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RAPID ASSESSMENT REPORT FOR SITE 7 BUILDING 653 ZONE H CNC CHARLESTON SC

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Rapid Assessment Report
for
Site 7, Building 653

Zone H
Charleston Naval Complex
North Charleston, South Carolina

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

November 1999

Rev. 1
11/12/99

RAPID ASSESSMENT REPORT
FOR
SITE 7, BUILDING 653

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:
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0068

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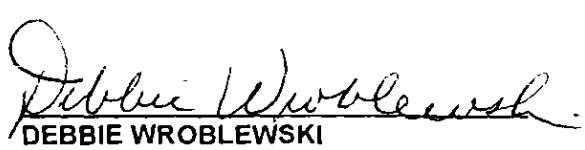

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CERTIFICATION PAGE

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

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South Carolina Registration No. 17132
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EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment (RA) for Site 7 which includes a single underground storage tank (UST) which supplied fuel oil to Building 653 at Charleston Naval Complex (CNC) Zone H, in North Charleston, South Carolina. The RA was performed under the direction of the South Carolina Department of Health and Environmental Control's (SCDHEC's) Rapid Assessment Plan and approval letter dated November 4, 1998.

TtNUS performed the following actions during the RA:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate public and private potable wells, to locate utilities line areas, to locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed the previously prepared Underground Storage Tank Assessment Report for USTs 653A to determine boring locations and monitoring well placements;
- Conducted site survey to identify utilities and to construct a site plan;
- Performed direct push investigation, collected soil and groundwater samples for field screening of total petroleum hydrocarbons using an organic vapor analyzer;
- Collected groundwater samples from direct push borings for mobile lab screening analysis for benzene, toluene, ethyl benzene, total xylenes (BTEX), and diesel range organics;
- Installed four piezometer wells;
- Installed shallow permanent monitoring wells to approximately 12 feet below land surface (bls) and a vertical delineation well to approximately 26 feet bls;
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis of analyzed for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260 and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270;
- Performed groundwater natural attenuation sampling;
- Collected soil samples for laboratory analysis of the 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 and piezometer top of casing elevations and collected depth to groundwater measurements to evaluate the groundwater flow direction.

Conclusion

No Chemicals of Concern (CoCs) were detected in the onsite soils at concentrations that exceed the SCDHEC Risk Based Screening Levels (RBSLs) for sandy soils. Groundwater samples from six of the monitoring wells were reported to contain detectable concentrations of groundwater CoCs. Two of the compounds, benzene and naphthalene were detected at concentrations exceeding RBSLs. Benzene was detected in the groundwater sample from monitoring well CNC07-M01 at a concentration which exceeds the RBSL of 5 µg/l. Naphthalene was detected in groundwater samples from four monitoring wells CNC07-M01, CNC07-M03, CNC07-M05, and CNC07-M06 at concentrations exceeding the RBSL of 10 µg/l.

Naphthalene was detected in the groundwater sample from deep monitoring well CNC07-M07. The detected concentration was less than the RBSL. No other CoCs were detected above method detection limits in the onsite deep monitoring well.

Recommendation

Dissolved hydrocarbon concentrations in CNC07-M01 do not exceed the Soil Screening Target Levels (SSTLs) for benzene and naphthalene calculated for a point of exposure 85 feet away (the utility corridor). In addition, the naphthalene concentration in CNC07-M05 does not exceed the SSTL calculated for a point of exposure 40 feet away (also the utility corridor). Because soil concentrations were not above RBSLs and groundwater concentrations did not exceed the SSTLs, no further action is recommended at this site.

1.0 INTRODUCTION

Site 7 includes a single underground storage tank (UST) which supplied fuel oil to Building 653 located at the Charleston Naval Complex (CNC), Zone H in North Charleston, South Carolina. This Rapid Assessment (RA) was performed by Tetra Tech NUS, Inc.'s (TtNUS's) Tallahassee, Florida, office, located at 1401 Oven Park Drive, Suite 102, Tallahassee, Florida 32308 (telephone number 850/385-9899) on behalf of the U.S. Navy Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFAC), 2155 Eagle Drive, North Charleston, South Carolina (telephone number 843/820-7307). Authorization to conduct the RA for the Site was issued by NAVFAC under Contract Task Order (CTO) 0068. The RA was performed under the direction of the South Carolina Department of Health and Environmental Control's (SCDHEC's) Rapid Assessment Plan and approval letter dated November 4, 1998. TtNUS performed fieldwork necessary to complete the RA between January 15, 1999, and March 22, 1999.

1.1 SITE DESCRIPTION

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

The area surrounding CNC 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, utility locations, and vicinity surface drainage, is included as Figure 2.

Building 653 is a former Enlisted Men's Barracks located on Bordelon Avenue at the Naval Base. Formerly a single UST was located on the north side of the building between the building and Bordelon Avenue (see Figure 3). The UST was designated UST 653A and was used to store heating fuel oil for the building's boilers. The UST was removed in January and February 1996 [Supervisor of Ship Building,

Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston (SPORTENDETCHASN), 1997].

1.2 SITE HISTORY

In 1901, the U.S. Navy acquired 2,250 acres near Charleston to 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 home port for combatant ships and submarines of the U.S. Atlantic Fleet [Final RCRA Facility Investigation Report for Zone H, EnSafe/Allen & Hoshall (E/A&H, 1996].

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

Building 653 is a former enlisted Men's Barracks on the Charleston Naval Complex. From 1969 until 1984 the building was supplied heating oil fuel from a UST designated UST 653A. In 1984, the tank was disconnected and a replacement UST designated 653B was put into service. Tank 653B was removed from the site sometime prior to the CNC's closure; however, no record of the closure has been identified (SPORTENVDETCHASN, 1997).

UST 653A, a steel, 2,000 –gallon fuel oil tank was installed in 1969. The UST was installed with the base of the tank approximately 6 feet below land surface (bls) and did not contain spill prevention equipment or overfill protection equipment. The distribution lines for the UST were constructed of copper and operated as suction lines as opposed to pressurized system. The tank and distribution lines were removed between January 28 and February 27, 1997. To complete the removal operation the UST was drained,

cut open at both ends, and cleaned with a steam cleaner. The UST was then cut up for recycling. At the time of removal both the UST and system piping were described as moderately corroded and pitted, but without visible holes. Soil removed from the UST excavation was initially stockpiled onsite, then later transferred to CNC Building 1601 for remediation in Detachment Charleston's Bioremediation Facility (SPORTENVDETCHASN, 1997).

During the excavation of UST 653A, an 8-inch diameter, uncapped open metal pipe was uncovered approximately 6-feet bls. A mixture of water and petroleum drained from the pipe into the excavation during the removal activities. Storm drain plans of this area indicate Building 653 is serviced by a 6-inch diameter corrugated metal storm drain branch feeding an 18-inch reinforced concrete trunk line. The storm drain drawings are not to scale, and it cannot be determined if the piping identified during the UST excavation was part of the storm drain system (SPORTENVDETCHASN, 1997).

As part of the UST removal operations, confirmation soil samples were recovered from the excavation area. Based on the confirmation sample analytical results, the UST removal contractor decided to further excavate soil below the two UST system-piping runs in an effort to remove the most contaminated soil. Approximately 5 cubic yards of contaminated soil was removed from an area approximately 7-feet diameter and 3-feet deeper than the original 3-foot excavation depth. During the UST removal operation, organic vapors in ambient air and organic vapors in headspace samples were recorded (SPORTENVDETCHASN, 1997). The soil analytical results and the UST Assessment Report (SPORTENVDETCHASN, 1997) are included as Appendix A.

1.3 RECEPTOR SURVEY RESULTS

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

- Water utility, sanitary sewer utility, and storm drain utility: All three utility lines are located on the south side of Bordelon Avenue likely within 10 feet of the former UST location. In addition, water and storm drain utility lines supplying Building 653 are located immediately west of the former tank location.

- Natural gas utility: A natural gas line extends along the entire northern edge of Bordelon Avenue. The line is situated approximately 40 feet north of the former UST location.

- Electrical utility: Overhead electrical utility lines at the site are located along the southern edge of Bordelon Avenue. Building 653 is supplied electricity by a buried electrical line which lies along the east and south walls of the building.

Potable wells and irrigation wells were not identified within 1000 feet of the site. Although numerous monitoring wells are present at the facility and some located within 1000 feet of the site, the location of the monitoring wells have not been included in this RA report. The nearest surface water body to the site is Cooper River located approximately 2,200 feet from the site. Building basements are not present on CNC.

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 phosphatic 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. Transmissivity in the Pleistocene aquifer is generally less than 1,000 feet per day and well yields are variable, ranging from 0 to 200 gallons per

minute (gpm). This groundwater contains high concentrations of iron and is commonly acidic at shallow depths (E/A&H, 1996).

The Cooper Group is hydrogeologically significant mainly because of its low permeability. In most locales, its sandy, finely granular limestone produces little or no water, but instead acts as confining material causing artesian conditions in the underlying Santee Limestone. Yields from wells in the Santee Limestone 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

Seventeen direct push soil borings were advanced at Site 7 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 15 through February 19, 1999, seven monitoring wells were installed on-site. Lithologic samples were collected and recorded during the drilling process to allow a vertical delineation of soils from land surface to a depth of 26 feet bls.

Based on lithologic descriptions from the above soil borings and monitoring wells, it appears that the subsurface soil consists of silty and clayey sands to a depth of approximately 4 to 5 feet bls, clay and sandy clay from 5 feet to approximately 10 feet bls, and sand and silty sand to the maximum exploration depth. A generalized view of the subsurface lithology is presented in Figures 4 and 5. Lithologic descriptions of the soil boring logs are presented in Appendix B.

2.1.2 Site Hydrogeology

Four piezometers were installed at Site 7 as part of the RA investigation. The piezometers were installed to determine the groundwater flow direction in the field and assist in the placement of monitoring wells. The piezometers were located in former soil boring at locations paired as follows: piezometer CNC07-P01 and soil boring CNC07-B05; piezometer CNC07-P02 and soil boring CNC07-B10; piezometer CNC07-P03 and soil boring CNC07-B11; and piezometer CNC07-P04 and soil boring CNC07-B12.

Three of the piezometers were installed as temporary piezometers, which were removed after relative top-of-casing elevations were measured and groundwater measurements were recorded. One piezometer, CNC07-P01, was installed as a permanent piezometer for continuing water level measurements. The piezometer was installed as a permanent feature because on-site utilities limited the use of a drill rig for monitoring well installation.

Seven monitoring wells, CNC07-M01 through CNC07-M07, were installed as part of this RA investigation. The monitoring well and permanent piezometer locations are shown in Figure 3. Six of the monitoring

wells CNC07-M01 through CNC07-06, were completed as shallow wells to an approximate depth of 12 feet bls. The monitoring wells were completed using 10 feet of polyvinyl chloride (PVC) well screen that bracketed the water table. Monitoring well CNC07-M07 was completed as a Type III monitoring well with 6-inch 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 26 feet and a 2-inch diameter PVC monitoring well was installed with a 5-feet, 0.01-inch machine slotted monitoring well screen. 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 2 to 4 feet bls. Groundwater elevation measurements were recorded on February 21, 1999. The recorded water-level data are presented in Table 1. Figure 6 presents the groundwater potentiometric surface during the February 21, 1999 field event. Based on the potentiometric map, it appears that groundwater flow is toward the northwest toward Bordelon Avenue.

