓	✓	ASTNS71-4	
-05	SPORTØ697-5	5/27/98	1025		✓		✓	2																	✓	✓	ASTNS71-5	
-06	SPORTØ697-6	5/27/98	1049		✓		✓	2																	✓	✓	ASTNS71-6	

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	5-27-98	1450	[signature]	[signature]	5/27/98	1450	Stephanie Barbeau
Stephanie Barbeau	5-27-98	15:10	[signature]				

Relinquished by:	Date:	Time:	Received by lab by:	Date	Time:	Remarks:
Stephanie Barbeau	5-27-98	15:10	[signature]	5/27/98	1510	

White = sample collector Yellow = file Pink = with report

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
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: NPWC00197 Report Date: June 09, 1998

Sample ID	: SPORT 0703-1
Lab ID	: 9805827-01
Matrix	: Soil
Date Collected	: 05/29/98
Date Received	: 05/29/98
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	0.250	1.00	ug/kg	1.0	TCL	06/05/98	1607	123272	
Ethylbenzene	U	0.00	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	0.620	2.00	ug/kg	1.0					
Naphthalene	U	0.00	0.420	1.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	89.4	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	85.4	(63.4 - 136.)
Toluene-d8	BTEX-8260	85.8	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	89.4	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	85.4	(63.4 - 136.)
Toluene-d8	NAP-8260	85.8	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260

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9805827-01

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
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: NPWC00197

Report Date: June 09, 1998

Sample ID : SPORT 0703-1

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.
indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
J 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

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
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: NPWC00197 Report Date: June 09, 1998

Sample ID	: SPORT 0703-2
Lab ID	: 9805827-02
Matrix	: Soil
Date Collected	: 05/29/98
Date Received	: 05/29/98
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	0.250	1.00	ug/kg	1.0	TCL	06/02/98	1259	123272	
Ethylbenzene	U	0.00	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	0.620	2.00	ug/kg	1.0					
Naphthalene	U	0.00	0.420	1.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	86.6	333	ug/kg	1.0	RLC	06/03/98	1408	123205	2
Acenaphthylene	U	0.00	93.2	333	ug/kg	1.0					
Anthracene	U	0.00	63.3	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	59.9	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	56.6	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	103	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	59.9	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	86.6	333	ug/kg	1.0					
Chrysene	U	0.00	46.6	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	56.6	333	ug/kg	1.0					
Fluoranthene	U	0.00	79.9	333	ug/kg	1.0					
Fluorene	U	0.00	79.9	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	140	333	ug/kg	1.0					
Naphthalene	U	0.00	76.6	333	ug/kg	1.0					
Phenanthrene	U	0.00	76.6	333	ug/kg	1.0					
Pyrene	U	0.00	63.3	333	ug/kg	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds CPU 06/01/98 2050 123205

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
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

c: NPWC00197 Report Date: June 09, 1998

Sample ID : SPORT 0703-2

rrogate Recovery	Test	Percent%	Acceptable Limits
luorobiphenyl	M610	70.8	(30.0 - 115.)
robenzene-d5	M610	71.0	(23.0 - 120.)
erphenyl-d14	M610	89.5	(37.3 - 128.)
mofluorobenzene	BTEX-8260	89.9	(53.5 - 154.)
romofluoromethane	BTEX-8260	70.9	(63.4 - 136.)
ene-d8	BTEX-8260	76.4	(72.1 - 137.)
mofluorobenzene	NAP-8260	89.9	(53.5 - 154.)
ro[redacted]romethane	NAP-8260	70.9	(63.4 - 136.)
ene-d8	NAP-8260	76.4	(72.1 - 137.)

Method	Method-Description
	EPA 8260
	EPA 8270
	EPA 3550

alifiers in this report are defined as follows:
dicates that the analyte was not detected at a concentration greater than the detection limit.
ates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
cates that the analyte was not detected at a concentration greater than the detection limit.
ates that a quality control analyte recovery is outside of specified acceptance criteria.

ta report has been prepared and reviewed
rdance with General Engineering Laboratories
d operating procedures. Please direct
stions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen J Blakeney
ed By

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874[illegible]
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: NPWC00197

Report Date: June 09, 1998

Sample ID	: SPORT 0703-3
Lab ID	: 9805827-03
Matrix	: Soil
Date Collected	: 05/29/98
Date Received	: 05/29/98
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	0.250	1.00	ug/kg	1.0	TCL	06/02/98	1329	123272	1
Ethylbenzene	U	0.00	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	0.620	2.00	ug/kg	1.0					
Naphthalene	U	0.00	0.420	1.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	86.6	333	ug/kg	1.0	RLC	06/03/98	1438	123205	2
Acenaphthylene	U	0.00	93.2	333	ug/kg	1.0					
Anthracene	U	0.00	63.3	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	59.9	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	56.6	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	103	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	59.9	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	86.6	333	ug/kg	1.0					
Chrysene	U	0.00	46.6	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	56.6	333	ug/kg	1.0					
Fluoranthene	U	0.00	79.9	333	ug/kg	1.0					
Fluorene	U	0.00	79.9	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	140	333	ug/kg	1.0					
Naphthalene	U	0.00	76.6	333	ug/kg	1.0					
Phenanthrene	U	0.00	76.6	333	ug/kg	1.0					
Pyrene	U	0.00	63.3	333	ug/kg	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds — CPU 06/01/98 2050 123205 3

9805827-03

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8745
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: NPWC00197 Report Date: June 09, 1998

Sample ID : SPORT 0703-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	59.1	(30.0 - 115.)
Nitrobenzene-d5	M610	59.8	(23.0 - 120.)
p-Terphenyl-d14	M610	89.0	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	88.3	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	72.1	(63.4 - 136.)
Toluene-d8	BTEX-8260	76.9	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	88.3	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	72.1	(63.4 - 136.)
Toluene-d8	NAP-8260	76.9	(72.1 - 137.)

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

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 09, 1998

Sample ID : SPORT 0703-4
Lab ID : 9805827-04
Matrix : Soil
Date Collected : 05/29/98
Date Received : 05/29/98
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	0.250	1.00	ug/kg	1.0	TCL	06/02/98	1401	123272	1
Ethylbenzene		1.07	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)		9.62	0.620	2.00	ug/kg	1.0					
Naphthalene		2.31	0.420	1.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	86.6	333	ug/kg	1.0	RLC	06/03/98	1508	123205	2
Acenaphthylene	U	0.00	93.2	333	ug/kg	1.0					
Anthracene	U	0.00	63.3	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	59.9	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	56.6	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	103	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	59.9	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	86.6	333	ug/kg	1.0					
Chrysene	U	0.00	46.6	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	56.6	333	ug/kg	1.0					
Fluoranthene	U	0.00	79.9	333	ug/kg	1.0					
Fluorene	U	0.00	79.9	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	140	333	ug/kg	1.0					
Naphthalene	U	0.00	76.6	333	ug/kg	1.0					
Phenanthrene	U	0.00	76.6	333	ug/kg	1.0					
Pyrene	U	0.00	63.3	333	ug/kg	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds CPU 06/01/98 2050 123205 3

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
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: NPWC00197 Report Date: June 09, 1998

Sample ID : SPORT 0703-4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	69.3	(30.0 - 115.)
Nitrobenzene-d5	M610	69.7	(23.0 - 120.)
p-Terphenyl-d14	M610	97.7	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	80.6	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	69.8	(63.4 - 136.)
Toluene-d8	BTEX-8260	77.0	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	80.6	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	69.8	(63.4 - 136.)
Toluene-d8	NAP-8260	77.0	(72.1 - 137.)

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

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874'
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: NPWC00197 Report Date: June 09, 1998

Sample ID : SPORT 0703-5

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	72.6	(30.0 - 115.)
Nitrobenzene-d5	M610	73.2	(23.0 - 120.)
p-Terphenyl-d14	M610	98.2	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	79.3	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	72.0	(63.4 - 136.)
Toluene-d8	BTEX-8260	77.6	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	79.3	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	72.0	(63.4 - 136.)
Toluene-d8	NAP-8260	77.6	(72.1 - 137.)

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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Karen Blakeney
Reviewed By

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 09, 1998

Sample ID	: SPORT 0703-6
Lab ID	: 9805827-06
Matrix	: Soil
Date Collected	: 05/29/98
Date Received	: 05/29/98
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	0.250	1.00	ug/kg	1.0	TCL	06/02/98	1507	123272	1
Ethylbenzene		9.67	0.230	1.00	ug/kg	1.0					
Toluene	J	0.960	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)		112	0.620	2.00	ug/kg	1.0					
Naphthalene		70.2	0.840	2.00	ug/kg	2.0	TCL	06/05/98	1640	123272	1
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1730	6660	ug/kg	20.	RLC	06/03/98	1607	123205	2
Acenaphthylene	U	0.00	1860	6660	ug/kg	20.					
Anthracene	U	0.00	1270	6660	ug/kg	20.					
Benzo(a)anthracene	U	0.00	1200	6660	ug/kg	20.					
Benzo(a)pyrene	U	0.00	1130	6660	ug/kg	20.					
Benzo(b)fluoranthene	U	0.00	2060	6660	ug/kg	20.					
Benzo(ghi)perylene	U	0.00	1200	6660	ug/kg	20.					
Benzo(k)fluoranthene	U	0.00	1730	6660	ug/kg	20.					
Chrysene	U	0.00	932	6660	ug/kg	20.					
Dibenzo(a,h)anthracene	U	0.00	1130	6660	ug/kg	20.					
Fluoranthene	U	0.00	1600	6660	ug/kg	20.					
Fluorene	J	4820	1600	6660	ug/kg	20.					
Indeno(1,2,3-c,d)pyrene	U	0.00	2800	6660	ug/kg	20.					
Naphthalene		6720	1530	6660	ug/kg	20.					
Phenanthrene		9750	1530	6660	ug/kg	20.					
Pyrene	U	0.00	1270	6660	ug/kg	20.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds CPU 06/01/98 2050 123205 3

9805827-06

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
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: NPWC00197 Report Date: June 09, 1998

Sample ID : SPORT 0703-6

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

Comments:
A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

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	82.2	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	70.2	(63.4 - 136.)
Toluene-d8	BTEX-8260	74.9	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	82.2	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	70.2	(63.4 - 136.)
Toluene-d8	NAP-8260	74.9	(72.1 - 137.)