As part of the Final RCRA Facility Investigation Report for Zone H (E/A&H, 1996), a tidal influence investigation was conducted. The objective of the investigation was to provide long-term water level monitoring to determine the effects of the tidal fluctuation on wells and groundwater flow throughout Zone H.

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

2.2 ASSESSMENT RESULTS

Seventeen soil borings were completed as part of the screening portion of the soil investigation at Site 7. Six 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; and 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 U.S. Environmental Protection Agency (EPA) Method 8260; and polynuclear aromatic hydrocarbons (PAHs) using EPA method 8270. One sample was collected for total organic carbon (TOC) analysis using EPA Method 415.1, total recoverable petroleum hydrocarbons (TRPH) using EPA Method 9071, and grain- size analysis using sieve and hydrometer methods. The sample collection was conducted in accordance with 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.

Groundwater samples for CoC evaluation were collected on March 17, 1999. Groundwater sampling was conducted using a peristaltic pump and low flow, quiescent techniques. The monitoring wells 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 sampling data sheets are included in Appendix C. A summary of the field parameter measurements is presented in Table 2. Groundwater samples were analyzed for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using EPA Method 8260 and PAHs using EPA method 8270. Four of the groundwater samples were also analyzed for the following natural attenuation parameters: dissolved oxygen, alkalinity, carbon dioxide, sulfide, ferrous iron, nitrite, manganese, nitrogen/nitrite, and sulfate. A summary of the natural attenuation parameters is presented in Table 3.

2.3 FIELD SCREENING ASSESSMENT

2.3.1 Soil Vapor Assessment

Although seventeen soil borings were completed as part of the soil screening investigation, only thirteen of the borings were evaluated for soil vapors. Organic Vapor Analysis (OVA) headspace measurements were recorded at 1-foot intervals from the ground surface to the top of the water table. Four of the soil borings; CNC07-B01, CNC07-02, CNC07-B03 and CNC07-B04; encountered the water table within 1 to 2 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 9,000 parts per million (ppm). Four of the soil borings, CNC01-B10, CNC07-B11, CNC07-B12, and CNC07-B13, were reported to contain soil vapor concentrations exceeding 90 ppm. Soil boring CNC07-B11 was reported to contain the highest soil vapor concentration.

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

2.3.2 Soil Mobile Lab Results

A single soil sample was collected from each of ten soil borings (soil borings CNC07-B01 through CNC07-B10) and analyzed in a mobile laboratory for BTEX and diesel range organics using EPA Method 8260. The soil samples were selected based on the soil vapor screening results with the additional criterion that the samples originate in the vadose zone above the water table. Table 5 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 5, with the exception of diesel range organics, none of the compounds analyzed for were detected at concentrations above instrument detection limits. Diesel range organics were detected at a concentration of 98,000 parts per billion (ppb) in the subsurface soil sample from soil boring CNC07-B07.

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

2.3.3 Groundwater Mobile Lab Results

Fifteen groundwater screening samples were collected (soil borings CNC07-B01 through CNC07-B10 and CNC07-B13 through CNC07-B17) and analyzed in a mobile laboratory for benzene, toluene, ethyl benzene, total xylenes and diesel range organics using EPA Method 8260. The groundwater screening samples were typically collected across the water table at depths ranging from 3 to 8 feet bls. Table 6 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 6, four of the screening groundwater samples contained compounds at concentrations above instrument detection limits. Samples from soil borings CNC07-B01 and CNC07-

B02 contained concentrations of toluene (2.8 ppb and 2.6 ppb, respectively) and total xylenes (11.7 ppb and 11.2 ppb, respectively). The sample soil boring from CNC07-B08 contained toluene (6.8 ppb), ethylbenzene (2.9 ppb), total xylenes (12.7 ppb), and diesel range organics (16,700 ppb). The sample from soil boring CNC07-B13 contained benzene (21.2 ppb), toluene (2.0 ppb), ethylbenzene (2.0 ppb), and total xylenes 9.1 ppb).

The mobile laboratory groundwater analysis was used as a screening method to assist in identifying locations for 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

Six subsurface soil samples (plus one duplicate sample) were collected at Site 7 for determination of CoCs. The soil boring locations are shown on Figure 3. Table 7 summarizes the CoCs detected in the soil samples. None of the soil CoCs, with the exception of benzo(a)anthracene (estimated 387 µg/kg) and chrysene (estimated 491 µg/kg) detected in soil boring CNC07-B09, were detected above method detection limits. The detected concentrations of benzo(a)anthracene and chrysene were below the Risk Based Screening Levels (RBSL) for sandy soils. The RBSL for sandy soils was used based on a grain size analysis completed on sample 07SLB0802 indicating a clayey sand matrix (Appendix D). Because of the limited detected concentrations of CoC in soils, an isoconcentration figure for soils has not been completed.

2.4.2 Chemicals of Concern in Groundwater

Table 8 presents the analytical results for CoCs detected in the groundwater samples. Groundwater analytical data sheets for the March 1999 field event are presented in Appendix C. Groundwater samples from six of the monitoring wells (CNC07-M01, CNC07-M03, CNC07-M04, CNC07-M05, CNC07-M06, and CNC07-M07) were reported to contain detectable concentrations of groundwater CoCs. Detected compounds include benzene, ethylbenzene, toluene, and naphthalene. Two of the compounds, benzene and naphthalene were detected at concentrations exceeding RBSLs. Benzene was detected in the groundwater sample from monitoring well CNC07-M01 at a concentration of 25.6 µg/l, which exceeds the RBSL of 5 µg/l. Naphthalene was detected in groundwater samples from monitoring wells CNC07-M01, CNC07-M03, CNC07-M05, and CNC07-M06 at concentrations of 178 µg/l, 27.9 µg/l, 84.7 µg/l, and 29.9 µg/l; respectively. The RBSL for naphthalene is 10 µg/l. Figure 7 presents the detected concentration of naphthalene for the March 1999 sampling event.

Although naphthalene was detected in the groundwater sample from deep monitoring well CNC07-M07, the detected concentration (1.29 µg/l) was less than the RBSL. No other CoCs were detected above method detection limits in the onsite deep monitoring well.

2.5 ANALYTICAL DATA

All analytical data from the February 1997 UST Closure Assessment 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 completed soils and groundwater analytical data for this RA is included in Appendix D.

2.6 AQUIFER CHARACTERISTICS AND EVALUATION

Groundwater levels were measured on February 21, 1999. Water level contour plotted on Figure 6 indicate that the groundwater flows to the northwest, with a hydraulic gradient ranging from 0.0021 to 0.0016 feet per foot between monitoring wells CNC07-M06 to CNC07-M03 and CNC07-M05 to CNC07-M04, respectively.

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

The well construction details and boring logs for each well tested during the RCRA investigation were reviewed to determine which wells were most representative of the conditions present at Site 7. To make this determination the screened interval, lithology and proximity to the site were evaluated. Based on this evaluation, monitoring well NBCH-656-001 was selected as the most representative well. NBCH-656-001 is located approximately 450 feet northwest of Site 7 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 conductivity measurements for NBCH-656-001 was 0.435 feet per day.

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

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

where:

V = average velocity

K = hydraulic conductivity = $0.435\ ft/day$

N = effective porosity = 0.43 (from sieve results of 51.3% sand & 38.0% clay and Figure C1 in SCDHEC, 1998)

i = average hydraulic gradient = $0.0019\ ft/ft$

therefore:

$$V = \left(\frac{0.435\ ft/day}{0.43}\right) x\ 0.0019\ ft/ft$$

$$V = 0.0019\ ft/day$$

In summary, the seepage velocity of the surficial aquifer was calculated to be approximately 0.7 feet per year based on a hydraulic conductivity of 0.435 feet per day, a hydraulic gradient of 0.0019 feet per foot, and a porosity of 43% for clayey sand and sandy clay. Aquifer characterization graphs are provided in Appendix E.

2.7 FATE AND TRANSPORT MODEL DESCRIPTION

The Domenico model was the fate and transport model used to determine groundwater site specific target levels (SSTLs) in the risk analysis. The Domenico dilution/attenuation model is presented in the SCDHEC guidance document, *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC 1998). This model is very conservative in that it assumes an infinite mass, aerial source condition through which groundwater flows. The model incorporates biological decay effects through a

first-order decay process; however, this mechanism was ignored because SCDHEC guidance specifies that the decay rate must be assumed to be zero if site-specific decay rates have not been determined.

The impacted groundwater source area was modeled as 50 ft (15.00 m) wide and 6.56 ft (2.0 m) deep; these values are conservative defaults suggested by the American Society for Testing Materials (ASTM) *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (ASTM 1997). The maximum source concentrations are assumed to exist throughout the source area, further compounding the conservatism of the estimate.

Site-specific data were used for saturated hydraulic conductivity, hydraulic gradient, and fraction of organic carbon. The soil bulk density and porosity were determined using Figures C1 and C3 given in SCDHEC (1998), based on the sieve test results for sample 07SLB0802, 51.3% sand and 38% clay.

The following estimates of dispersivity were used in the Domenico model as given in SCDHEC (1998):

Parameter	Estimate
Longitudinal Dispersivity, α_x	x/10, where x = distance between the point of exposure and the source or compliance point
Transverse Dispersivity, α_y	$\alpha_x/3$
Vertical Dispersivity, α_z	$\alpha_x/20$

Table 9 summarizes fate and transport parameters used in modeling the SSTLs.

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 northwest. Figure 7 shows the current extent of the naphthalene impact. Benzene was detected above its RBSL in one monitoring well, CNC07-M01.

The Domenico model was used to predict the distance at which the tip of the plume is attenuated to RBSLs in 10 and 20 years without using degradation due to biological decay. This was done by adjusting the time to 10 years (3.15×10^8 sec) and 20 years (6.31×10^8 sec) and solving for distance (x) by trial and error. The distance was changed separately for benzene and naphthalene until the required distance that is necessary for the concentration to attenuate to the RBSLs was determined. (Distances of less than 2.5 feet could not be calculated due to limitations of the spreadsheet model, but are assumed to differ

insignificantly from 2.5 feet.) Only benzene and naphthalene were present at the source at concentrations greater than the respective RBSLs; therefore, these were the only chemicals for which plume distances were calculated. The model estimates that after 10 years, the concentration of benzene and naphthalene is 0.005 mg/L and 0.010 mg/L (RBSLs) at distances less than 2.5 feet for both analytes (Figure 8). Furthermore, after 20 years, the concentration of benzene and naphthalene is 0.005 mg/L and 0.010 mg/L (RBSLs) at distances of 4.2 feet and <2.5 feet, respectively from monitoring well CNC07-M01 (Figure 9). The Domenico 10-year and 20-year simulation spreadsheets are presented in Appendix F.

It should be noted that the Domenico model predicts a relatively short migration, which is not reflected in the current range of naphthalene impact. For example, naphthalene was detected in monitoring well CNC07-M05, approximately 140 feet crossgradient from CNC07-M01. This is probably due to a higher original source concentration or product release in more than one area. Both USTs and associated piping have now been removed. Furthermore, the short migration distance is associated with the high carbon content of the site soil, causing adsorption of the benzene and naphthalene to the soil. Also noted, CNC07-M01 was used as the source location, which may have been associated with a leak from the piping entering the building. Well CNC07-M01 is upgradient of the former UST location.

3.0 TIER 2 EVALUATION

3.1 COMPARISON OF ANALYTICAL RESULTS WITH RBSLs

Soil samples were collected on January 22, 1999. The samples were analyzed for BTEX and PAH, including naphthalene. Benzene, toluene, and two PAH compounds [benzo(a)anthracene and chrysene] were detected in the soil at the site. However, no analyte concentration exceeded its RBSL for clayey soil less than 5 feet above groundwater. A comparison of soil concentrations to SCDHEC RBSLs is shown in Table 7.

Groundwater sampling was conducted on March 17, 1999. The samples were analyzed for BTEX, MTBE, and PAH, including naphthalene. Benzene and naphthalene were detected in monitoring well CNC07-M01 at concentrations above RBSLs of 25.6 µg/l and 178 µg/l, respectively. Naphthalene was also detected at lower concentrations in five of the six remaining wells, two of which were below the RBSL. Figure 7 shows naphthalene concentrations in groundwater. Benzene was also detected in well CNC07-M05 at a concentration below the RBSL. In addition, toluene and ethylbenzene were detected at concentrations below their respective RBSLs. A comparison of groundwater concentrations to SCDHEC RBSLs is shown in Table 8. A comparison of maximum soil and groundwater concentrations to RBSLs is shown in Table 10.

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 653 served as the Enlisted Men's Barracks 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 did not reveal the presence of any potable or irrigation water supply wells within 1,000 feet of the site. There are no basements on the CNC. The Shipyard Creek and Cooper River flow approximately 1,500 feet and 2,200 feet, respectively, from the site. Both water bodies are unlikely to be affected by impacted groundwater or soil at the site because of its distance from the area.

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 11 and 12 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 an employee who works in a commercial capacity at the site. Commercial use of the site in the future is likely; 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, the site is paved, and all soil concentrations of analytes were below RBSLs. Drinking water at this site is provided by the city; therefore, ingestion of groundwater is not a complete exposure pathway. The building foundation is assumed to be sufficient to prevent volatilization from both soil and groundwater into a commercial building, and there is no history of vapors in the commercial building. 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. 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 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: inhalation of volatiles from soil, dermal contact with soil, and incidental ingestion of soil. There is no soil impact above RBSLs at the site. On-site construction workers could be exposed to constituents in groundwater by the following pathways: inhalation of volatiles from groundwater, dermal contact with groundwater, and incidental ingestion of

groundwater. Utilities lie downgradient of the impacted area and this pathway was considered for groundwater exposure.

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/industrial facility; 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 remain commercial/ industrial, including all downgradient properties to the Cooper River. Therefore, this potential receptor was not considered further.

3.3.6 Surface Water

There are no surface waters within 1,000 feet of the site; therefore, this potential receptor was not considered further.

3.4 IDENTIFICATION OF DATA REQUIREMENTS

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

3.5 SITE-SPECIFIC TARGET LEVELS

Soil SSTLs were not required because soil concentrations did not exceed RBSLs.

The Domenico model as described in Section 2.8 and fate and transport parameters provided in Table 9 were used to determine groundwater SSTLs for benzene and naphthalene. Benzene and naphthalene were the only two analytes with concentrations above RBSLs. The groundwater flow at the site is to the northwest.

Because water utility, sanitary sewer utility, and storm drain utility lines are located on the south side of Bordelon Avenue, likely within 10 feet of the former UST location, exposure was evaluated for a

construction worker to shallow groundwater. CNC07-M01, 85 feet (25.91 m) from the utilities, has the maximum groundwater concentrations of benzene and naphthalene; therefore, the area surrounding this monitoring well was used as the source for predicted migration. [In addition, CNC07-M05, 40 feet (12.19 m) from the utilities, was considered separately as a source because of its closer location to the utility corridor and the lack of compliance well between CNC07-M05 and the corridor.] Conservatively, groundwater ingestion RBSLs were used as allowable point of exposure concentrations, although the construction worker exposure would be from inhalation of volatiles, dermal contact, and incidental ingestion of groundwater. The time of exposure was input to 250 years (7.884×10^9 sec). Using the values of RBSLs (5 µg/L for benzene, and 10 µg/L for naphthalene) at the point of exposure, the SSTLs at CNC07-M01 were calculated and compared with the concentrations in CNC07-M01. The SSTLs at the compliance well (CNC07-M03) were also calculated using the values of the RBSLs at the point of exposure. The distance from the compliance well to the point of exposure was estimated to be 35 feet (10.67 m).

Groundwater SSTLs for a point of exposure 85 feet away were determined to be:

Chemical of Concern	Source Area Concentration [mg/L]	Source SSTL [mg/L]	Compliance Point Concentration [mg/L]	Compliance Point SSTL [mg/L]
Benzene	0.0256	0.4651	ND	0.0099
Naphthalene	0.178	> 4.361E+14	0.0279	2.758E+13

In addition, using the RBSL (10 µg/L for naphthalene) at the point of exposure, the SSTL at CNC07-M05 was calculated and compared with the naphthalene concentration in CNC07-M05. Benzene was not evaluated at CNC07-M05 because the concentration was below its RBSL. The naphthalene groundwater SSTL for a point of exposure 40 feet away was determined to be:

Chemical of Concern	Source Area Concentration [mg/L]	Source SSTL [mg/L]
Naphthalene	0.0847	> 2.039E+14

Appendix G provides the Domenico model calculations generating SSTLs.

It should be noted that the current concentration of benzene at CNC07-M01 will exceed the SSTL calculated for a time greater than 563 years and the current concentration of naphthalene at CNC07-M05 will exceed the SSTL calculated for a time greater than 2,605 years. These calculations are based on extremely conservative assumptions of a constant source for the stated time periods and no biological decay. The source, assumed to be the USTs (653A and 653B) or associated piping, has been removed from the site.

3.6 RECOMMENDATIONS

Dissolved hydrocarbon concentrations in CNC07-M01 do not exceed the SSTLs for benzene and naphthalene calculated for a point of exposure 85 feet away (the utility corridor) in Section 3.5. In addition, the naphthalene concentration in CNC07-M05 does not exceed the SSTL calculated for a point of exposure 40 feet away (also the utility corridor) in Section 3.5. A comparison of SSTLs to present groundwater concentrations is provided in Table 13. Since there are no soil concentrations above RBSLs or groundwater concentrations above SSTLs, no further action is recommended at this site.

4.0 REFERENCES

ASTM (American Society for Testing and Materials), 1997. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites.

E/A&H (Ensafe/Allen & Hoshall, Inc.), 1996. Final RCRA Facility Investigation Reportfor 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), 1997. Underground Storage Tank (UST) Assessment Report for UST 653A, Charleston Naval Base Complex, North Charleston, South Carolina, February 27, 1997.

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

TABLE 1

GROUNDWATER ELEVATIONS
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
SOUTH CHARLESTON, SOUTH CAROLINA

Monitoring Well No.	Total Depth of Well (ft)	Top of Casing Elevation (ft MSL)	Date Measured	Depth to Water (BTOC)	Groundwater Elevation (MSL)
CNC07-M01	12	10.12	2/21/99	3.61	6.51
CNC07-M02	12	10.00	2/21/99	3.55	6.45
CNC07-M03	12	9.72	2/21/99	3.25	6.47
CNC07-M04	12	9.33	2/21/99	2.89	6.44
CNC07-M05	12	9.86	2/21/99	3.35	6.51
CNC07-M06	12	10.09	2/21/99	3.49	6.60
CNC07-M07	26	9.99	2/21/99	NM	NM
CNC07-P01	12	9.74	2/21/99	NM	NM

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

TABLE 2

GROUNDWATER FIELD MEASUREMENTS
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well I.D.	Date Sampled	Purge method	Volume (Gallons)	Temperature (°C)	Ph	Specific Conductance (uMHOS/cm)	Turbidity (NTU)
CNC07-M01	3/17/99	PP	9.0	17.8	7.47	0.699	< 10
CNC07-M02	3/17/99	PP	9.0	18.1	7.35	0.779	56
CNC07-M03	3/17/99	PP	9.0	14.1	7.44	1.83	< 10
CNC07-M04	3/17/99	PP	7.0	20.7	7.12	1.16	< 10
CNC07-M05	3/17/99	PP	7.0	18.5	6.98	1.04	< 10
CNC07-M06	3/17/99	PP	8.0	16.7	7.42	1.27	< 10
CNC07-M07	3/17/99	PP	<1*	18.3	6.43	27.80	999

PP - Peristaltic pump, low flow technique.
(°C) - Degrees Celcius
uMHOS/cm - Micro HOS per centimMicro HOS per centimeter.
NTU - Nephelometric turbidity units.
* - Well purged dry using low flow purging method

TABLE 3

GROUNDWATER NATURAL ATTENUATION FIELD MEASUREMENTS
SITE 7, BUILDING 653
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)*
CNC07-M01	3/17/99	0.55	332	190	0.02	1.20	0.016	0.0	ND	9.5	6,100
CNC07-M02	3/17/99	0.76	500	275	0.02	0.09	0.053	0.0	0.019	2.9	8,000
CNC07-M06	3/17/99	0.26	590	250	0.02	1.12	0.016	0.2	ND	2.86	4,500

mg/l - milligrams per liter
* - Fixed base laboratory analysis

TABLE 4

SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 7, BUILDING 653
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (PPM)
CNC07-B01	07SSB0101	1	ND
	07SSB0102	2	Wet Soil
	07SSB0103	3	Wet Soil
	07SSB0104	4	Wet Soil
CNC07-B02	07SSB0201	1	ND
	07SSB0202	2	Wet Soil
	07SSB0203	3	Wet Soil
	07SSB0204	4	Wet Soil
CNC07-B03	07SSB0301	1	ND
	07SSB0302	2	ND
	07SSB0303	3	Wet Soil
	07SSB0304	4	Wet Soil
CNC07-B04	07SSB0401	1	ND
	07SSB0402	2	ND
	07SSB0403	3	Wet Soil
	07SSB0404	4	Wet Soil
CNC07-B05	07SSB0501	1	ND
	07SSB0502	2	ND
CNC07-B06	07SSB0601	1	ND
	07SSB0602	2	ND
CNC07-B07	07SSB0701	1	1
	07SSB0702	2	2
CNC07-B08	07SSB0801	1	ND
	07SSB0802	2	ND
CNC07-B09	07SSB0901	1	ND
	07SSB0902	2	ND
CNC07-B10	07SSB1001	1	ND
	07SSB1002	2	370
	07SSB1003	3	2500
	07SSB1004	4	Wet Soil
CNC07-B11	07SSB1101	1	2
	07SSB1102	2	190
	07SSB1103	3	9000
CNC07-B12	07SSB1101	1	ND
	07SSB1102	2	2
	07SSB1103	3	90
CNC07-B13	07SSB1301	1	2
	07SSB1302	2	48
	07SSB1303	3	190

NOTES:
OVA -organic vapor analyzer equipped with a flame ionization detector.
PPM - parts per million.
ND - not detected.
wet soil - soil saturated; not representative of soil vapor concentrations.