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.
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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	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 09, 1998

Sample ID : SPORT 0703-6

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414

(803) 556-8171 • Fax (803) 766-1178

NPW1n 00197

980-027

CHAIN OF CUSTODY RECORD

Page 1 of 1

General Engineering La[illegible]es, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

Client Name/Facility Name: SPORT ENVDET CHASN

Collected by/Company: SPORT ENVDET CHASN

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

Q= 33076

	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/NAP	PAH	Remarks	
01	SPORT0703-1	5/29/98	0815		✓		✓	1																✓		AST NS 71-1A Soil Trip Blank	.1
02	SPORT0703-2	5/29/98	0929		✓		✓	2																✓	✓	AST NS 71-2A	.2
03.	SPORT0703-3	5/29/98	1000		✓		✓	2																✓	✓	AST NS 71-3A	
04	SPORT0703-4	5/29/98	1028		✓		✓	2																✓	✓	AST NS 71-4A	
05	SPORT0703-5	5/29/98	1105		✓		✓	2																✓	✓	AST NS 71-5A	
06	SPORT0703-6	5/29/98	1138		✓		✓	2																✓	✓	AST NS 71-6A	

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	5-29-98	1355	[signature]	[signature]	5/29/98	1550	Stephanie Betleston

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
Stephanie Betleston	5/29/98	16:11	Pat Nower	5-29-98	16:11	

GENERAL ENGINEERING LABORATORIES, INC.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87459
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: NPWC00197 Report Date: June 12, 1998

Sample ID	: SPORT0707-1
Lab ID	: 9806112-01
Matrix	: Soil
Date Collected	: 06/02/98
Date Received	: 06/03/98
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	0.250	1.00	ug/kg	1.0	TCL	06/09/98	1928	123691	1
Ethylbenzene	U	0.00	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	0.620	2.00	ug/kg	1.0					
Naphthalene	U	0.00	0.420	1.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	79.8	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	78.1	(63.4 - 136.)
Toluene-d8	BTEX-8260	79.5	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	79.8	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	78.1	(63.4 - 136.)
Toluene-d8	NAP-8260	79.5	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260

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9806112-01

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 12, 1998

Sample ID : SPORT0707-1

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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9806112-01

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 12, 1998

Sample ID	: SPORT0707-2
Lab ID	: 9806112-02
Matrix	: Soil
Date Collected	: 06/02/98
Date Received	: 06/03/98
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	0.250	1.00	ug/kg	1.0	TCL	06/09/98	0207	123691	
Ethylbenzene	U	0.00	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)	J	1.93	0.620	2.00	ug/kg	1.0					
Naphthalene		3.50	0.420	1.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	85.5	330	ug/kg	1.0	RLC	06/10/98	1048	123657	2
Acenaphthylene	U	0.00	92.1	330	ug/kg	1.0					
Anthracene	U	0.00	62.5	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	59.2	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	55.9	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	102	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	59.2	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	85.5	330	ug/kg	1.0					
Chrysene	U	0.00	46.1	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	55.9	330	ug/kg	1.0					
Fluoranthene	U	0.00	79.0	330	ug/kg	1.0					
Fluorene	U	0.00	79.0	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	138	330	ug/kg	1.0					
Naphthalene	U	0.00	75.7	330	ug/kg	1.0					
Phenanthrene	U	0.00	75.7	330	ug/kg	1.0					
Pyrene	U	0.00	62.5	330	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds RDH 06/08/98 1325 123657 3

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9806112-02

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
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: NPWC00197 Report Date: June 12, 1998

Sample ID : SPORT0707-2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	68.8	(30.0 - 115.)
Nitrobenzene-d5	M610	68.5	(23.0 - 120.)
p-Terphenyl-d14	M610	91.3	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	82.5	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	70.9	(63.4 - 136.)
Toluene-d8	BTEX-8260	73.3	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	82.5	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	70.9	(63.4 - 136.)
Toluene-d8	NAP-8260	73.3	(72.1 - 137.)

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	EPI
FL	E87156/87294	E87472/8
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: NPWC00197 Report Date: June 12, 1998

Sample ID	: SPORT0707-3
Lab ID	: 9806112-03
Matrix	: Soil
Date Collected	: 06/03/98
Date Received	: 06/03/98
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	0.250	1.00	ug/kg	1.0	TCL	06/09/98	0238	123691	
Ethylbenzene	U	0.00	0.230	1.00	ug/kg	1.0					
Toluene	U	0.00	0.220	1.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.620	0.620	2.00	ug/kg	1.0					
Naphthalene	J	0.700	0.420	1.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	86.1	331	ug/kg	1.0	RLC	06/10/98	1117	123657	2
Acenaphthylene	U	0.00	92.7	331	ug/kg	1.0					
Anthracene	U	0.00	62.9	331	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	59.6	331	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	56.3	331	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	103	331	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	59.6	331	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	86.1	331	ug/kg	1.0					
Chrysene	U	0.00	46.3	331	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	56.3	331	ug/kg	1.0					
Fluoranthene	U	0.00	79.4	331	ug/kg	1.0					
Fluorene	U	0.00	79.4	331	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	139	331	ug/kg	1.0					
Naphthalene	U	0.00	76.1	331	ug/kg	1.0					
Phenanthrene	U	0.00	76.1	331	ug/kg	1.0					
Pyrene	U	0.00	62.9	331	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds RDH 06/08/98 1325 123657

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(803) 556-8171 • Fax (803) 766-1178

9806112-03

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
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: NPWC00197 Report Date: June 12, 1998

Sample ID : SPORT0707-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	65.0	(30.0 - 115.)
Nitrobenzene-d5	M610	68.5	(23.0 - 120.)
p-Terphenyl-d14	M610	92.9	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	84.2	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	72.3	(63.4 - 136.)
Toluene-d8	BTEX-8260	73.8	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	84.2	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	72.3	(63.4 - 136.)
Toluene-d8	NAP-8260	73.8	(72.1 - 137.)

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

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
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: NPWC00197 Report Date: June 12, 1998

Sample ID	: SPORT0707-4
Lab ID	: 9806112-04
Matrix	: Soil
Date Collected	: 06/03/98
Date Received	: 06/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		1440	10.0	50.0	mg/kg	1.0	AAT	06/08/98	1500	123700	1

M = Method	Method-Description
M 1	EPA 9071A

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

9806112-04

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
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: NPWC00197 Report Date: June 12, 1998

Sample ID	: SPORT0707-5
Lab ID	: 9806112-05
Matrix	: Soil
Date Collected	: 06/03/98
Date Received	: 06/03/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		2840	10.0	50.0	mg/kg	1.0	AAT	06/08/98	1500	123700	

M = Method	Method-Description
M 1	EPA 9071A

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(803) 556-8171 • Fax (803) 766-1178

9806112-05

NPL 00197

BB

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

CHAIN OF CUSTODY RECORD

9806112%

Page_____ of _____

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: SPORTENVDETCHASN

	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	~~PCBs~~ TPH	Cyanide	Coliform - specify type	BTEX/NAPS	PAH	Remarks
-01	SPORT0707-1	6-2-98	0800		✓		✓	1			-													✓		ASTNS 71-3B SOIL TRIP BLANK .1
-02	SPORT0707-2	6-2-98	1030		✓		✓	2																✓	✓	ASTNS 71-1B .2
-03	SPORT0707-3	6-3-98	1300		✓		✓	2						-	-				---					✓	✓	ASTNS 71-2B .2
-04	SPORT0707-4	6-3-98	1400		✓	✓		1													✓					ASTNS71 DP North End .3
-05	SPORT0707-5	6-3-98	1420		✓	✓		1													✓					ASTNS71 DP South End .3

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 33151

Remarks

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	6-3-98	1540	[signature]	[signature]	6/3/98	1540	[signature]
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
[signature]	6/3/98	1603	[signature]	6/3/98	1603		

White - sample collector Yellow - file Pink - initial report

Attachment III

Certificate of Disposal (tank)
Disposal Manifests (hazardous waste)

AST 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 (843) 743-6482

TANK ID & LOCATION

AST NS71; Building NS-71, Bordelon Ave., N. Charleston, SC

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

TYPE OF TANK	SIZE (GAL)
Fuel oil	2,200 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 Jul 98 (Date)

OAKRIDGE LANDFILL
SPECIAL WASTE DISPOSAL APPLICATION

803-563-2607

NS-71

SALES PERSON: MATTICE

APPLICATION ID #:

DISPOSAL FACILITY: OAKRIDGE

APPLICATION DATE: 6-19-98

A. GENERAL INFORMATION

Customer Name: SUPERVISOR OF SHIPBUILDING F CONV
Address: 1899 N HORSON AVE
NORTH CHARLESTON SC 29405-2106
Phone: 743-6777
Contact: TODD DAILEY
USEPA ID#:

Waste Type: DIESEL CONTAMINATED SOIL
Quantity: 90 TONS Per: TOTAL
Delivery Method: TRUCK
Contractor: CHANNELS
Contractor's Phone: 821-1662
State of Origin: SC State of Disposal: SC

B. WASTE DESCRIPTION

Physical State: Solid (X) Liquid ( ) Gas ( ) Semi-Solid ( )
Single Phased: Yes (X) No ( )
% Solids: 100 pH: NT
% Free Liquids: 0 Color: BROWN / BLACK
% Radioactive Waste: 0 Odor: PETRO
% Asbestos: 0 Flash Point: >140°F
Reactive Sulfides (ppm): NT
Reactive Cyanides (ppm): NT

PROCESS OF WASTE GENERATION:
SPILL OF VIRGIN DIESEL FUEL

CONTENTS OF WASTE BY VOLUME IN %:
100% VIRGIN DIESEL FUEL CONTAMINATED SOIL

C. HAZARDOUS CONSTITUENTS

	Total (ppm)	TCLP (ppm)
PCB's	<RL	
TPH	2840	
BTEX	<RL	
TOX	<RL	
TCLP METALS		
Arsenic	<RL	
Barium		
Cadmium		
Chromium		
Lead		
Mercury		
Selenium		
Silver		
TCLP VOLATILES/SEMI-VOLATILES		
Benzene		
Carbon Tetrachloride		
Chlorobenzene		
Chloroform		
m-Cresol		
o-Cresol		
p-Cresol		
1,4-Dichlorobenzene		
1,2-Dichloroethane		
1,1-Dichloroethene		
2,4-Dinitrotoluene		
Hexachlorobenzene		
Hexachlorobutadiene		
Hexachloroethane		
Methyl Ethyl Ketone		
Nitrobenzene		
Pentachlorophenol		
Pyridine		
Tetrachloroethene		
Trichloroethene		
2,4,5-Trichlorophenol		
2,4,5-Trichlorophenol		
Vinyl Chloride		
TCLP HERBICIDES/PESTICIDES		
Chlordane		
Endrin		
Heptachlor		
Lindane (Gamma-BHC)		
Methoxychlor		
Silvex (2,4,5-TP)		
Toxaphene		
2,4-D		

D. CERTIFICATIONS

I certify that the laboratory results identified below are attached as support to the data certified on this application form.

lab name(s): COASTAL ENVIRONMENTAL LABS

report date(s): 6-12-98

sample ID#(s): SPORT0707-4 & -5

< RL = LESS THAN REGULATORY LIMIT PER GENERATORS KNOWLEDGE.

By signing this form I certify that:
1. I am the legal generator of the waste described on this form.
2. The waste described on this form is not a regulated Hazardous Waste as defined by the USEPA, the State of Origin or the State of Disposal listed above.
3. This form and its attachments contain true and accurate descriptions of the waste.
4. Any laboratory data used to support the information presented on this form has been obtained from the analysis of a volumetrically representative sample, obtained and analyzed according to 40 CFR 261, EPA Document SW-846, or other applicable regulations or guidelines, of EXACTLY THE SAME WASTE that I will deliver to Chambers for either hauling or disposal.

Certified Signature: x Todd M. Dailey Date: 6/19/98

Printed/Typed Name, Title & Employer: TODD M. DAILEY, WASTE MANAGEMENT SUPERVISOR, CEERD

mod 12-9

OAKRIDGE LANDFILL
A RAILWAY TRANSFER COMPANY

2183 Highway 78
P.O. Box 145
Dorchester, SC 29437
(803) 563-2607
(803) 563-4188 Fax

SPECIAL WASTE MANIFEST

Approval # OR 9806022
Expiration 09/19/98

Generator: SUPERVISOR OF SHIPBUILDING

Account Number: 490-299

Location/Address: 1899 N HOBSON AV N CHARLESTON SC

Tele Number: 843-743-6777 **Contact:** TODD DAILEY

Generator Signature: _____

********** TO BE COMPLETED BY TRANSPORTER **********

Transporter of Waste: C E CHINNERS

Date: 7-1-98 **Truck #** 28

Driver Signature: Harvey Wright

********** TO BE COMPLETED BY OAKRIDGE LANDFILL **********

Disposal Site: Chambers Oakridge Laudfill DPW 130

Description of Waste: SOL / DIESEL CONTAMINATED SOIL

Ticket Number: 49593 **Tonnage:** 23.71

Received By: Jessie M

OAKRIDGE LANDFILL
2183 Highway 78
P.O. Box 145
Dorchester, SC 29437
(803) 563-2807
(803) 563-4158 Fax

SPECIAL WASTE MANIFEST

Approval # OR 9806022
Expiration 09/19/98

Generator: SUPERVISOR OF SHIPBUILDING

Account Number: 490-299

Location/Address: 1899 N HOBSON AV N CHARLESTON SC

Tele Number: 843-743-6777 **Contact:** TODD DAILEY

Generator Signature: Todd M. Daily

********** TO BE COMPLETED BY TRANSPORTER **********

Transporter of Waste: C E CHINNERS Butler Waste

Date: 7-1-98 **Truck #** 18

Driver Signature: J. R. McMillan

********** TO BE COMPLETED BY OAKRIDGE LANDFILL **********

Disposal Site: Chambers Oakridge Landfill DPW 130

Description of Waste: SOL / DIESEL CONTAMINATED SOIL

Ticket Number: 69610 **Tonnage:** 27.68

Received By: Cassie

APPENDIX B

GEOLOGIC BORING LOGS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B01	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO** ⊽ 3.5 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SANDY CLAY: ~20% fine-grained sand, soft, shell fragments, damp, black to dark brown.		CL		
				250	SANDY CLAY: as above, dark gray.				
	01SFB0103			580	SANDY CLAY: as above, silty, moderate petroleum odor, black.				
	⊽			1100	SANDY CLAY: as above, wet.				
5					CLAYEY SAND: fine-grained, silty, clayey, soft, wet, olive green.		SC		
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B02	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO** ⊽ 3.5 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				90	SANDY CLAY: ~20% fine to medium-grained sand, soft, shell fragments damp, black to dark brown.		CL		
				700	SANDY CLAY: as above, strong petroleum odor, damp, gray to tan.				
	01SFB0203			700	SILTY SAND: fine-grained, silty, strong petroleum odor, damp, olive green.		SM		
	⊽			1050	SILTY SAND: as above, shell fragments, wet.				
5					SILTY SAND: as above, saturated, yellowish green.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B03	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.5 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				90	CLAYEY SAND: brown clayey (~15%) fine sand,soft, damp.		SC		
				700	SANDY CLAY: tanish brown fine sandy (~15-20%) clay, moderately soft, damp.		CL		
	01SFB0303			700	CLAYEY SAND: light gray, clayey (~40%) sand, soft, wet.		SC		
▽				1050	CLAYEY SAND: as above, decreasing clay content (~15-20%), wet.				
5					CLAYEY SAND: dark gray silty, clayey fine-grained sand, saturated.				
					CLAY: dark gray organic clay with trace of fine sand, mucky, saturated.		OL		
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B04	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAYEY SAND: brownish tan clayey (~15%) sand, shell fragments, damp, loose.		SC		
	01SFB0402			0	CLAYEY SAND: dark brown clayey (~10%) sand, fine to very fine-grained loose, damp.				
	∇			200	CLAYEY SAND: light gray, clayey (~35%) sand, very fine to fine- grained, petroleum odor, wet.				
				1200	CLAYEY SAND: as above, decreasing clay content (~15-20%), wet.				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B05	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SAND: dark brown, fine to very fine-grained sand, trace clay, loose, damp.		SP		
	01SFB0502			0	CLAYEY SAND: tanish orange clayey sand, fine to very fine-grained, clay ~15-20%, loose, damp.		SC		
				2	CLAYEY SAND: light gray, clayey (~30%) sand, very fine to fine- grained, wet.				
▽				450	CLAYEY SAND: as above, decreasing clay content (~15%), wet.				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B06	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
	01SFB0602			20	CLAYEY SAND: black, clayey (~15-20%) very fine to fine-grained sand, strong petroleum odor, damp.		SC		
				60	CLAYEY SAND: as above, damp.				
				1500	CLAYEY SAND: as above, wet.				
▽				1050	SANDY CLAY: balck, very fine to fine-grained sandy clay, soft, wet.		CL		
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B07	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAYEY SAND: brown, clayey (~30%) very fine to fine-grained sand, damp.		SC		
	01SFB0702			2	CLAYEY SAND: as above, black.				
				200	CLAYEY SAND: as above, wet.				
▽				6000	CLAYEY SAND: as above, increasing clay content (~40-45%).				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B08	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO** ▽ 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHOLOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAYEY SAND: dark brown clayey (~40%) very fine to fine-grained sand, damp.		SC		
	01SFB0802			1	CLAYEY SAND: as above.				
	▽			90	SANDY SILTY CLAY: dark brown, very fine-grained, sandy silty clay, mucky, petroleum odor, highly saturated.		OL		
				200	SANDY SILTY CLAY: as above, very stong petroleum odor.				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

ASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
ORING ID: CNC01-B09	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/13/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO** ∇ 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHOLOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SILTY SAND: brown silty (~20%) very fine to fine-grained sand, damp.		SM		
	01SFB0902			0	SILTY SAND: as above, increasing silt content (~40%), damp.				
				0	SILTY SAND: as above w/ brown sandy clay lenses, wet.				
∇				600	SANDY CLAY: dark brown very fine to fine-grained sandy clay, soft, wet.		CL		
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B10	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHOLOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SILTY SAND: brown, silty (~25%) very fine to fine-grained sand, damp.		SM		
	01SFB1002			0	CLAY: brown clay w/ trace fine sand, soft, damp.		CL		
				0	CLAY: as above, wet.				
	▽			0	CLAY: as above, saturated.				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B11	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 2ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO** ∇ 2 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAY: brown clay w/ trace fine sand, soft, wet.		CL		
				0	CLAY: as above, saturated.				
∇					End of boring. Hole collapsed.				
5									
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B12	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 1ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 1 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
▽				0	SILTY SAND: brownish tan, silty (~20%), very fine to fine-grained sand, saturated. End of boring. Saturated sediments encountered just below surface.		SM		
5									
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B13	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 1ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 1 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SILTY SAND: brownish tan, silty (~20%), very fine to fine-grained sand, saturated.		SM		
▽					End of boring. Saturated sediments encountered just below surface.				
5									
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B14	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 1ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 1 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					SILTY SAND: brownish tan, silty (~20%), very fine to fine-grained sand, saturated.		SM		
▽					End of boring. Saturated sediments encountered just below surface.				
5									
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B15	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SANDY CLAY: ~20% fine-grained sand, soft, shell fragments, damp, black to dark brown.		CL		
	01SFB1502			0	SANDY CLAY: as above, dark gray.				
				0	SANDY CLAY: as above, silty, moderate petroleum odor, black.				
	▽			2000	SANDY CLAY: as above, wet.				
5					CLAYEY SAND: fine-grained, silty, clayey, soft, wet, olive green.		SC		
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B16	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO** ⊽ 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SANDY CLAY: ~20% fine to medium-grained sand, soft, shell fragments damp, black to dark brown.		CL		
	01SFB1602			0	SANDY CLAY: as above, strong petroleum odor, damp, gray to tan.				
				0	SILTY SAND: fine-grained, silty, strong petroleum odor, damp, olive green.		SM		
	⊽			200	SILTY SAND: as above, shell fragments, wet.				
5					SILTY SAND: as above, saturated, yellowish green.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B17	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAYEY SAND: brown clayey (~15%) fine sand,soft, damp.		SC		
	01SFB1702			0	SANDY CLAY: tanish brown fine sandy (~15-20%) clay, moderately soft, damp.		CL		
				0	CLAYEY SAND: light gray, clayey (~40%) sand, soft, wet.		SC		
▽				1125	CLAYEY SAND: as above, decreasing clay content (~15-20%), wet.				
5					CLAYEY SAND: dark gray silty, clayey fine-grained sand, saturated.				
					CLAY: dark gray organic clay with trace of fine sand, mucky, saturated.		OL		
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7921
BORING ID: CNC01-B18	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				7	CLAYEY SAND: brownish tan clayey (~15%) sand, shell fragments, damp, loose.		SC		
	01SFB1802			6	CLAYEY SAND: dark brown clayey (~10%) sand, fine to very fine-grained loose, damp.				
	∇			4	CLAYEY SAND: light gray, clayey (~35%) sand, very fine to fine- grained, petroleum odor, wet.				
				N/A	CLAYEY SAND: as above, decreasing clay content (~15-20%), wet.				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

E: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B19	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/14/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 2.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
	01SFB1901			15	SAND: dark brown, fine to very fine-grained sand, trace clay, loose, damp.		SP		
				4	CLAYEY SAND: tanish orange clayey sand, fine to very fine-grained, clay ~15-20%, loose, damp.		SC		
▽				0	CLAYEY SAND: light gray, clayey (~30%) sand, very fine to fine- grained, wet.				
				N/A	CLAYEY SAND: as above, decreasing clay content (~15%), wet.				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B20	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/21/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHOLOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAYEY SAND: black, clayey (~15-20%) very fine to fine-grained sand, strong petroleum odor, damp.		SC		
	01SFB2002			2	CLAYEY SAND: as above, damp.				
				2	CLAYEY SAND: as above, wet.				
	∇				SANDY CLAY: balck, very fine to fine-grained sandy clay, soft, wet.		CL		
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B21	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/21/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				3	CLAYEY SAND: brown, clayey (~30%) very fine to fine-grained sand, damp.		SC		
	01SFB2102			7	CLAYEY SAND: as above, black.				
				5	CLAYEY SAND: as above, wet.				
	▽				CLAYEY SAND: as above, increasing clay content (~40-45%).				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B22	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/21/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO** ⊽ 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAYEY SAND: dark brown clayey (~40%) very fine to fine-grained sand, damp.		SC		
				29	CLAYEY SAND: as above.				
	01SFB2203 ⊽			1800	SANDY SILTY CLAY: dark brown, very fine-grained, sandy silty clay, mucky, petroleum odor, highly saturated.		OL		
					SANDY SILTY CLAY: as above, very stong petroleum odor.				
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 01	**PROJECT NO.** 7912
BORING ID: CNC01-B23	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 01/21/99	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 8ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** 3.0 ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				3	SILTY SAND: brown silty (~20%) very fine to fine-grained sand, damp.		SM		
				4	SILTY SAND: as above, increasing silt content (~40%), damp.				
	01SFB2303 ▽			16	SILTY SAND: as above w/ brown sandy clay lenses, wet.				
					SANDY CLAY: dark brown very fine to fine-grained sandy clay, soft, wet.		CL		
5					No Samples Collected from 4 to 8 ft.				
					End of Boring				
10									
15									

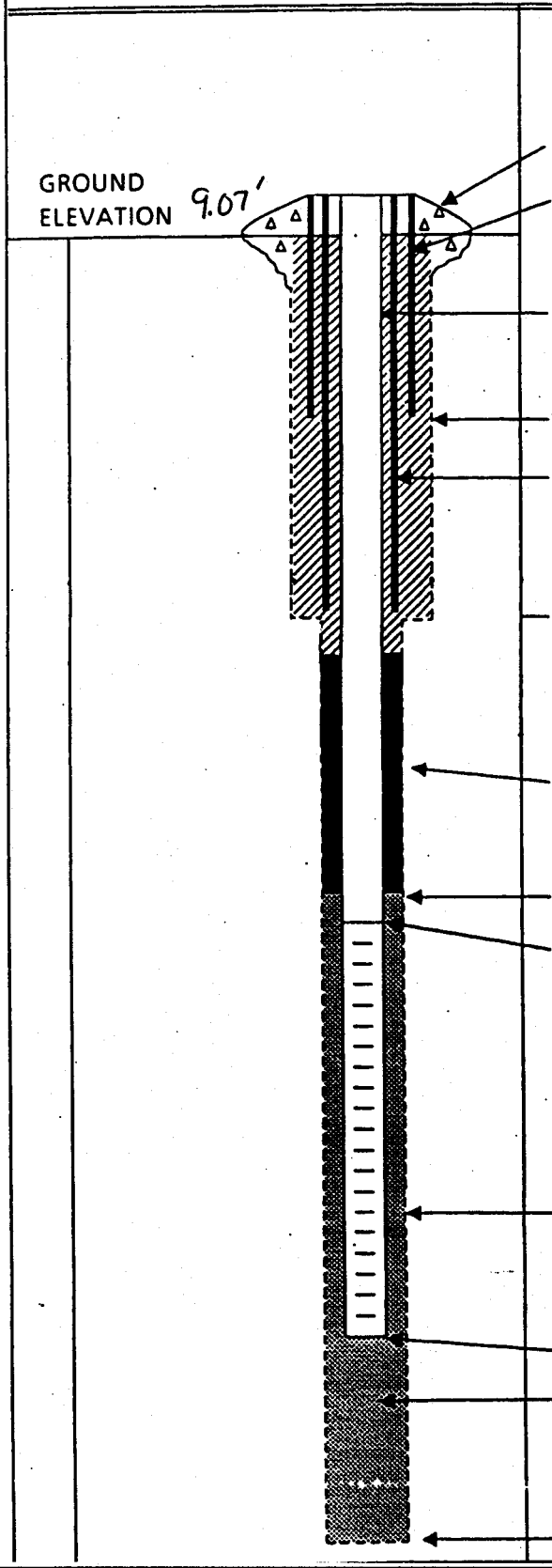
Tetra Tech NUS

BORING NO.: CNC 01-MW2

MONITORING WELL SHEET

PROJECT: CNC Group H
PROJECT NO.: 7912
ELEVATION: Toc = 8.84' msl
FIELD GEOLOGIST: Pam Jackson
LOCATION: Site 1
BORING:
DATE: Feb 16 - 19, 1999