TABLE 5

SUMMARY OF MOBILE LABORATORY SOIL SCREENING RESULTS
JANUARY 1999
SITE 7, BUILDING 653
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
CNC07-B01	07SFB0101	0-1	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B02	07SFB0201	0-1	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B03	07SFB0302	1-2	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B04	07SFB0402	1-2	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B05	07SFB0502	1-2	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B06	07SFB0602	1-2	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B07	07SFB0702	1-2	<1.0	<1.0	<1.0	<1.0	98,000
CNC07-B08	07SFB0802	1-2	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B09	07SFB0902	1-2	<1.0	<1.0	<1.0	<1.0	<50,000
CNC07-B10	07SFB1003	2-3	<1.0	<1.0	<1.0	<1.0	<50,000

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

TABLE 6

SUMMARY OF MOBILE LABORATORY GROUNDWATER SCREENING RESULTS
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Mobile Laboratory Screening Data (PPB)[1]				
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel Range Organics
CNC07-B01	07GFB01	<1.0	2.8	<1.0	11.7	<10,000
CNC07-B02	07GFB02	<1.0	2.6	<1.0	11.2	<10,000
CNC07-B03	07GFB03	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B04	07GFB04	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B05	07GFB05	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B06	07GFB06	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B07	07GFB07	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B08	07GFB08	<1.0	6.8	2.9	12.7	16,700
CNC07-B09	07GFB09	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B10	07GFB10	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B13	07GFB13	21.2	2.0	2.0	9.1	<10,000
CNC07-B14	07GFB14	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B15	07GFB15	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B16	07GFB16	<1.0	<1.0	<1.0	<1.0	<10,000
CNC07-B17	07GFB17	<1.0	<1.0	<1.0	<1.0	<10,000

NOTES:
[1] Laboratory screening data were analyzed using EPA Method 8260. Compounds not detected are reported as less than the instrument detection limit.
PPB - parts per billion
NS - no sample collected from this location

TABLE 7

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Soil Boring / Sample No.	Sample Date	Benzene	Ethyl-benzene	Naphthalene	Toluene	Xylenes (total)	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Dibenzo(a,h) anthracene	Chrysene	Total Organic Carbon*
RBSL[1]		5	1260	210	1622	42471	73084	29097	231109	87866	12998	
CNC07-B02/ 07SLB0201	22-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC07-B05/ 07SLB0502	22-Jan-99	0.794 [J]	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC07-B06/ 07SLB0602	22-Jan-99	1.48 [J]	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC07-B06/ 07SLB0602[4]	22-Jan-99	0.985 [J]	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC07-B08/ 07SLB0802	22-Jan-99	2.04 [J]	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
CNC07-B09/ 07SLB0902	22-Jan-99	ND	ND	ND	ND	ND	387 [J]	ND	ND	ND	491 [J]	NA
CNC07-B12/ 07SLB1202	22-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14200
ZHTL0701[2]	22-Jan-99	ND	ND	ND	0.504 [J]	ND	NA	NA	NA	ND	NA	NA
ZHRL00201[3]	20-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA

All concentrations are in micrograms per kilograms (ug/kg). J = Estimated concentration. ND = Compound not detected.
NA = Compound not analyzed. * Concentration in milligrams per kilograms
Sample 07SLB0802 was also analyzed for total recoverable petroleum hydrocarbons and contained an estimated 115 milligrams/kilograms.
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for sandy soils; depth to groundwater less than 5 feet.
[2] trip blank sample.
[3] equipment blank sample.
[4] Duplicate

TABLE 8

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
SITE 07, BUILDING 653
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
CHC07-M01 / 07GLM0101	17-Mar-99	**25.6**	2.63 [J]	7.53	ND	**178**	ND	ND	ND	ND	ND	ND
CHC07-M02 / 07GLM0201	17-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHC07-M03 / 07GLM0301	17-Mar-99	ND	ND	ND	ND	**27.9**	ND	ND	ND	ND	ND	ND
CHC07-M04 / 07GLM0401	17-Mar-99	ND	ND	ND	ND	3.31 [J]	ND	ND	ND	ND	ND	ND
CHC07-M05 / 07GLM0501	17-Mar-99	0.506 [J]	0.762 [J]	ND	ND	**84.7**	ND	ND	ND	ND	ND	ND
CHC07-M06 / 07GLM0601	17-Mar-99	ND	0.654 [J]	ND	ND	**29.9**	ND	ND	ND	ND	ND	ND
CHC07-M07 / 07GLM0701	17-Mar-99	ND	ND	ND	ND	1.29 [J]	ND	ND	ND	ND	ND	ND
ZHTL01901[3]	17-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 = Compound not detected. NA = Compound not analyzed.

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

[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for groundwater.

[2] The Risk based screening level for individual PAH CoC is 10 ug/l or 25 ug/l for total PAHs.

[3] trip blank sample.

[4] equipment blank sample.

Bold value indicates concentration exceeded RBSLs.

TABLE 9

FATE AND TRANSPORT INPUT PARAMETERS
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Parameter	Domenico Dilution/Attenuation Model[1]
Hydraulic Conductivity [m/sec]	1.54E-06
Hydraulic Gradient	0.0021
Porosity	0.44
Estimated Plume Length [ft]	NA
Soil Bulk Density[a] [kg/L]	1.6
Partition Coefficient [L/kg]	chemical specific[b]
Fractional Organic Carbon	1.42E-02
First Order Decay Rate[a] [sec^{-1}]	0
Modeled Plume Length [ft]	NA
Modeled Plume Width [ft]	NA
Source Width[a] [m]	15
Source Thickness[a] [m]	2
Soluble Mass [kg]	Infinite[c]

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

(a) - Stated values are default values.

(b) - See Appendix I for chemical-specific partition coefficient (k_{oc}) values.

(c) - Assumption of the Domenico Model

TABLE 10

COMPARISON OF MAXIMUM CONCENTRATIONS TO RBSLs
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Concern	Maximum Concentration (Soil) (mg/kg)	RBSLs (Soil) (mg/kg)[a]	Maximum Concentration (GW) (mg/L)	RBSLs (GW) (mg/L)[b]
Benzene	0.00204	0.005	**0.0256**	0.005
Toluene	0.000504	0.478	0.00263	1
Ethybenzene	ND	0.364	0.00753	0.7
Xylenes	ND	11.119	ND	10
Benzo(a)anthracene	0.387	17.687	ND	0.01
Benzo(b)fluoranthene	ND	7.042	ND	0.01
Benzo(k)fluoranthene	ND	55.93	ND	0.01
Chrysene	0.491	3.146	ND	0.01
Dibenzo(a,h)anthracene	ND	21.265	ND	0.01
MTBE	NA	--	ND	0.04
Naphthalene	ND	0.052	**0.178**	0.01

(a) - From Risk-Based Corrective Action for Petroleum Releases, Table 5, Depth to GW - 0-5 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
"-" Indicates that the value is above the saturation level.
Bolded Value indicates the concentration exceeded the RBSL.

TABLE 11

EXPOSURE PATHWAY ASSESSMENT - CURRENT USE
SITE 7, BUILDING 653
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 water supply well downgradient.	
	Dermal contact	No		
	Inhalation	No	No residential basement	
Surface Water	Ingestion	No	No surface water within 1000 ft	
	Dermal contact	No		
	Inhalation	No		
Surficial Soil	Ingestion	No	No surface soil with BTEX, MTBE, or PAHs above RBSLs	
	Dermal contact	No		
	Inhalation	No		
Subsurface Soil	Ingestion	No	No impacted subsurface soil	
	Dermal contact	No		
	Inhalation	No		

TABLE 12

EXPOSURE PATHWAY ASSESSMENT - FUTURE USE
SITE 7, BUILDING 653
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	Yes	Potential future constrution worker may have dermal, inhalation, and incidential ingestion exposure	No additional data required
	Dermal contact	Yes		
	Inhalation	Yes		
Surface Water	Ingestion	No	No surface water within 1000 ft	
	Dermal contact	No		
	Inhalation	No		
Surficial Soil	Ingestion	No	No surface soil with BTEX, MTBE, or PAHs above RBSLs	
	Dermal contact	No		
	Inhalation	No		
Subsurface Soil	Ingestion	No	No impacted subsurface soil	
	Dermal contact	No		
	Inhalation	No		

TABLE 13

COMPARISON OF MAXIMUM CONCENTRATIONS TO SSTLs
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

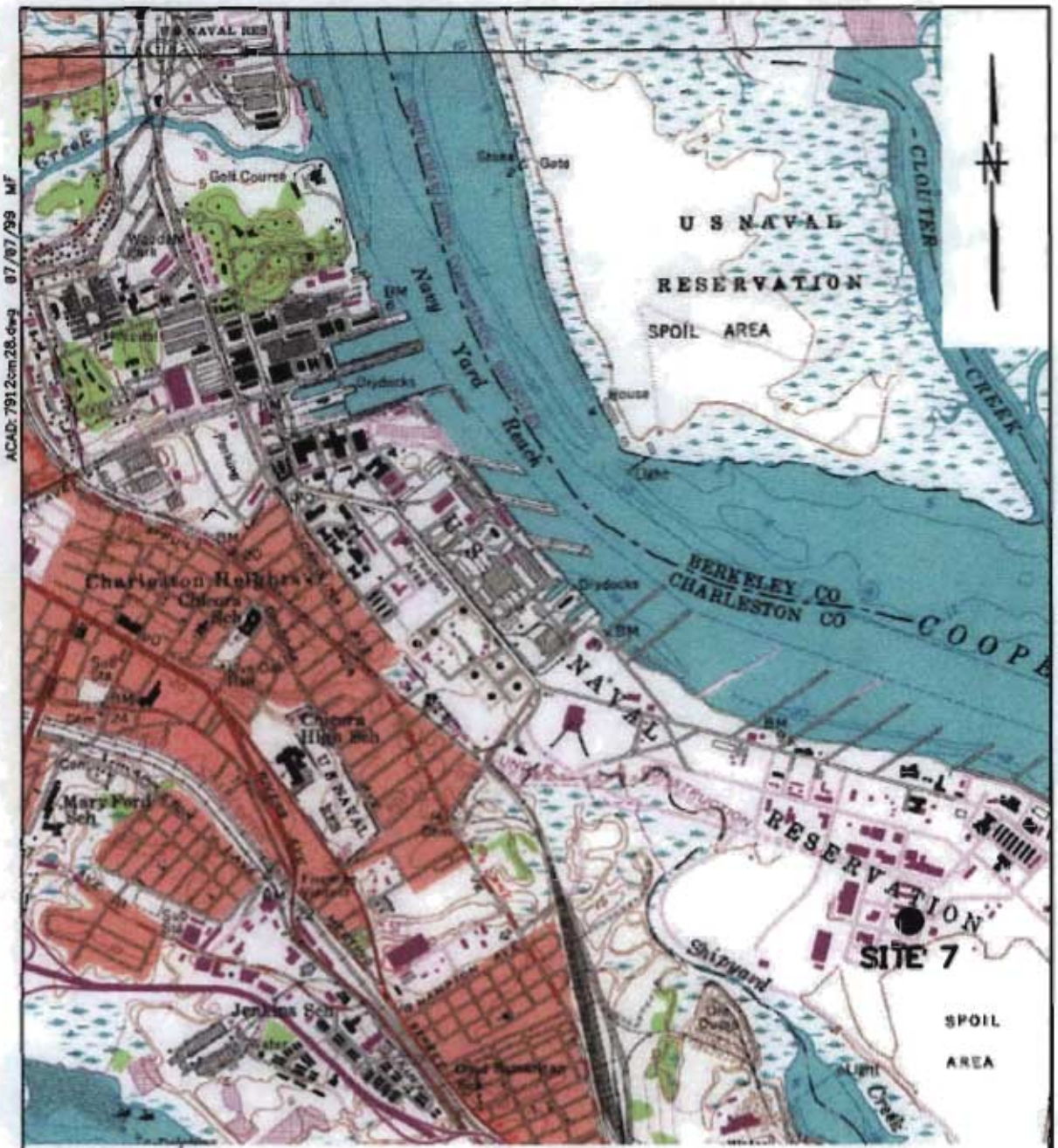
Groundwater SSTLs for CNC07-M01

Chemical of Concern	Source Area Concentration [mg/L]	Source SSTL [mg/L]	Compliance Point Concentration [mg/L]	Compliance Point SSTL [mg/L]
Benzene	0.0256	0.4651	ND	0.0099
Xylenes	ND	2517.63	ND	2442.84
Naphthalene	0.178	> 4.361E+14	0.0279	2.758E+13