DRILLER: Custom Drilling
DRILLING METHOD: HSA / rotary
DEVELOPMENT METHOD: over-pumping



TOC elevation = 8.84' msl

TYPE OF SURFACE SEAL: cement

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING: manhole

RISER PIPE I.D. 2" ID
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8 10 1/4"

PERM. CASING I.D. 6"
TYPE OF CASING & BACKFILL: portland type I cement

ELEVATION / DEPTH BOTTOM OF CASING: -11.16 / 20'

ELEVATION / DEPTH TOP OF SEAL: -10.16 / 19
TYPE OF SEAL: bentonite

DEPTH TOP OF SAND PACK: -11.16 20

ELEVATION/DEPTH TOP OF SCREEN: -13.16 / 22'
TYPE OF SCREEN:

TYPE OF SAND PACK: 20/30 Silica Sand

BOREHOLE DIA. BELOW CASING: 5 7/8"

ELEVATION / DEPTH BOTTOM OF SCREEN: -18.16 / 27'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 1
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION / DEPTH OF HOLE: -18.16 / 27'

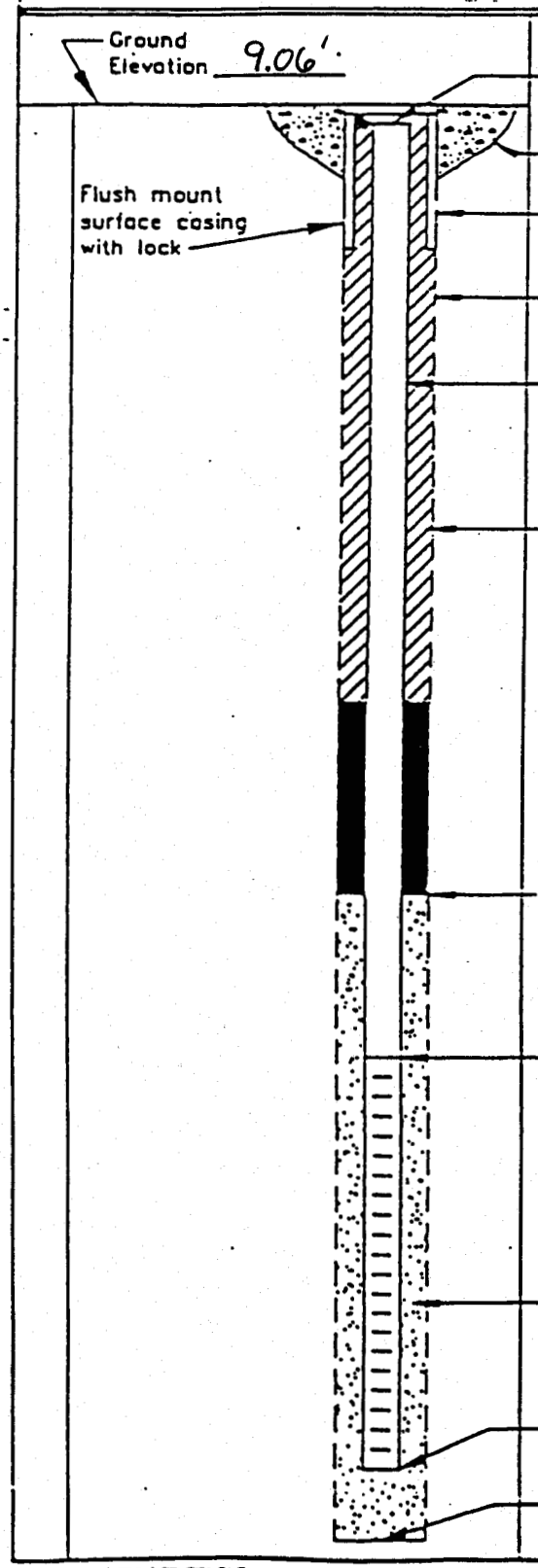
BORING NO.: CMW-7 MW1

MONITORING WELL SHEET

PROJECT CNC Group H Site 1
PROJECT NO. 7912
ELEVATION TOC = 8.77 ft msl
FIELD GEOLOGIST Pam Wa Jackson

LOCATION 25' SW of building NS-7
BORING
DATE February 16 1999

DRILLER Custom Drilling
DRILLING METHOD Hollow Stem Auger
DEVELOPMENT METHOD Over pumping



ELEVATION TOP OF RISER: 8.77 ft msl
TYPE OF SURFACE SEAL: Concrete
TYPE OF PROTECTIVE CASING: manhole
I.D. OF PROTECTIVE CASING: 8"
DIAMETER OF HOLE: ≈ 6 1/4"
TYPE OF RISER PIPE: PVC
RISER PIPE I.D.: 2" ID
TYPE OF BACKFILL/SEAL: 30/65 fine Sand
DEPTH/ELEVATION TOP OF SAND: 1', 7.77'
DEPTH/ELEVATION TOP OF SCREEN: 2', 6.77'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.010 X 10'
TYPE OF SAND PACK: 20/30 silica
DIAMETER OF HOLE IN BEDROCK:
DEPTH/ELEVATION BOTTOM OF SCREEN: 12', -3.23
DEPTH/ELEVATION BOTTOM OF SAND: 12.5', -3.73
DEPTH/ELEVATION BOTTOM OF HOLE: 12.5', -3.73
BACKFILL MATERIAL BELOW SAND:

ACFILE: L:\70\GEOL\GBURD1.DOC

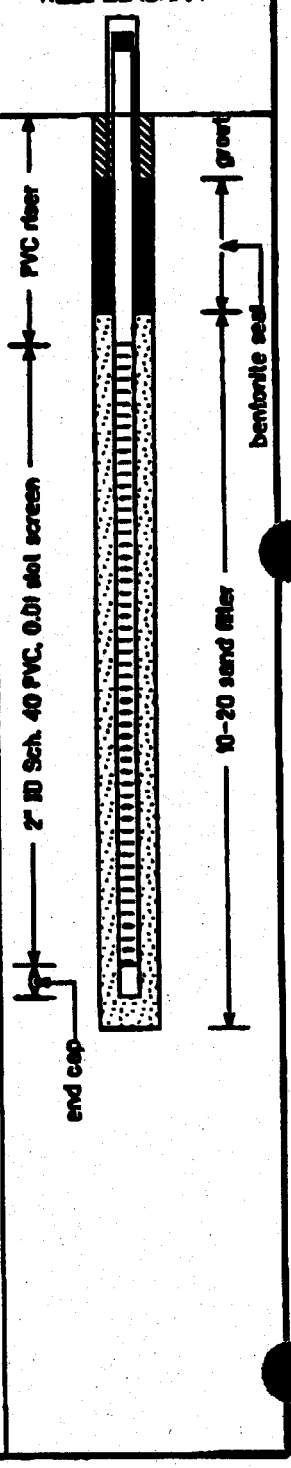
EnSafe/Allen & Hoshall

Monitoring Well NBCH656001

Project: Zone H-Naval Base Charleston	Coordinates: 232486.08 E, 388586.19 N
Location: Charleston, SC	Surface Elevation: 9.1 feet msl
Started at 0830 on 8-25-94	TOC Elevation: 11.23 feet msl
Completed at 1000 on 8-25-94	Depth to Groundwater: 4.32 feet TOC Measured: 8-21-95
Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon	Groundwater Elevation: 6.91 feet msl
Drilling Company: Alliance Environmental	Total Well Depth: 13.5 feet bgs
Geologist: B. Dotson	Well Screen: 3.5 to 13.0 feet bgs

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)
								Surface conditions: grassy with dark brown, fine sand, silt, some clay, and shell fragments -- spoil.	9.1
							FILL	Sand: dark brown, fine, some silt and clay, with some shells, moist.	5.6
							SP	Sand: grey-white, medium, well-sorted, moist.	4.6
6			1	75				Apparently saturated at 6 feet.	
							ML	Silt: dark brown, saturated, liquified.	1.1
10			2	25					3.9
							ML	Silt: dark brown, clayey, little to no sand, saturated; collected portion of spoon for physical parameter analysis.	
15			3	100					5.9
20									

WELL DIAGRAM



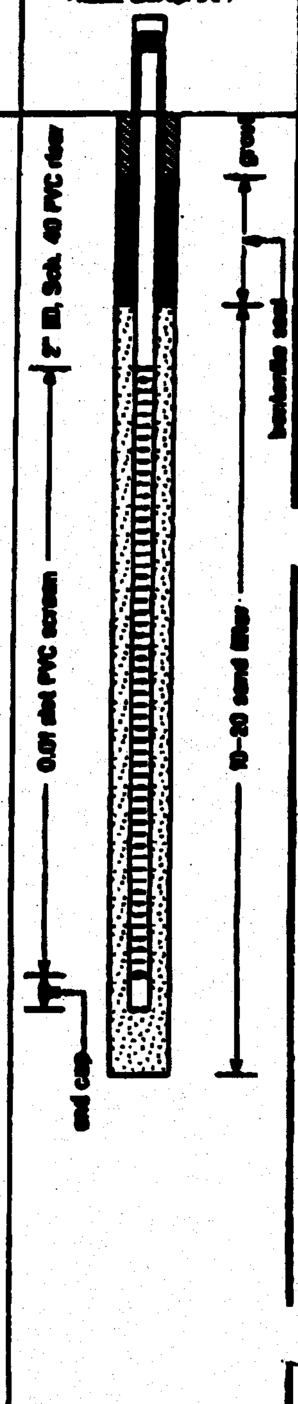
EnSafe/Allen & Hoshall

Monitoring Well NBCH658002

Project: Zone H-Naval Base Charleston	Coordinates: 2324189.99 E, 369957.43 N
Location: Charleston, SC	Surface Elevation: 8.5 feet msl
Started at 1130 on 8-25-94	TOC Elevation: 10.77 feet msl
Completed at 1145 on 8-25-94	Depth to Groundwater: 4.86 feet TOC Measured: 8-21-95
Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon	Groundwater Elevation: 5.91 feet msl
Drilling Company: Alliance Environmental	Total Well Depth: 14 feet bgs
Geologist: B. Dotson	Well Screen: 4 to 13.5 feet bgs

DEPTH IN FEET	SAMPLE NO.	% RECOVERY	PID (ppm)	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)
					Surface conditions: grassy with dark brown, silty sand, moist, with shell fragments -- spoil.	
						8.5
				FILL	Spoils. Same as above.	8
				CL	Clay: dark brown, silty, moist.	7.5
5	1	100	1.6	SM	Sand: tan-light brown blending to gray at 5 feet, fine, silty.	6.5
				SM	Cuttings: Fine sand and silt, dark brown to black, saturated.	5
10	2	100	1.7	ML	Silt: dark gray, clayey, little to no sand, saturated, liquified.	1.5
						-4.5
				SM	Sand: orange-brown, silty.	-5
				SW	Sand: medium gray, with shell fragments, moderately well-sorted.	-5.5
15	3	100	2.4	OL	Silt: dark gray with some clay, with marsh grass.	-6.5
20						