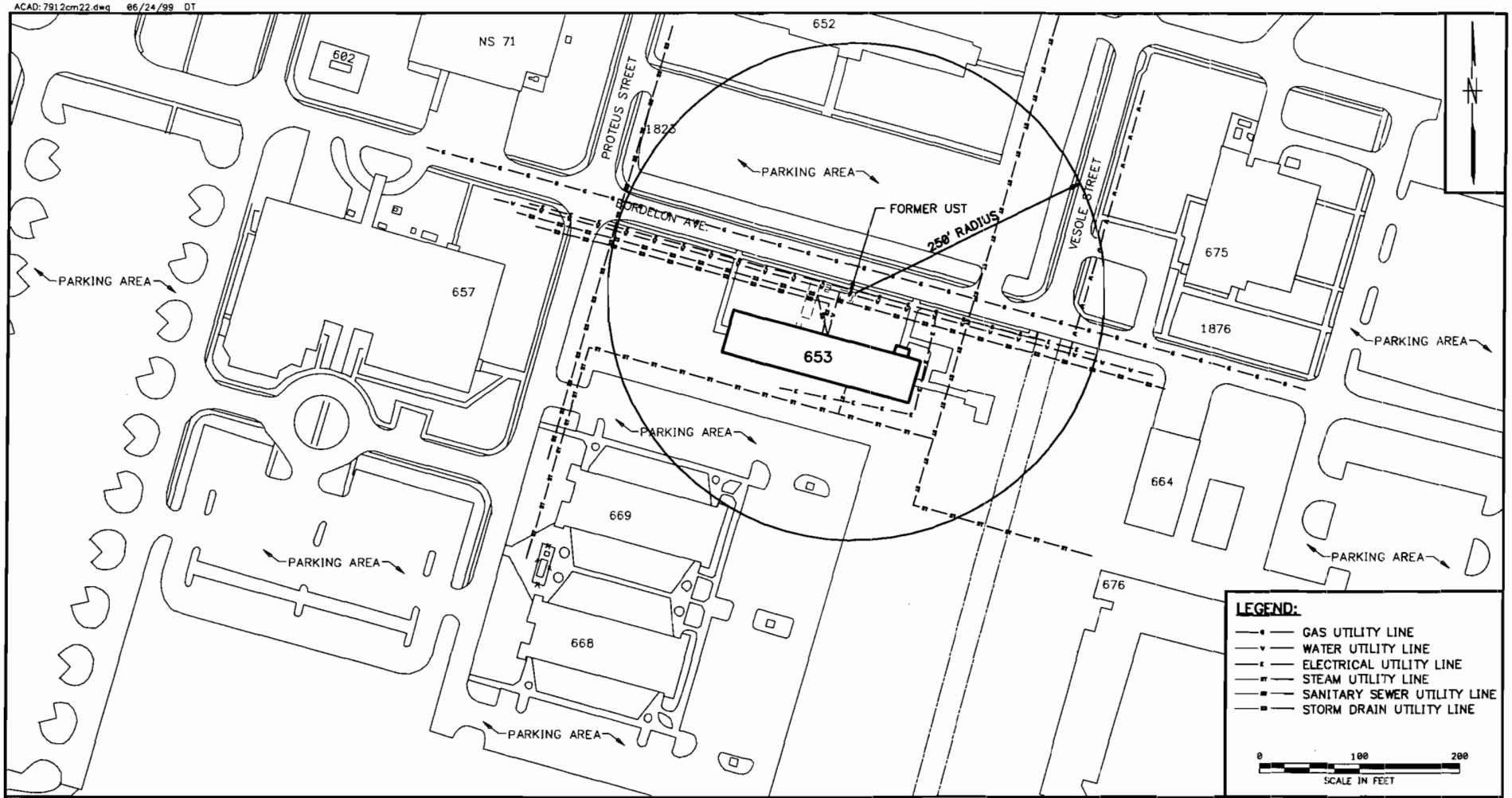
Groundwater SSTLs for CNC07-M05

Chemical of Concern	Source Area Concentration [mg/L]	Source SSTL [mg/L]	Compliance Point Concentration [mg/L]	Compliance Point SSTL [mg/L]
Naphthalene	0.0847	> 2.039E+14	NA	NA

mg/l - milligrams per liter
ND - Analyte not detected above method detection limit
Shaded cell indicates the concentration exceeds the SSTL.


ACAD: 7912cm28.dwg 07/07/99 MF
US NAVAL RES
Golf Course
Navy Yard Reach
U S NAVAL
RESERVATION
SPOIL AREA
CLOUTER CREEK
BERKELEY CO
CHARLESTON CO
COOPE
Charleston Rollers
Chicora Hi Sch
Mary Ford Sch
NAVAL
RESERVATION
SITE 7
Shipyard
SPOIL
AREA
Light Creek
N
0
2000
4000
SCALE IN FEET
SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1979
QUADRANGLE MAP NORTH CHARLESTON REVISED, 1979
DRAWN BY MF DATE 7/7/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED
SITE LOCATION MAP
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 1
REV. 0
FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/26/98

ACAD: 7912cm22.dwg 06/24/99 DT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DLT 6/21/99 DATE
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

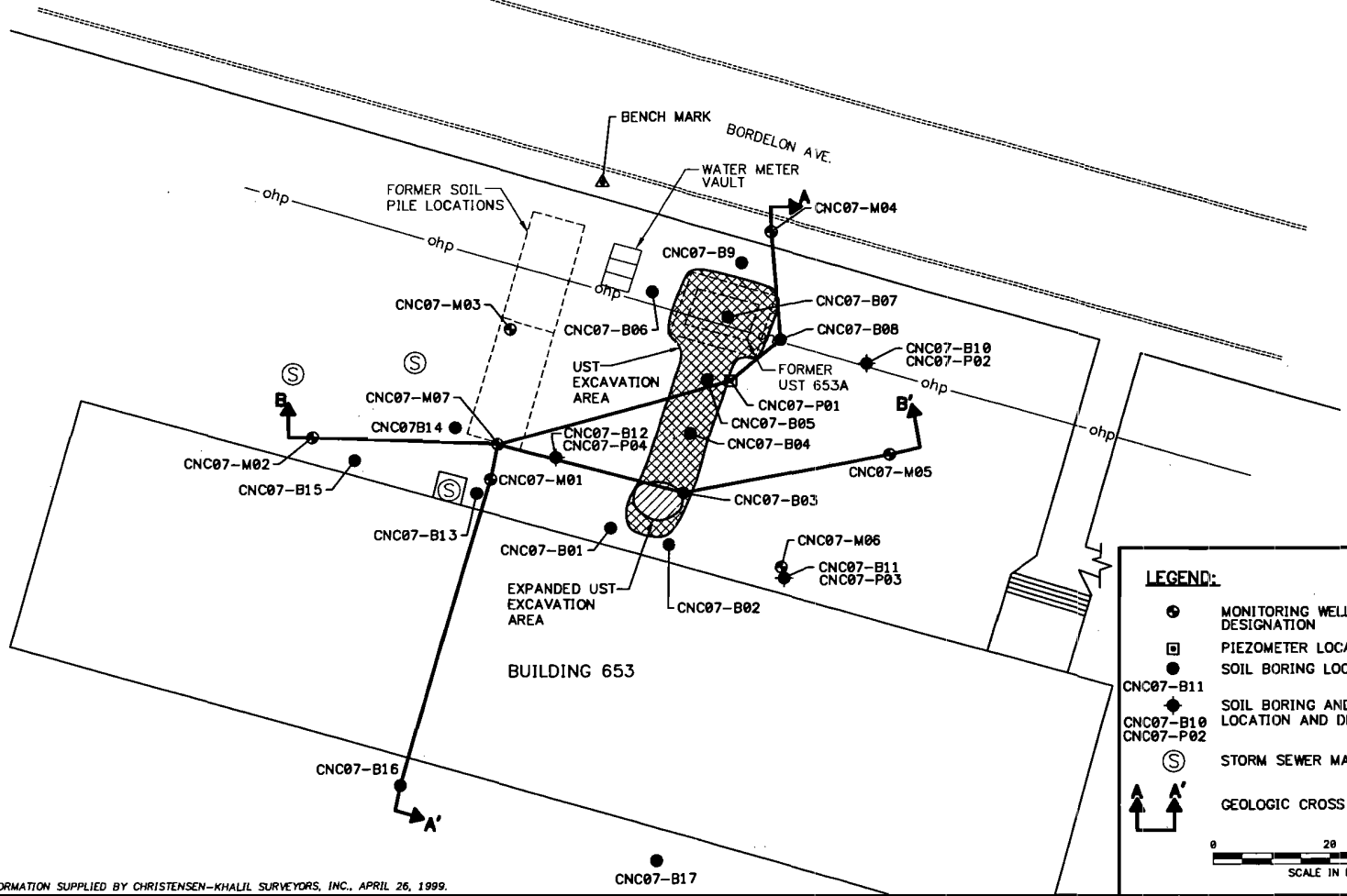
DEPARTMENT OF THE NAVY · SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND

SITE VICINITY MAP
SITE 7, BUILDING 653
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.DVG - REV 0 - 1/20/98

ACAD: 7912CM21.dwg 06/24/99 DT



LEGEND:

- MONITORING WELL LOCATION AND DESIGNATION
- PIEZOMETER LOCATION AND DESIGNATION
- CNC07-B11 — SOIL BORING LOCATION AND DESIGNATION
- CNC07-B10 / CNC07-P02 — SOIL BORING AND TEMPORARY PIEZOMETER LOCATION AND DESIGNATION
- (S) — STORM SEWER MANHOLE
- A A' — GEOLOGIC CROSS SECTION LOCATION

0 20 40
SCALE IN FEET

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

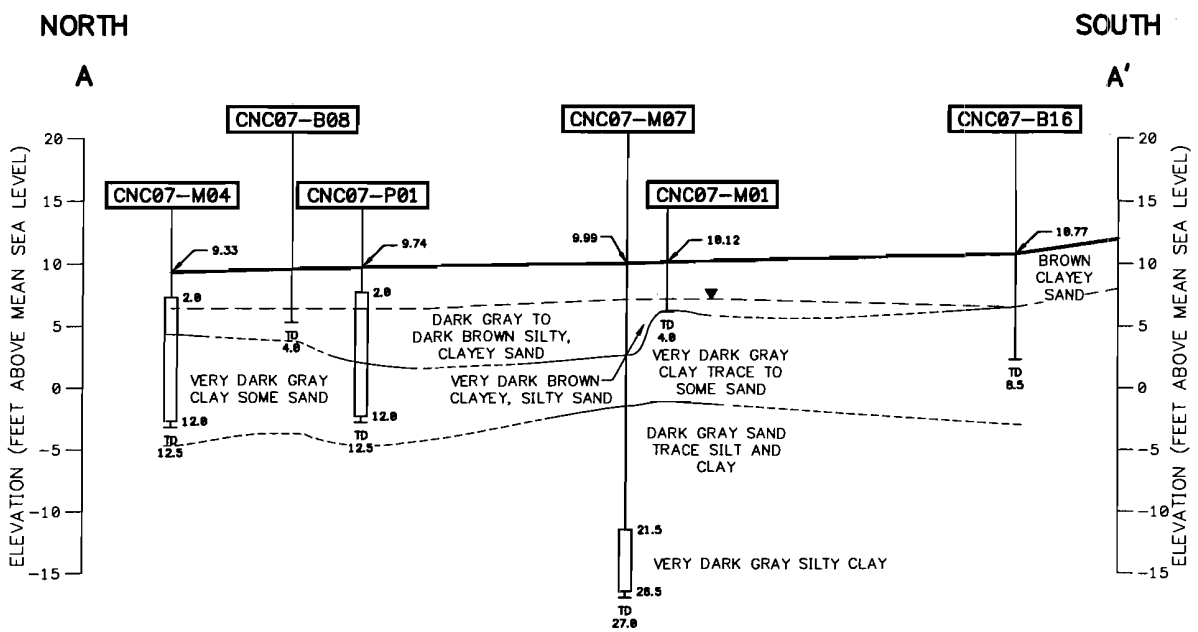
DRAWN BY DLT DATE 6/18/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

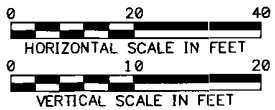
SITE AREA AND SAMPLING LOCATIONS
SITE 7 BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

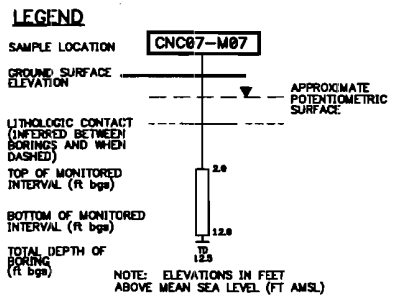
CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3
REV. 0

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

ACAD: 7912qx09.dwg 06/24/99 DT







NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

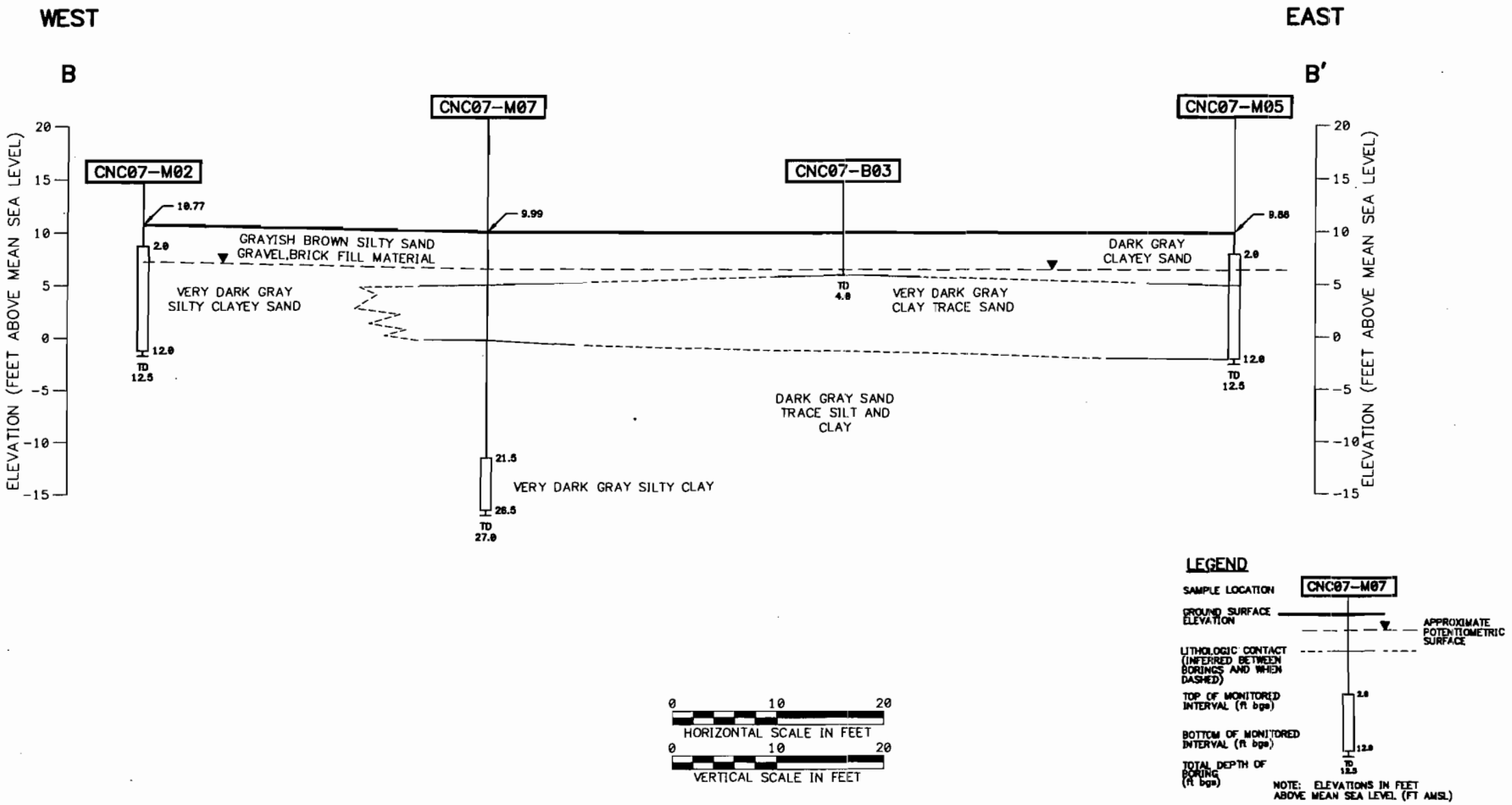
DRAWN BY DT DATE 6/17/99
CHECKED BY DATE
COST/SCHED—AREA
SCALE AS NOTED

GEOLOGIC CROSS SECTION
A–A'
SITE 7, BUILDING 653
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

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

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

ACAD: 7912qx10.dwg 06/24/99 DT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DT DATE 6/18/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

GEOLOGIC CROSS SECTION
B-B'
SITE 7, BUILDING 653
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

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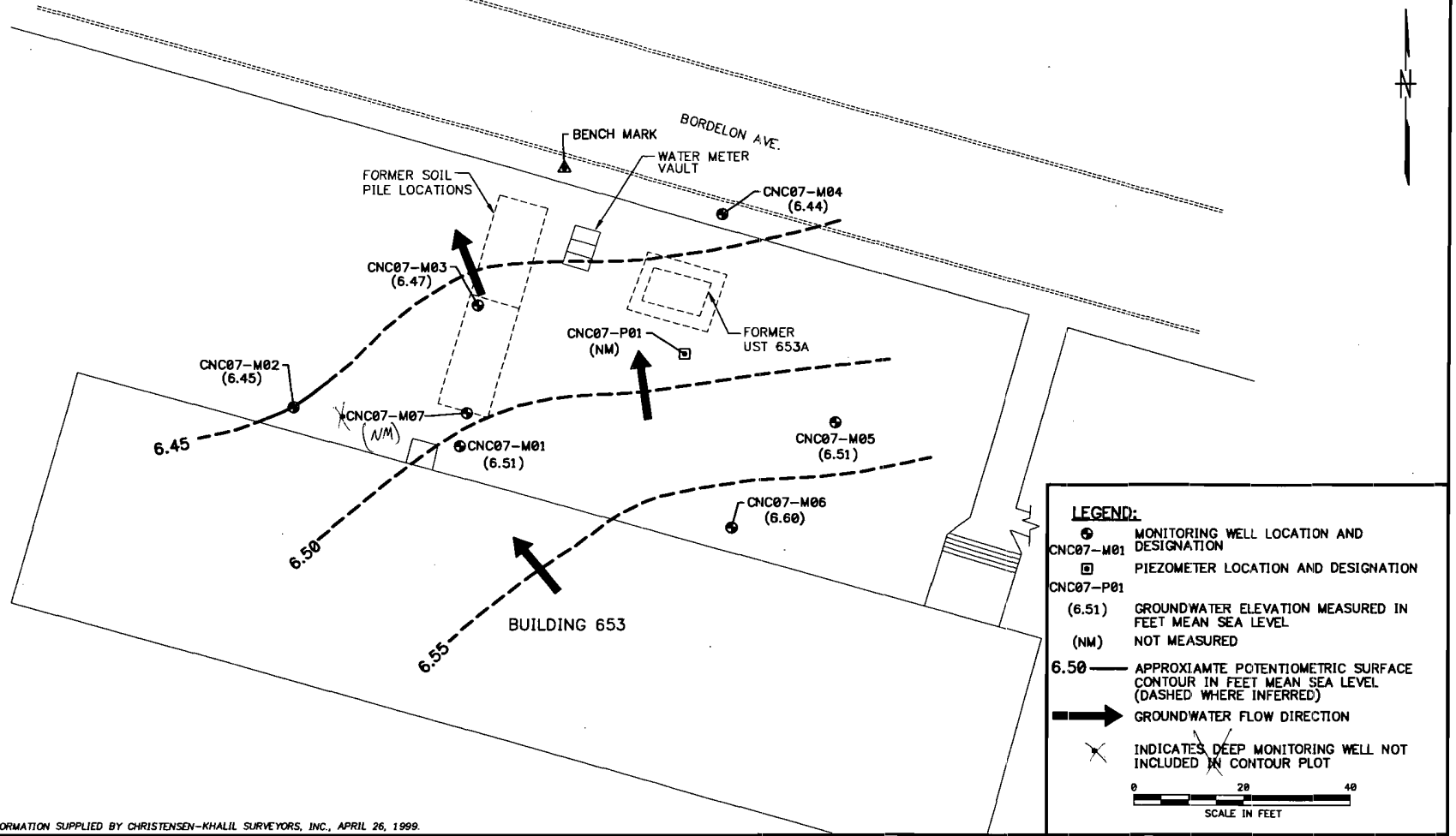


SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC., APRIL 26, 1999.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