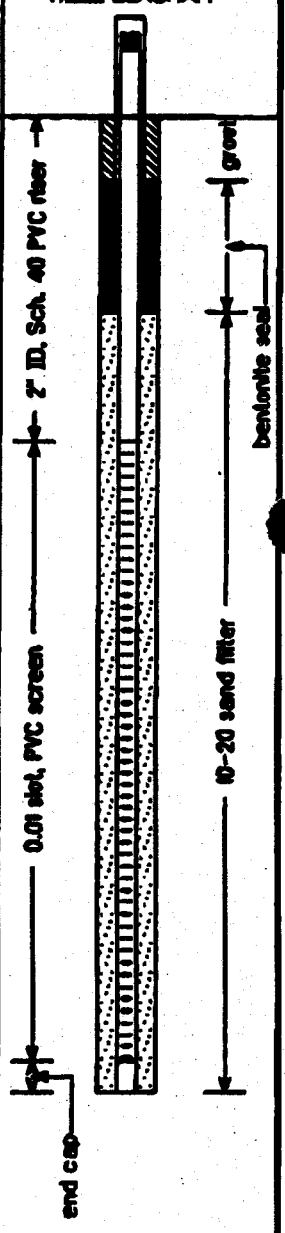
WELL DIAGRAM



EnSafe/Allen & Hoshall	Monitoring Well NBCH656003
Project: Zone H-Naval Base Charleston	Coordinates: 2324094.17 E, 390511.40 N
Location: Charleston, SC	Surface Elevation: 8.5 feet msl
Started at 1355 on 8-25-94	TOC Elevation: 10.94 feet msl
Completed at 1420 on 8-25-94	Depth to Groundwater: unknown feet TOC Measured: none
Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon	Groundwater Elevation: unknown feet msl
Drilling Company: Alliance Environmental	Total Well Depth: 15 feet bgs
Geologist: B. Dotson	Well Screen: 5.0 to 14.5 feet bgs

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)
							FILL	Spoils, gravel silt with sand.	5.5
							SM	Sand: gray to black, silty, becoming predominantly silt at 5 feet.	5
5			1	100	4				3.5
								Saturated at 6 to 7 feet.	
							CL	Clay: brown, gray and black mottling, sandy, wet.	5
							ML		0
								Silt: silver gray, clayey, wet.	-5
10			2	60					
							SM	Sand: light brown, silty, saturated.	-4.5
							ML	Silt: dark gray, clayey, saturated.	-5
15			3	75					-8
20									

WELL DIAGRAM



SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 1
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: NBCH656001
Sample Location: NBCH656001
Duplicate: ☐

SAMPLING DATA:

Date: 3/18/99	Color	pH	S.C.	Temp.	Turbidity	DO	Sal.	
Time: 1545	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	
Method: Peristaltic pump								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☑	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
10	x 0.01	= 0.10
_____	x 0.02	=

Notes: .5 chemetrics

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0	=
☑	200-800 mg/L	50 ml	1.600 N	2.0	_____ & 315	x 2.0	= 630
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	mg/L	mg/L	mg/L

Notes: chem 500 (100 - 1000 range)

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☑	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
340	x 1.0	= 340
_____	x 2.0	=

Notes: 100 - 1000 range - 100

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 0.1ml:_____ 0.2ml:_____ 0.3ml:_____

GROUNDWATER SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 1
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: NBCH656001
Sample Location: NBCH656001
Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter HS-C Color Chart Analysis Time: _____
Program No.:
Concentration: 0.01 mg/L Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter IR-18C Color Wheel Analysis Time: _____
Program No.:
Concentration: 0.81 mg/L Filtered: ☐
Notes:

Nitrite:

Equipment: HACH DR-890 Colorimeter Analysis Time: _____
Program No.:
Concentration: 0.047 mg/L Reagent Blank Correction: ☐
Standard Solution: ☐ Results: _____
Notes:

Nitrate: Mn

Equipment: HACH DR-890 Colorimeter Analysis Time: _____
Program No.:
Concentration: 6.0 mg/L
Nitrite Interference Treatment: ☐
Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐
Standard Additions: ☐ Digits Required: 0.1ml:_____ 0.2ml:_____ 0.3ml:_____
Notes:

001 003
DO = 10 DO = 0

SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 1
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: NBCH656003
Sample Location: NBCH656003
Duplicate: ☐

SAMPLING DATA:

Date: 3/18/99	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	Sal. (%)	
Time: 1610								
Method: Peristaltic pump								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☑	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
0	x 0.01 =	0
	x 0.02 =	

Notes: 1.0 chemetrics

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1 =	
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4 =	
☐	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0 =	
☑	200-800 mg/L	50 ml	1.600 N	2.0	_____ & _____	x 2.0 =	
☑	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0 =	
☑	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & 180	x 10.0 =	1800

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	mg/L	mg/L	mg/L

Notes: 100 - 1000 range = 1000+

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☑	100-400 mg/L	200 ml	3.636 N	1.0
☑	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1 =	
	x 0.2 =	
	x 1.0 =	
516	x 2.0 =	1032

Notes: ~~100 - 1000~~ 100 - 1000 range ~ 280

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 0.1ml:_____ 0.2ml:_____ 0.3ml:_____

GROUNDWATER SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 1
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: NBCH656003
Sample Location: NBCH656003
Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter HS-C Color Chart Analysis Time: _____
Program No.:
Concentration: 0.07 mg/L Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter IR-18C Color Wheel Analysis Time: _____
Program No.:
Concentration: 2.09 mg/L Filtered: ☐
Notes:

Nitrite:

Equipment: HACH DR-890 Colorimeter Analysis Time: _____
Program No.:
Concentration: 0.079 mg/L Reagent Blank Correction: ☐
Standard Solution: ☐ Results: _____
Notes:

~~Nitrate:~~ Mn

Equipment: HACH DR-890 Colorimeter Analysis Time: _____
Program No.:
Concentration: 2.9 mg/L
Nitrite Interference Treatment: ☐
Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐
Standard Additions: ☐ Digits Required: 0.1ml:_____ 0.2ml:_____ 0.3ml:_____
Notes:

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 1
Project No.: 7912

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

Sample ID No.: 01GLM0101
Sample Location: CNC01-M01
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/18/99 Time: 1700	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/18/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.96	2.78	16.3	17	0.54	0.13	
Monitor Reading (ppm):	1	7.01	2.93	16.5	2	0.71	0.14	
Well Casing Diameter: 2"	2	6.65	3.62	16.9	4	0.42	0.19	
Well Casing Material: PVC	3	6.95	3.24	16.9	29	0.36	0.16	
Total Well Depth (TD): 12.05								
Static Water Level (WL): 1.89								
One Casing Volume(gal/L): 1.76								
Start Purge (hrs): 1050								
End Purge (hrs): 1151								
Total Purge Time (min): 61								
Total Vol. Purged (gal/L): 96								

450 ml/min
3 G
5 G
8 G

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 1
Project No.: 7912

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

Sample ID No.: 01GLM0201
Sample Location: CNC01-M02
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/18/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1720								
Method: Peristaltic								

PURGE DATA

Date: 3/18/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	11.26	16.6	19.1	44	1.01	0.97	
Monitor Reading (ppm):	1	11.33	16.7	19.3	950	0.73	0.97	
Well Casing Diameter: 2"	2	11.35	16.8	19.5	>999	1.15	0.99	
Well Casing Material: PVC	3							
Total Well Depth (TD): 26.75'								
Static Water Level (WL): 1.43'		well pumped dry after 4 gallons						
One Casing Volume(gal/L): 4.16								
Start Purge (hrs): 1015								
End Purge (hrs): 1045								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 4.0								

600ml/1G
450
36
46

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 1
Project No.: 7912

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

Sample ID No.: NBCH656001
Sample Location: NBCH-656-001
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/18/99 Time: 1545	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/18/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.36	2.71	17.5	93	0.68	0.13	430 ml/mi
Monitor Reading (ppm):	1	7.18	2.71	17.1	57	0.39	0.13	2G
Well Casing Diameter: 2"	2	6.89	2.58	16.5	5	0.46	0.12	4G
Well Casing Material: PVC	3	6.95	2.60	16.7	33	0.29	0.12	6G
Total Well Depth (TD): 15.65'		6.79	2.83	16.9	26	0.49	0.14	9G
Static Water Level (WL): 4.16								
One Casing Volume(gal/L): 1.9G								
Start Purge (hrs): 1015								
End Purge (hrs): 1140								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 9.5								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOC, MTBE, Naphthalene	HCl	(3) 40 ml	✓
PAH	—	(2) 1000 ml	✓
Nitrate, Sulfate	—	(1) 500 ml	✓
Methane		(3) 40 ml	✓

OBSERVATIONS / NOTES

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 1
Project No.: 7912

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

Sample ID No.: NBCH656002
Sample Location: NBCH-656-002
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/18/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1640								
Method:								

PURGE DATA

Date: 3/18/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.03	3.21	18.1	53	1.18	0.15	475 ml
Monitor Reading (ppm):	1	6.95	3.13	18.0	6	1.20	0.15	1G
Well Casing Diameter: 2"	2	6.85	3.19	18.0	22	1.26	0.15	4G
Well Casing Material: PVC	3	6.72	3.85	18.1	11	.70	0.19	6G
Total Well Depth (TD): 15.57'								9G
Static Water Level (WL): 4.02'								
One Casing Volume(gal/L): 1.96								
Start Purge (hrs): 1020								
End Purge (hrs): 1142								
Total Purge Time (min): 82								
Total Vol. Purged (gal/L): 9.5								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOC, MTBE, Naphthalene	HCl	(3) 40 ml	✓
PAH		(2) 1000 ml	✓

OBSERVATIONS / NOTES

Circle if Applicable:
MS/MSD | Duplicate ID No.:

Signature(s):

Gwstmp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 1
Project No.: 7912

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

Sample ID No.: NBCH656003
Sample Location: NBCH-656-003
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/18/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1610								
Method: Peristaltic								

PURGE DATA

Date: 3/18/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.45	28.4	19.1	59	1.05	1.75	
Monitor Reading (ppm):	1	6.50	27.9	19.1	36	1.04	1.72	
Well Casing Diameter: 2"	2	6.36	28.9	19.6	6	.77	1.79	
Well Casing Material: PVC	3	6.40	29.8	20.1	7	.82	1.86	
Total Well Depth (TD): 17.3'		6.52	31.0	20.4	4	.40	1.93	
Static Water Level (WL): 4.18'								
One Casing Volume(gal/L): 2.16								
Start Purge (hrs): 1020								
End Purge (hrs): 1146								
Total Purge Time (min): 86								
Total Vol. Purged (gal/L): 96								

475 ml
2 G
4 G
1 G
8 G

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOC, MTBE, Naphthalene	HCl	(3) 40 ml	✓
PAH	—	(2) 1000 ml	✓
Nitrate, Sulfate	—	(1) 250 ml	✓
Methane		(3) 40 ml	✓

OBSERVATIONS / NOTES

Circle if Applicable:
MS/MSD | Duplicate ID No.:

Signature(s):

Gwsamp

APPENDIX D

SOIL AND GROUNDWATER LABORATORY ANALYTICAL DATA

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 16, 1999

Sample ID	: ZHTL01001
Lab ID	: 9901882-01
Matrix	: Water
Date Collected	: 01/27/99
Date Received	: 01/27/99
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	1731	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	86.7	(60.2 - 139.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	101.	(70.6 - 152.)
Toluene-d8	BTEX/NAP/MTBE-8260B	88.9	(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.

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9901882-01

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 16, 1999

Sample ID : 01SLB0202
Lab ID : 9901882-02
Matrix : Soil
Date Collected : 01/27/99
Date Received : 01/27/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE		5.55	0.504	5.00	ug/kg	1.0	MAP	02/04/99	0202	141418	1
ETHYLBENZENE	J	2.74	0.302	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.179	5.60	ug/kg	1.0					
NAPHTHALENE	J	0.907	0.683	5.00	ug/kg	1.0					
TOLUENE	J	2.81	1.05	5.00	ug/kg	1.0					
XYLENES, TOTAL	J	0.779	0.280	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		19.0	1.00	1.00	wt%	1.0	GJ	01/28/99	1540	140922	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	1980	4120	ug/kg	10.	TSD	02/04/99	1331	140941	3
ACENAPHTHYLENE	U	ND	1820	4120	ug/kg	10.					
ANTHRACENE	U	ND	1080	4120	ug/kg	10.					
BENZO(A)ANTHRACENE	J	1310	845	4120	ug/kg	10.					
BENZO(A)PYRENE	J	1060	886	4120	ug/kg	10.					
BENZO(B)FLUORANTHENE	U	ND	1760	4120	ug/kg	10.					
BENZO(G,H,I)PERYLENE	U	ND	1010	4120	ug/kg	10.					
BENZO(K)FLUORANTHENE	U	ND	1630	4120	ug/kg	10.					
CHRYSENE	J	1420	676	4120	ug/kg	10.					
DIBENZ(A,H) ANTHRACENE	U	ND	1030	4120	ug/kg	10.					
FLUORANTHENE	J	2840	808	4120	ug/kg	10.					
FLUORENE	U	ND	1410	4120	ug/kg	10.					
INDENO(1,2,3-CD)PYRENE	J	1770	993	4120	ug/kg	10.					
PHENANTHRENE	J	1880	742	4120	ug/kg	10.					
PYRENE	J	2110	890	4120	ug/kg	10.					
General Chemistry											
Total Rec. Petro. Hydrocarbons	J	98.4	61.5	123	mg/kg	1.0	AAT	02/11/99	1100	141864	4

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9901882-02

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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 16, 1999

Sample ID : 01SLB0202

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 Davis

Reviewed By

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9901882-02

GENERAL ENGINEERING LABORATORIES, INC.

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 16, 1999

Sample ID : 01SLB2001

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	1245	141418	4
GC/MS Base/Neutral Compounds	CPU	01/29/99	2400	140941	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	56.0	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	47.8	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	75.0	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	125.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	103.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	123.	(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'.

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 16, 1999

Sample ID : 01SLB2001D
Lab ID : 9901882-04
Matrix : Soil
Date Collected : 01/27/99
Date Received : 01/27/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	J	1.08	0.513	5.00	ug/kg	1.0	MAP	02/04/99	0311	141418	1
ETHYLBENZENE	U	ND	0.308	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER	U	ND	0.182	5.70	ug/kg	1.0					
NAPHTHALENE	U	ND	0.695	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.07	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.285	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		19.0	1.00	1.00	wt%	1.0	GJ	01/28/99	1540	140922	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	791	1650	ug/kg	4.0	TSD	02/04/99	1434	140941	3
ACENAPHTHYLENE	U	ND	727	1650	ug/kg	4.0					
ANTHRACENE	U	ND	433	1650	ug/kg	4.0					
BENZO(A)ANTHRACENE	U	ND	338	1650	ug/kg	4.0					
BENZO(A)PYRENE	U	ND	354	1650	ug/kg	4.0					
BENZO(B)FLUORANTHENE	U	ND	702	1650	ug/kg	4.0					
BENZO(G,H,I)PERYLENE	U	ND	402	1650	ug/kg	4.0					
BENZO(K)FLUORANTHENE	U	ND	653	1650	ug/kg	4.0					
CHRYSENE	U	ND	270	1650	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	ND	410	1650	ug/kg	4.0					
FLUORANTHENE	U	ND	323	1650	ug/kg	4.0					
FLUORENE	U	ND	565	1650	ug/kg	4.0					
INDENO(1,2,3-CD)PYRENE	U	ND	397	1650	ug/kg	4.0					
PHENANTHRENE	U	ND	297	1650	ug/kg	4.0					
PYRENE	U	ND	356	1650	ug/kg	4.0					

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9901882-04

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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 16, 1999

Sample ID : 01SLB2001D

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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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 16, 1999

Sample ID : 01SLB2401

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	1245	141418	4
GC/MS Base/Neutral Compounds	CPU	01/29/99	2400	140941	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
-Fluorobiphenyl	M610-TETR	70.6	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	70.9	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	104.	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	118.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	103.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	107.	(72.1 - 137.)

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

Notes:
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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 16, 1999

Sample ID : 01SLB2601
Lab ID : 9901882-06
Matrix : Soil
Date Collected : 01/27/99
Date Received : 01/27/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	J	4.16	0.558	5.00	ug/kg	1.0	MAP	02/04/99	0420	141418	1
ETHYLBENZENE		5.44	0.335	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.198	6.20	ug/kg	1.0					
NAPHTHALENE	U	ND	0.756	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.17	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.310	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		22.0	1.00	1.00	wt%	1.0	GJ	01/28/99	1540	140922	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	820	1710	ug/kg	4.0	TSD	02/04/99	1538	140941	3
ACENAPHTHYLENE	U	ND	753	1710	ug/kg	4.0					
ANTHRACENE	U	ND	449	1710	ug/kg	4.0					
BENZO(A)ANTHRACENE	J	1200	350	1710	ug/kg	4.0					
BENZO(A)PYRENE	J	1220	367	1710	ug/kg	4.0					
BENZO(B)FLUORANTHENE	J	1240	728	1710	ug/kg	4.0					
BENZO(G,H,I)PERYLENE	J	657	417	1710	ug/kg	4.0					
BENZO(K)FLUORANTHENE	J	970	676	1710	ug/kg	4.0					
CHRYSENE	J	1380	280	1710	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	ND	425	1710	ug/kg	4.0					
FLUORANTHENE		3550	335	1710	ug/kg	4.0					
FLUORENE	U	ND	586	1710	ug/kg	4.0					
INDENO(1,2,3-CD)PYRENE	J	1060	412	1710	ug/kg	4.0					
PHENANTHRENE		2060	307	1710	ug/kg	4.0					
PYRENE		2930	369	1710	ug/kg	4.0					

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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 16, 1999

Sample ID : 01SLB2601

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 Davis

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9901882-06

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 16, 1999

Sample ID : 01SLB1501

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	1245	141418	4
GC/MS Base/Neutral Compounds	CPU	01/29/99	2400	140941	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	69.1	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	60.2	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	89.7	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	114.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	83.9	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	107.	(72.1 - 137.)

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

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.

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

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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 16, 1999

Sample ID : 01SLB1501
Lab ID : 9901882-07
Matrix : Soil
Date Collected : 01/27/99
Date Received : 01/27/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep											
EVAPORATIVE LOSS @ 105 C		21.0	1.00	1.00	wt%	1.0	GJ	01/28/99	1540	140922	1
General Chemistry											
Total Organic Carbon		9240	43.1	100	mg/kg	1.0	LS	02/08/99	1542	141409	2

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 415.1 Modified

Notes:
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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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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: February 16, 1999

Sample ID : 01SLB0301
Lab ID : 9901882-09
Matrix : Soil
Date Collected : 01/27/99
Date Received : 01/27/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	J	2.49	0.491	5.00	ug/kg	1.0	MAP	02/04/99	0529	141418	1
ETHYLBENZENE	J	0.721	0.294	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.174	5.45	ug/kg	1.0					
NAPHTHALENE	U	ND	0.665	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.02	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.273	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		18.0	1.00	1.00	wt%	1.0	GJ	01/28/99	1540	140922	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	781	1630	ug/kg	4.0	TSD	02/05/99	1348	140941	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	J	317	267	1630	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	ND	405	1630	ug/kg	4.0					
FLUORANTHENE	J	642	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	J	375	293	1630	ug/kg	4.0					
PYRENE	J	546	352	1630	ug/kg	4.0					

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9901882-09

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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 16, 1999

Sample ID : 01SLB0301

M = Method	Method-Description

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Valerie S Davis

Reviewed By

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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 16, 1999

Sample ID : 01SLB2701

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	1245	141418	4
GC/MS Base/Neutral Compounds							CPU	01/29/99	2400	140941	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	61.9	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	52.6	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	79.1	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	119.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	102.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	116.	(72.1 - 137.)

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

Notes:
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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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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 16, 1999

Sample ID	: 01SLB2101
Lab ID	: 9901882-11
Matrix	: Soil
Date Collected	: 01/27/99
Date Received	: 01/27/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	J	1.04	0.527	5.00	ug/kg	1.0	MAP	02/04/99	0638	141418	1
ETHYLBENZENE	U	ND	0.316	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER	R	ND	0.187	5.85	ug/kg	1.0					
NAPHTHALENE	U	ND	0.714	5.00	ug/kg	1.0					
TOLUENE	J	1.23	1.10	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.293	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		18.0	1.00	1.00	wt%	1.0	GJ	01/28/99	1540	140922	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	781	1630	ug/kg	4.0	TSD	02/05/99	1420	140941	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					

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9901882-11

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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 16, 1999

Sample ID : 01SLB2101

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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9901882-11

GEOTECHNICAL ANALYSIS

GEOTECHNICAL SPREADSHEET

Project Number:	tetr00498	Depth:	UNKNOWN
Sample Number:	9901882-02	Tested By:	M. Yates
Boring Number:	NA	Date:	2/16/99
Location:	NA		

GRAIN-SIZE ANALYSIS

HYGROSCOPIC MOISTURE CONTENT DETERMINATION

weight of total air dried sample=	60.55
weight of container + air-dried soil=	31.84
weight of container + oven-dried soil=	30.83
weight of container=	6.97
weight of water=	1.01
weight of oven-dried soil=	23.86
weight of air-dried soil=	24.87
hygroscopic moisture correction factor=	0.96
weight of oven-dried sample for hydro. anal.=	58.13