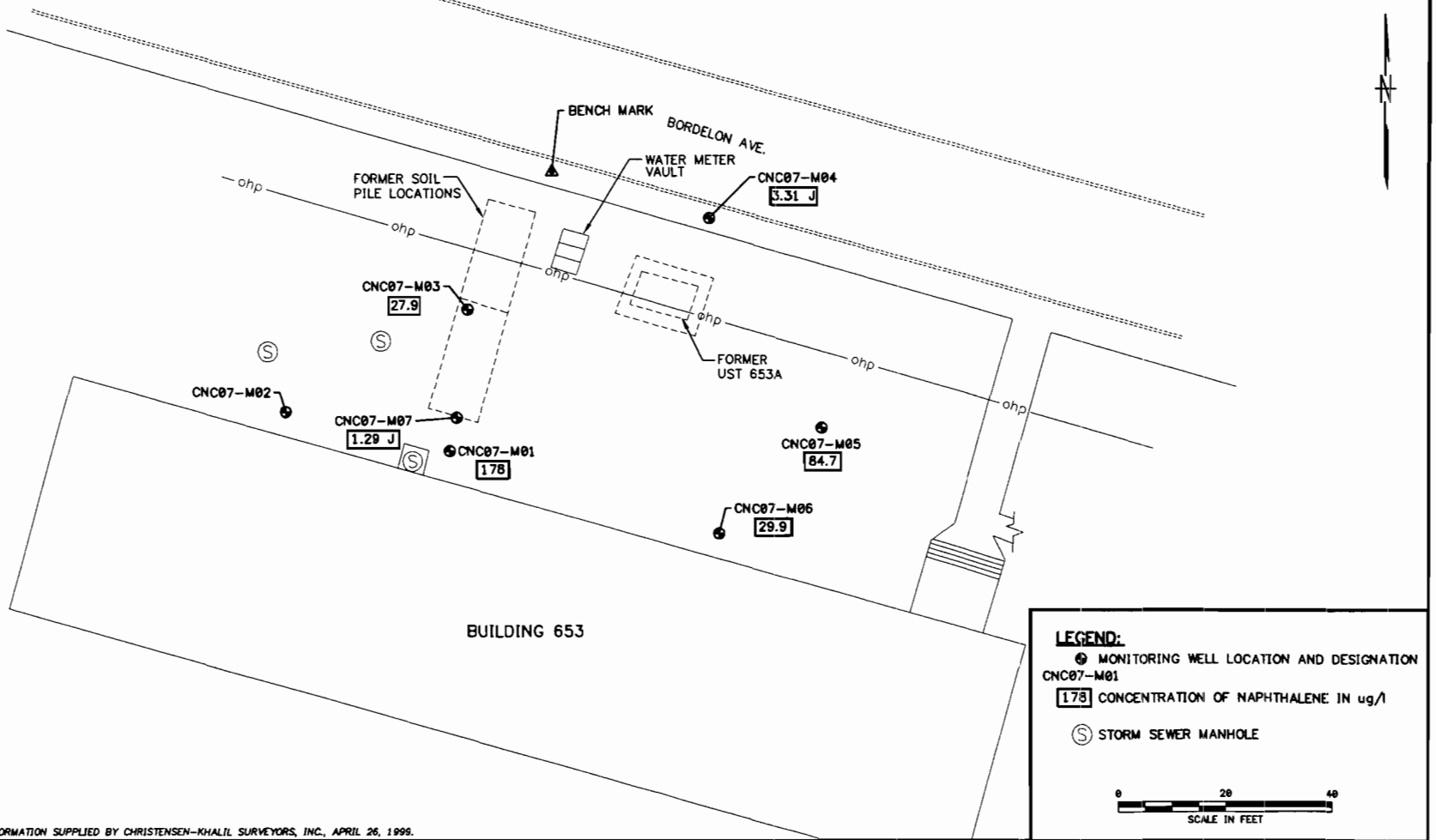
DRAWN BY DLT DATE 6/18/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE: AS NOTED

GROUNDWATER POTENTIOMETRIC MAP
FEBRUARY 21, 1999
SITE 7 BUILDING 653
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. SDN_BH.DWG ~ REV 0 ~ 1/20/98

ACAD: 7912GM33.dwg 06/24/99 DT



LEGEND:

⊕ MONITORING WELL LOCATION AND DESIGNATION CNC07-M01

[178] CONCENTRATION OF NAPHTHALENE IN ug/l

Ⓢ STORM SEWER MANHOLE

0 20 40
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 DATE: DLT 6/18/99
CHECKED BY DATE:
COST/SCHED-AREA:
SCALE: AS NOTED

NAPHTHALENE CONCENTRATIONS IN GROUNDWATER
SITE 7 BUILDING 653
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_SH.DWG - REV 0 - 1/20/98

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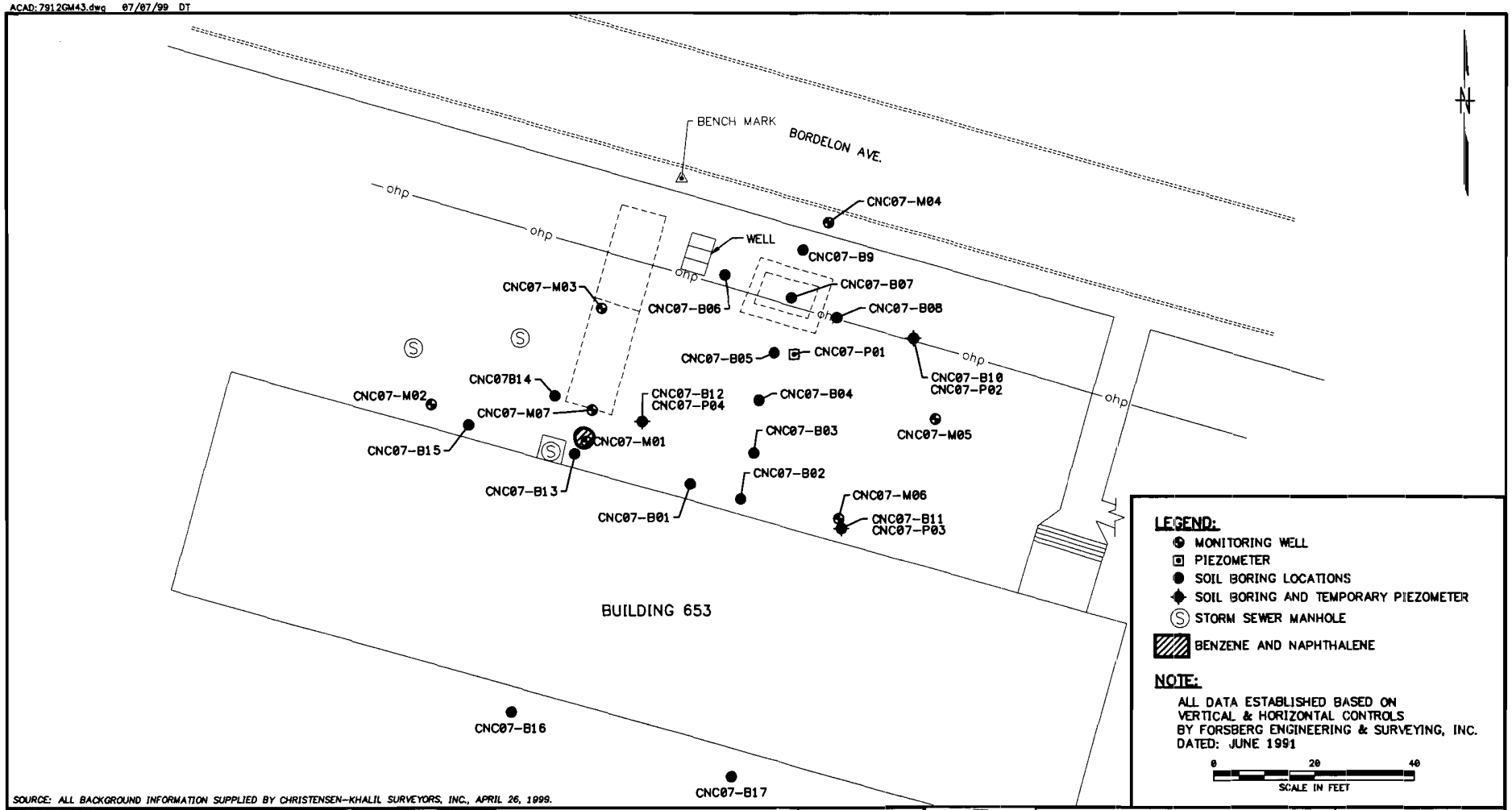


SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC., APRIL 26, 1999.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

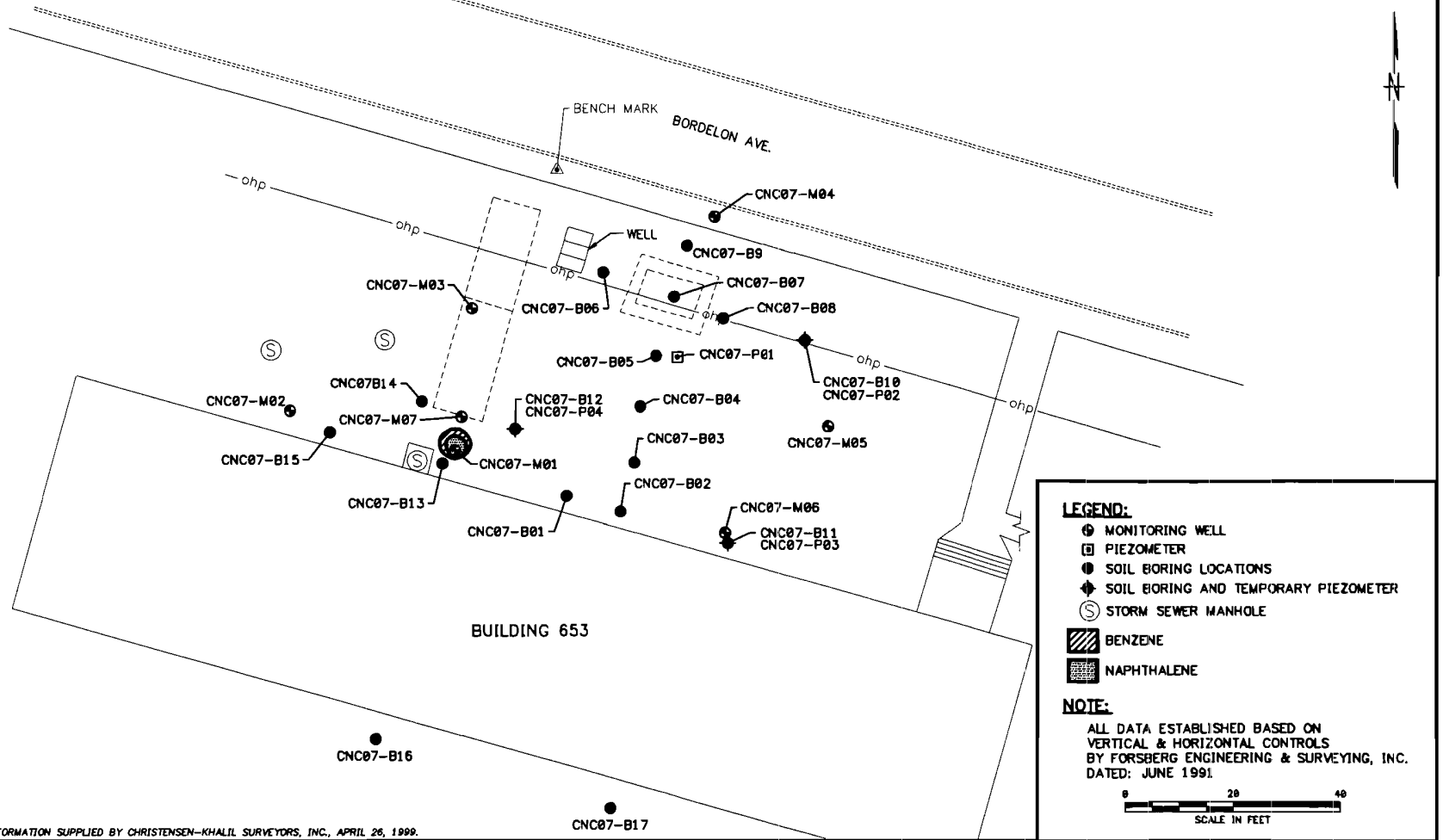
DRAWN BY DLT DATE 7/7/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