SIEVE ANALYSIS

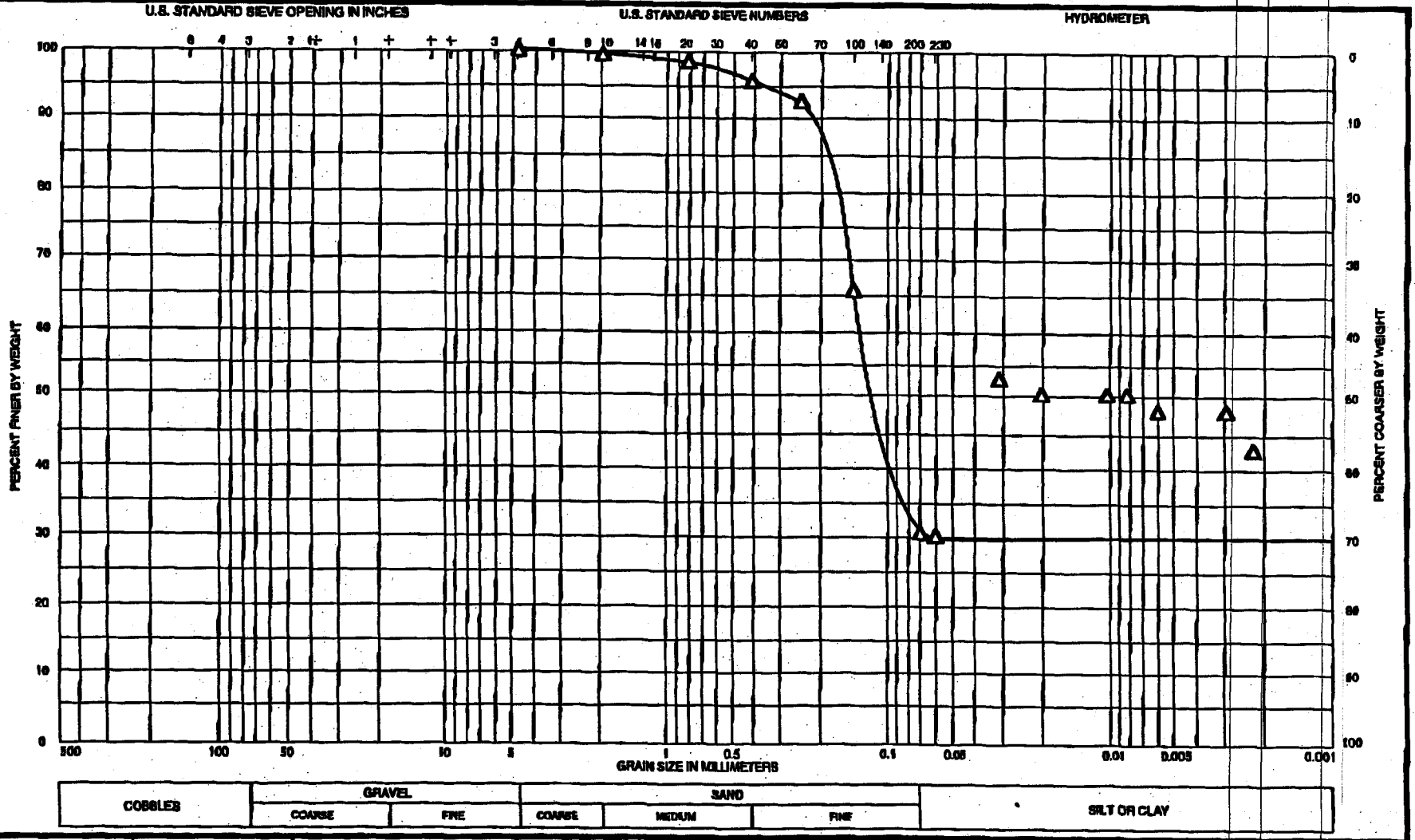
weight of oven-dried sample= 58.13

Sieve #	Weight Ret.	Weight Passed	% Passing
4	0	58.13	100.0
10	0.17	57.96	99.7
20	0.65	57.31	98.6
40	1.1	56.21	96.7
60	2.21	54.00	92.9
100	15.84	38.16	65.6
200	20.07	18.09	31.1
230	0.42	17.67	30.4
pan	0.03	17.64	30.3

HYDROMETER ANALYSIS

weight	58.13
SG	2.45

TIME	ACTUAL READING	TEMP.	COMPOSITE CORRECTION	R	LENGTH	K	DIAMETER	P
2	1.021	24	0.00275	1.01625	10.7	0.01388	.03216	53.0
5	1.02	24	0.00275	1.01725	11.0	0.01388	.02059	50.1
15	1.02	24	0.00275	1.01725	11.0	0.01388	.01189	50.1
30	1.02	24	0.00275	1.01725	11.0	0.01388	.00841	50.1
60	1.019	24	0.00275	1.01625	11.3	0.01388	.00601	47.2
250	1.019	24	0.00275	1.01625	11.3	0.01388	.00295	47.2
1440	1.019	19	0.00400	1.01500	11.3	0.01474	.00130	43.6



Sample No.	Specific Gravity	Classification	Nat w %	LL	PL	PI
9901882-02	—	SC	—			
		% GRAVEL = 0.0				
		% SAND = 68.9				
		% SILT = 1.1				
		% CLAY = 30.0				

GRADATION CURVES

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A Division of General Engineering Laboratories, Inc.

Project tetr00498
Area Tetra Tech NUS, Inc.
Boring No.
Date February 16, 1999

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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
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	U	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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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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9903742-01

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 : NBCH656001

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	1812	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	2.18	10.0	ug/l	1.0	TSD	03/29/99	1806	145135	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					
General Chemistry											
NITROGEN, NITRATE	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/19/99	1938	145013	4
SULFATE (AS SO4)		0.451	0.0380	0.200	mg/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	ES	03/23/99	1445	145135	5

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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 : NBCH656001

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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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 : NBCH656002
Lab ID : 9903742-05
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	1848	145387	1
TERT-BUTYL METHYL ETHER	U	ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/25/99	1848	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	1848	145387	1
1,1,2,2-TETRACHLOROETHANE	U	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	U	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	U	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	1.97	1.20	5.00	ug/l	1.0					

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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 : NBCH656002

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	92.2	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	89.6	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	97.9	(66.0 - 117.)
Toluene-d8	EDB-8260B	82.5	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	89.6	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	97.9	(66.0 - 117.)
Toluene-d8	MTBE-8260B	82.5	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	89.6	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	97.9	(66.0 - 117.)
Toluene-d8	NAP-8260B	82.5	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	89.6	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	97.9	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	82.5	(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.

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: April 06, 1999

Sample ID : NBCH656003
Lab ID : 9903742-06
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	1924	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	1924	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	1924	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	1.73	1.20	5.00	ug/l	1.0					

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: April 06, 1999

Sample ID : NBCH656003

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	35.4*	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	37.3	(35.3 - 108.)
p-Terphenyl-d14	M610-TETR	23.4*	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	88.6	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	96.6	(66.0 - 117.)
Toluene-d8	EDB-8260B	81.2	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	88.6	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	96.6	(66.0 - 117.)
Toluene-d8	MTBE-8260B	81.2	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	88.6	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	96.6	(66.0 - 117.)
Toluene-d8	NAP-8260B	81.2	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	88.6	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	96.6	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	81.2	(73.0 - 122.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 8260
M 3	SW846 8270C
M 4	EPA 300.0
M 5	EPA 3510

Notes:
The qualifiers in this report are defined as follows:
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GENERAL ENGINEER LABORATORY

Client Sample ID: NBCH656003

GC Volatiles

Lot-Sample #...:	I9C300160-002	Work Order #...:	CT56R201	Matrix.....:	WATER
Date Sampled...:	03/18/99 16:10	Date Received..:	03/30/99		
Prep Date.....:	03/30/99	Analysis Date..:	03/30/99		
Prep Batch #...:	9090371	Analysis Time..:	16:10		
Dilution Factor:	50				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	2000 B,D	25	ug/L

NOTE(S):

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

D Result was obtained from the analysis of a dilution.

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 : 01GLM0101

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	1701	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	2.40	10.9	ug/l	1.0	TSD	03/29/99	1706	145135	3
ACENAPHTHYLENE	U	ND	1.42	10.9	ug/l	1.0					
ANTHRACENE	U	ND	2.51	10.9	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	3.05	10.9	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.18	10.9	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	5.12	10.9	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.73	10.9	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.83	10.9	ug/l	1.0					
CHRYSENE	U	ND	2.40	10.9	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.40	10.9	ug/l	1.0					
FLUORANTHENE	U	ND	3.38	10.9	ug/l	1.0					
FLUORENE	U	ND	2.29	10.9	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.71	10.9	ug/l	1.0					
PHENANTHRENE	U	ND	1.96	10.9	ug/l	1.0					
PYRENE	U	ND	2.73	10.9	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	72.2	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	68.5	(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 06, 1999

Sample ID : 01GLM0101

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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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 : 01GLM0201

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	2035	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE	U	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	U	ND	0.300	1.00	ug/l	1.0					
tractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.51	11.4	ug/l	1.0	TSD	03/29/99	1736	145135	3
ACENAPHTHYLENE	U	ND	1.48	11.4	ug/l	1.0					
ANTHRACENE	U	ND	2.62	11.4	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	3.19	11.4	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.28	11.4	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	5.36	11.4	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.85	11.4	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.96	11.4	ug/l	1.0					
CHRYSENE	U	ND	2.51	11.4	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.51	11.4	ug/l	1.0					
FLUORANTHENE	U	ND	3.53	11.4	ug/l	1.0					
FLUORENE	U	ND	2.39	11.4	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.88	11.4	ug/l	1.0					
PHENANTHRENE	U	ND	2.05	11.4	ug/l	1.0					
PYRENE	U	ND	2.85	11.4	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	68.4	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	65.3	(35.3 - 108.)

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Laboratory Certifications

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Sample ID : 01GLM0201

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414

(843) 556-8171 • Fax (843) 766-1178

9903742-03

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

9903742%

Page 1 of 1

Client Name/Facility Name: Zone H, Charleston Naval Complex

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	Methanol	Anions	Remarks	
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 7/14/99	1545/0915	✓			✓	9			2			3										3	1		.3
05	NBCH656002	3/18/99	1640	✓			✓	5			2			3													.2
06	NBCH656003	3/18/99 7/14/99	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:
[signature]	3/19/99	1230	[signature]				
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
			[signature]	3/19/99	1230	VOC = 8260 w/ MTBE + Naphthalene	

PAH = 8270

White = sample collector Yellow = file Pink = with report

39165

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2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
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CHAIN OF CUSTODY RECORD

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Page 1 of 1

Client Name/Facility Name

Collected by/Company

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

Q# 39165

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	~~TOX~~ P/H	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required P	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Methane F	Anions F	Remarks	
-08	ZHTL02001	3/19/99	1300					3						3												Trip Blank	1
-09	09GLM0101	3/19/99	1310					9			2			3										3	1		3
-10	09GLM0201	3/19/99	1325					5			2			3													2
-11	09GLM0301	3/19/99	1345					9			2			3										3	1		3
-12	09GLM0401	3/19/99	1405					5			2			3													2
-13	09GLM0501	3/19/99	1425					5			2			3													2
-14	09GLM0601	3/19/99	1440					9			2			3										3	1		3
-15	09GLM0701	3/19/99	1555					5			2			3													2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Bm Monge	3/19/99	1720					
Relinquished by:	Date:	Time:	Received by lab:	Date:	Time:	Remarks:	
			B Franco	3/19/99	1720	VOC = 8260 w/ MTBE + Naphthalene PAH = 8270	

White = sample collector Yellow = file Pink = with report

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9903742-03

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CHAIN OF CUSTODY RECORD

Page 1 of 1

9903742%

Client Name/Facility Name: Zone H, Charleston Naval Complex

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	Methanp	Anions	Remarks	
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 ~~3/19/99~~	1545/1615	✓			✓	9			2			3										3	1		.3
05	NBCH656002	3/18/99	1640	✓			✓	5			2			3													.2
06	NBCH656003	3/18/99 ~~3/19/99~~	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:
[signature]	3/19/99	1230	[signature]				
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
			[signature]	3/19/99	1230	VOC = 8260 w/ MTBE + Naphthalene	

PAH = 8270

White = sample collector Yellow = file Pink = with report

39165

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CHAIN OF CUSTODY RECORD

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Page 1 of 1

Client Name/Facility Name

Collected by/Company

Q# 39165

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	~~TOX~~ P/H	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	F Methane	F Anions	Remarks	
-08	ZHTL02001	3/19/99	1300					3						3												Trip Blank	1
-09	09GLM0101	3/19/99	1310					9			2			3										3	1		3
-10	09GLM0201	3/19/99	1325					5			2			3													2
-11	09GLM0301	3/19/99	1345					9			2			3										3	1		3
-12	09GLM0401	3/19/99	1405					5			2			3													2
-13	09GLM0501	3/19/99	1425					5			2			3													2
-14	09GLM0601	3/19/99	1440					9			2			3										3	1		3
-15	09GLM0701	3/19/99	1555					5			2			3													2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	3/19/99	1720					
Relinquished by:	Date:	Time:	Received by lab:	Date:	Time:	Remarks:	
			[signature]	3/19/99	1720	VOC = 8260 w/ MTBE + Naphthalene	

PAH = 8270

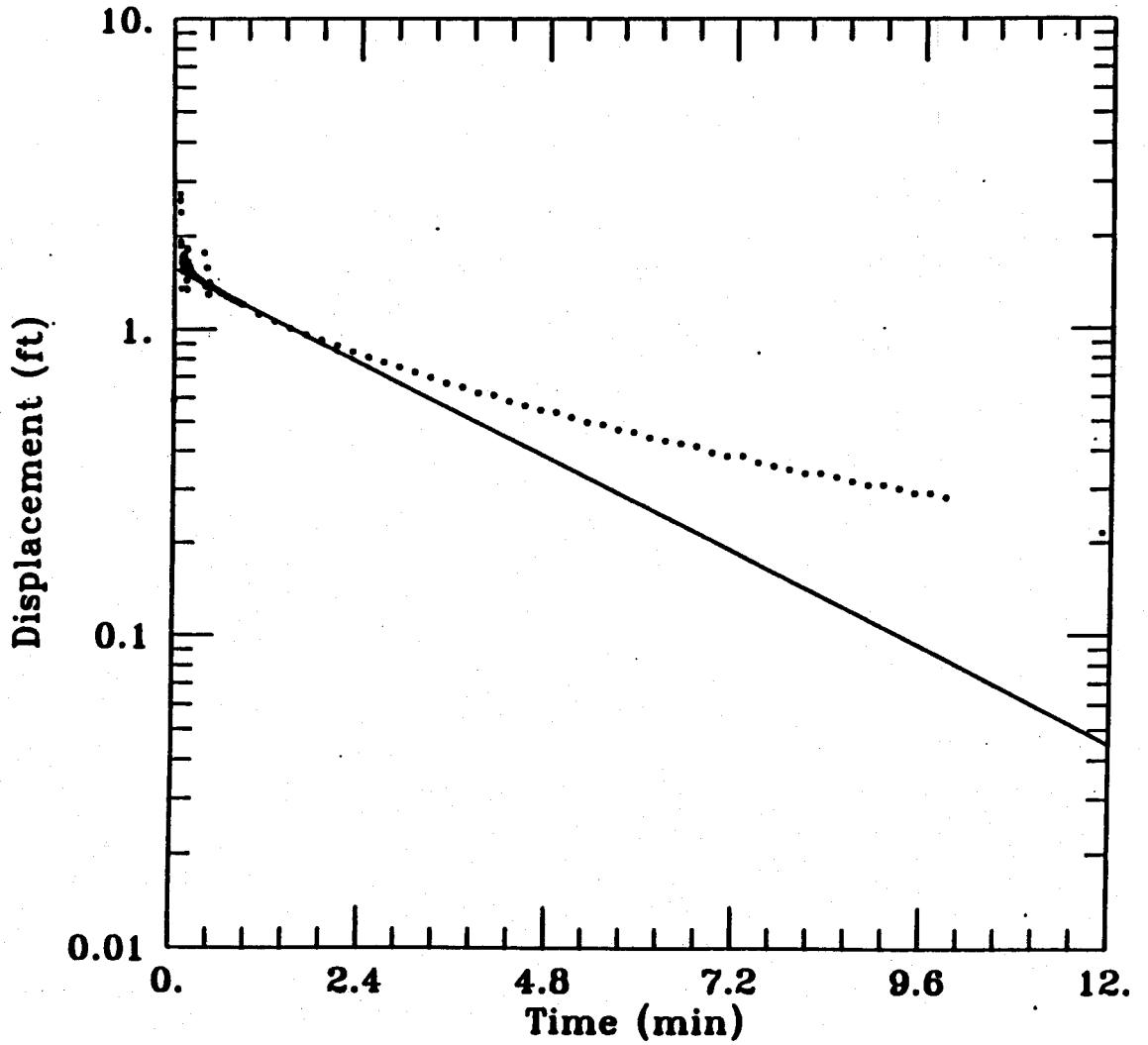
White = sample collector Yellow = file Pink = with report

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

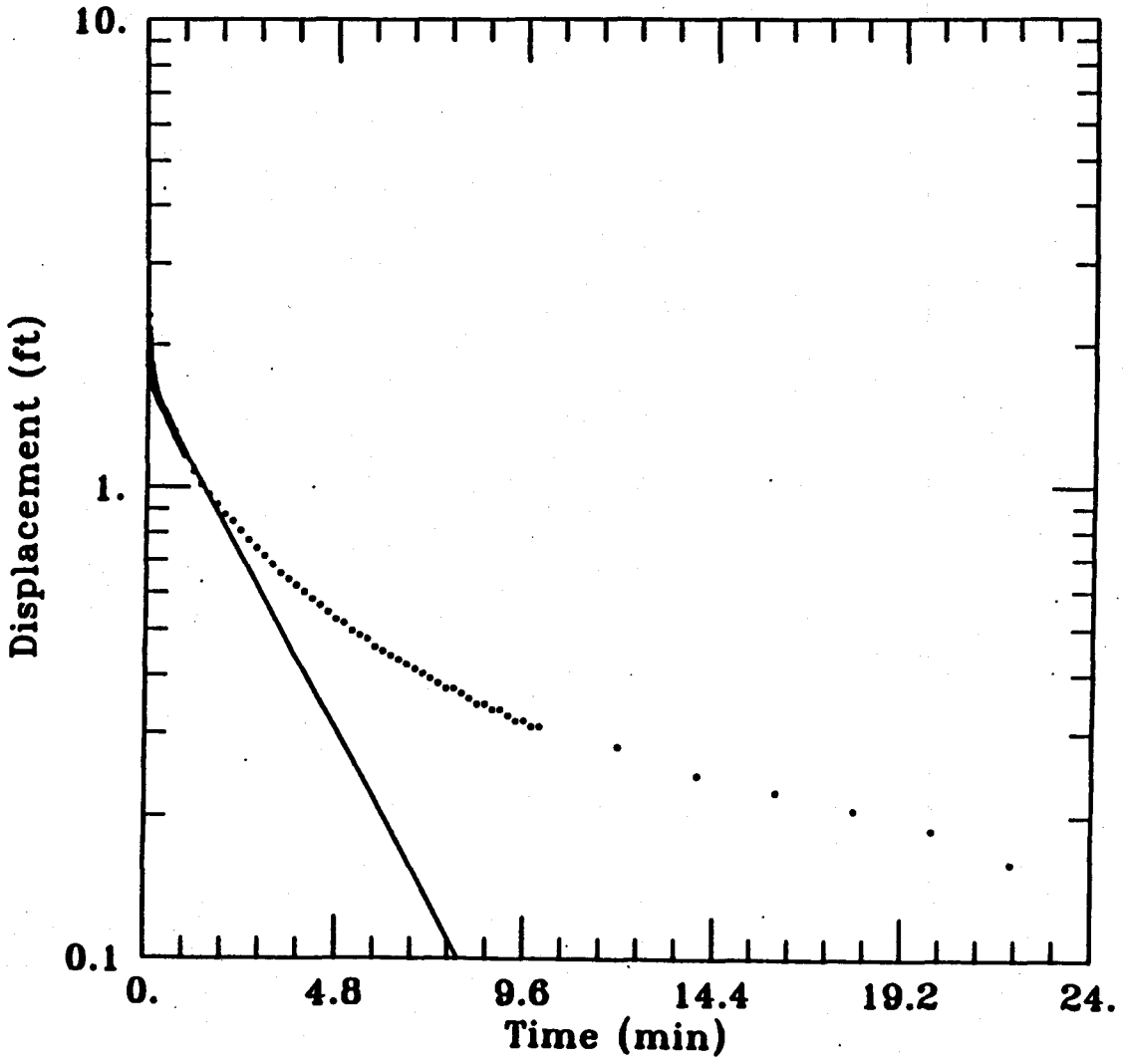
TEST DATA:
H0 = 0.5886 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 10. ft
b = 12. ft
H = 12. ft

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

APPENDIX F

SOIL LEACHABILITY MODEL

IN-SITU SOIL RISK EVALUATION

Site Data

SITE ID #	10334	COUNTY	Charleston
FACILITY NAME	Site 1, Building NS-71		
STREET ADDRESS	Charleston Naval Complex, North Charleston, SC		

Soil Risk Evaluation Data

					Figure
TPH		98.4	mg/kg		
Soil % SAND (Estimated)		38.3	%		
Soil % CLAY (Estimated)		38.5	%		
Worst Case Soil Analyses	Benzene	0.00555	mg/kg	Cs	
	Toluene	0.00281	mg/kg	Cs	
	Ethylbenzene	0.00274	mg/kg	Cs	
	Xylenes	0.00079	mg/kg	Cs	
	Naphthalene	0.00091	mg/kg	Cs	
	MTBE	na	mg/kg	Cs	
Natural Organic Carbon Content		9240	mg/kg	foc	
Average Annual Recharge		25	cm	Hw	
Distance from highest Soil Impact to water table		100	cm	L	
Bulk Density of Soil		1.45	g/cc	Bd	1
Wetting Front Suction		-33	cm	Hf	2
Soil Hydraulic Conductivity		2.40E-05	cm/sec	Kf	3
Porosity		0.48	decimal %	Φ	4
Residual Water Content		0.06	decimal %	Wr	5

List possible human exposure pathways from surface soil.
Soil leaching to groundwater - off-site ingestion or irrigational use of shallow groundwater.

SOIL LEACHABILITY MODEL FOR BENZENE

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site:	Site 1, Building NS-71
Location:	Charleston Naval Complex, North Charleston, SC

REFERENCES:

(1) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Figure 1.
(2) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Table 2.
(3) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Input Parameters.
(4) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Table 1.
(5) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Figure 2.
(6) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Figure 3.
(7) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Figure 4.
(8) SCDHEC, RBCA For Petroleum Releases, January 1998, Appendix B, Figure 5.

INPUT:

			BENZENE
COC	Chemical of Concern		
Bd	Soil Bulk Density (1)	g/cm3	1.45
Crsbl	Risk Based Screening Level	mg/L	0.035
Cs	Concentration of COC in soil	mg/kg	0.00555
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil (3)	mg/kg	9240
H'	Henry's Law Constant (4)	unitless	0.23
Hf	Wetting front suction head (always negative) (5)	cm	-33
Hw	Average Annual Recharge (3)	cm	25.00
Kf	Soil Hydraulic Conductivity (6)	cm/s	2.40E-05
Koc	Soil/Water Partioning Coefficient (2)	ml/g	81
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	100
Φ	Porosity (7)	unitless	0.48
t1/2	Biodegradation "half life" (2)	days	16
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	98
Wr	Residual Water Content (8)	volume fraction	0.06

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

fcs = (foc +TPH/1.724)*1E-6 = 0.0093 decimal %

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

Cw = Cs*((Wr *1g/cc+Bd)/((Bd*Koc*fcs)+Wr+((ø-Wr)*H'))) = 0.0067 mg/l

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

f = Ø - Wr = 0.42 decimal %

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

t = (f/Kf)*(L-((Hw-Hf)*(ln((Hw+L-Hf)/(Hw-Hf))))) = 732,816 seconds

Step 3 - Determine the velocity of the water (Vw) in feet per year.

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 141 ft/year

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

Kd = Koc*foc*1E-6 = 0.74844 ml/g

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

Vc = Vw/(1+((Bd*Kd)/ø)) = 43 ft/year

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 27.69 days

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

Cp = 10^(log (Crsbl)+((Tc/2.3)*(0.693/t1/2))) = 0.1161 mg/l

COC concentration in soil pore water (Cw) is greater than concentration necessary to protect groundwater (Cp), therefore the SSTL must be calculated.

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

Csstl for BENZENE in soil = Cp*DAF*(((Bd*Koc*fcs)+Wr+(F*'H''))/(Wr*1g/cc+Bd)) = 0.766932 mg/kg

or

767 ug/kg

PREPARED BY: John Hofer 6/1/99
Date

CHECKED BY: Greg Swanson 6/4/99
Date

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 10334
FACILITY NAME Site 1, Building NS-71

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: BENZENE
(BTEX, Napth.)

				Table
Bioremediation "half-life"	16	days	t 1/2	1
Soil/water partitioning coefficient	81	ml/g	K oc	1

Results

				Equation Set	Step
Total Organic Carbon Content	0.0093	decimal %	f cs	I	1
Leachate Concentration	0.007	mg/l	C w	I	2
Air Filled Porosity	0.42	decimal %	f	II	1
Infiltration Rate Time	732,816	seconds	t	II	2
Velocity of Water	141	ft/year	V w	II	3
Soil/Water Distribution Coefficient	0.7484	ml/g	K d	III	1
Contaminant Percolation Rate	43	ft/year	V c	III	2
Time to Reach Groundwater	27.69	days	T c	IV	1
Concentration reaching Groundwater	0.1161	mg/l	C p	IV	2
Site Specific Target Level	**0.7669**	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? NO

Risk of Human Exposure due to contaminated soil.

	YES		NO
		X	