PREDICTED 10 YEAR MIGRATION
SITE 7, BUILDING 653
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

ACAD: 7912GM44.dwg 07/07/99 DT



LEGEND:

- MONITORING WELL
- PIEZOMETER
- SOIL BORING LOCATIONS
- SOIL BORING AND TEMPORARY PIEZOMETER
- STORM SEWER MANHOLE
- BENZENE
- NAPHTHALENE

NOTE:

ALL DATA ESTABLISHED BASED ON VERTICAL & HORIZONTAL CONTROLS BY FORSBERG ENGINEERING & SURVEYING, INC. DATED: JUNE 1991

0 20 40
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 7/7/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

PREDICTED 20 YEAR MIGRATION
SITE 7, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 9
REV. 0

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

APPENDIX A

UNDERGROUND STORAGE TANK ASSESSMENT REPORT – UST 653A

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

Date Received State Use Only

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

I. OWNERSHIP OF UST(S)

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

Mailing Address: P.O. Box 190010

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

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

II. SITE IDENTIFICATION AND LOCATION

Site I.D. #: Unregulated

Facility Name: Charleston Naval Base Complex, Building 653

Street Address: Bordelon Avenue

City: North Charleston, 29405-2413 County: Charleston

III. CLOSURE INFORMATION

Closure Started: 28 Jan 1997 Closure Completed: 27 Feb 1997

Number of USTs Closed: 1

N/A	SPORTENVDETCHASN
Consultant	UST Removal Contractor

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

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

LCDR Paul Rose
Name (Type or Print)

Signature

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

Date Received State Use Only

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

I. OWNERSHIP OF UST(S)

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

Mailing Address: P.O. Box 190010

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

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

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Number of USTs Closed: 1

N/A	SPORTENVDETCHASN
Consultant	UST Removal Contractor

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

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

LCDR Paul Rose
Name (Type or Print)

Signature

V. UST INFORMATION

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A. Product	Fuel oil					
B. Capacity	2,000 gal					
C. Age	1969					
D. Construction Material	Steel					
E. Month/Year of Last Use	1984					
F. Depth (ft.) To Base of Tank	6'					
G. Spill Prevention Equipment Y/N	N					
H. Overfill Prevention Equipment Y/N	N					
I. Method of Closure Removed/Filled	R					
J. Visible Corrosion or Pitting Y/N	Y					
K. Visible Holes Y/N	N					

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

UST 653A 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 USTs (attach disposal manifests)

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

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

UST 653A was moderately corroded and pitted, but no holes were found.

VI. PIPING INFORMATION

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A. Construction Material.....	Copper					
B. Distance from UST to Dispenser.....	44' See note 1					
C. Number of Dispensers.....	1 See note 1					
D. Type of System P/S.....	S					
E. Was Piping Removed from the Ground? Y/N....	Y					
F. Visible Corrosion or Pitting Y/N.....	Y					
G. Visible Holes Y/N.....	N					
H. Age.....	1969					

Note 1: The tank provided fuel oil to Building 653.

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

Corrosion was present, but no holes were found.

VII. BRIEF SITE DESCRIPTION AND HISTORY

NS 653 is a former Enlisted Men's Barracks on the Charleston Naval Base. UST 653A provided heating fuel oil to the building from 1969 to 1984, when it was disconnected and UST 653B was put into service. Tank 653B was removed some time prior to the shipyard's closure and no record of its removal could be found.

While excavating UST 653A, a set of abandoned copper lines was found ending near the tank. And at 6' below ground surface level, an uncapped, open metal pipe 8" in diameter was uncovered. A mixture of water and petroleum drained from the pipe into the UST excavation (~ 8" deep). Groundwater sample SPORT 0326-1 was collected from this water. Storm drain plans of the area indicate Building 653 being serviced by a 6" corrugated metal storm drain branch feeding an 18" reinforced concrete trunk. The storm drain drawings are not per scale and it cannot be determined if the piping which was uncovered in the pit was part of the storm drain system.

Based on relatively high FID readings, which accompanied the excavation samples, more OVA headspace soil samples were taken 2-3 feet beyond the excavation on each side of the tank pit. The samples were obtained by hand augering to a depth of approximately 4 feet below ground surface level. The FID readings ranged between 4 and 230 ppm and no additional excavation of the tank pit was performed. After the sample results were obtained, it was decided to further excavate below the two piping runs in the area of sample SPORT 0326-6 in an effort to remove the most contaminated area of soil. Approximately 5 cubic yards of contaminated soil was removed from an area about 7 feet in diameter and about 3 feet deeper than the original 3 foot piping trench excavation.

VIII. SITE CONDITIONS

		Yes	No	Unk
A.	Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells? If yes, indicate depth and location on the site map. **[throughout UST excavation]**	X		
B.	Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells? If yes, indicate location on site map and describe the odor (strong, mild, etc.) **[strong]**	X		
C.	Was water present in the UST excavation, soil borings, or trenches? If yes, how far below land surface (indicate location and depth)? UST excavation, 7' below GSL, 8" deep	X*		
D.	Did contaminated soils remain stockpiled on site after closure? If yes, indicate the stockpile location on the site map. Name of DHEC representative authorizing soil removal: _____	X**		
E.	Was a petroleum sheen or free product detected on any excavation or boring waters? If yes, indicate location and thickness on the site map. **[UST excavation, thick film]**	X		

* This was not groundwater, but water that flowed into the excavation from a previously left open drain pipe adjacent to the UST.

** Per conversation with DHEC, Mr. Tim Mettlen, and SouthDiv, Mr. Gabriel Magwood, petroleum contaminated soil may be removed from the excavation and stockpiled for disposal or remediation. The stockpiled soil has been transported to Building 1601, Detachment Charleston's Bioremediation Facility.

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 0326-1	UST excavation	Water	7'	29 Jan 97 1400	R. Jenkins	N/A
SPORT 0326-2	West end of tank	Soil	7'	29 Jan 97 1410	R. Jenkins	5205 ppm
SPORT 0326-3	East end of tank	Soil	7'	29 Jan 97 1420	R. Jenkins	1643 ppm
SPORT 0326-4	Dirt pile, composite of north half	Soil	-	29 Jan 97 1430	R. Jenkins	713 ppm
SPORT 0326-5	Dirt pile, composite of south half	Soil	-	29 Jan 97 1440	R. Jenkins	316 ppm
SPORT 0326-6	Pipe run, beneath connected pipes	Soil	2'	29 Jan 97 1450	R. Jenkins	26 ppm
SPORT 0326-7	Pipe run, beneath disconnected and abandoned pipes	Soil	2'	29 Jan 97 1500	R. Jenkins	70 ppm
SPORT 0327-1	Center of pipe run excavation	Soil	2'	31 Jan 97 1450	R. Jenkins	1.2 ppm
SPORT 0354-1	Bottom of expanded pipe excavation	Soil	6'	24 Feb 97 1400	B. Murray	1524 ppm

* = Depth Below the Surrounding Land Surface

X. SAMPLING METHODOLOGY

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

Soil and groundwater samples were taken after the removal of UST 653A. 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 extracted at the tank ends just above groundwater level. UST piping soil samples were taken under the piping at the mechanical connections. The groundwater sample was taken from the bottom center of the excavation. Biased composite samples were taken from the excavation dirt piles to characterize the soil for reuse or remediation.

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

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

XI. RECEPTORS

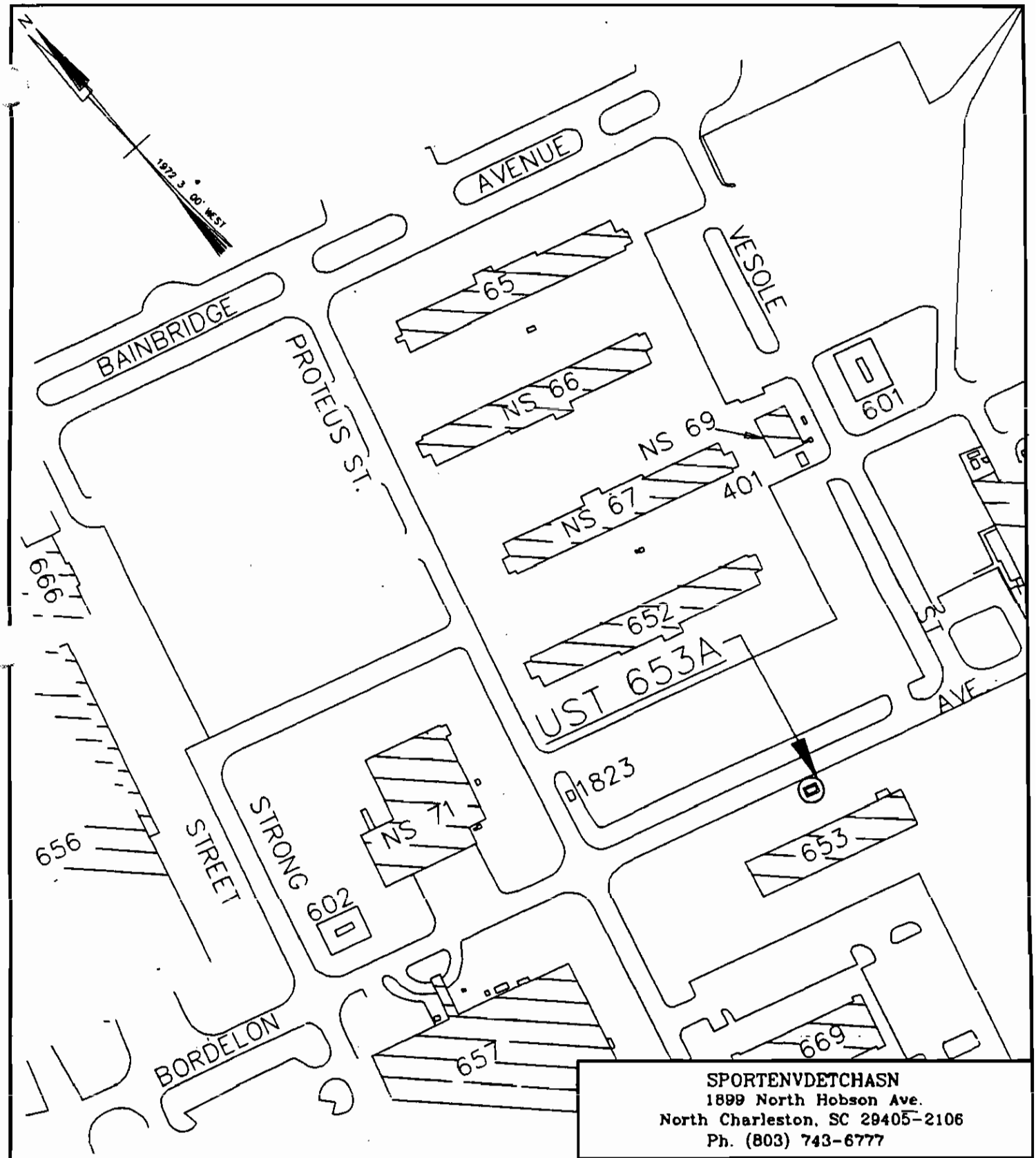
		Yes	No
A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system? If yes, indicate type of receptor, distance, and direction on site map.		X
B.	Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system? If yes, indicate type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

Attachment I

SITE MAP

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

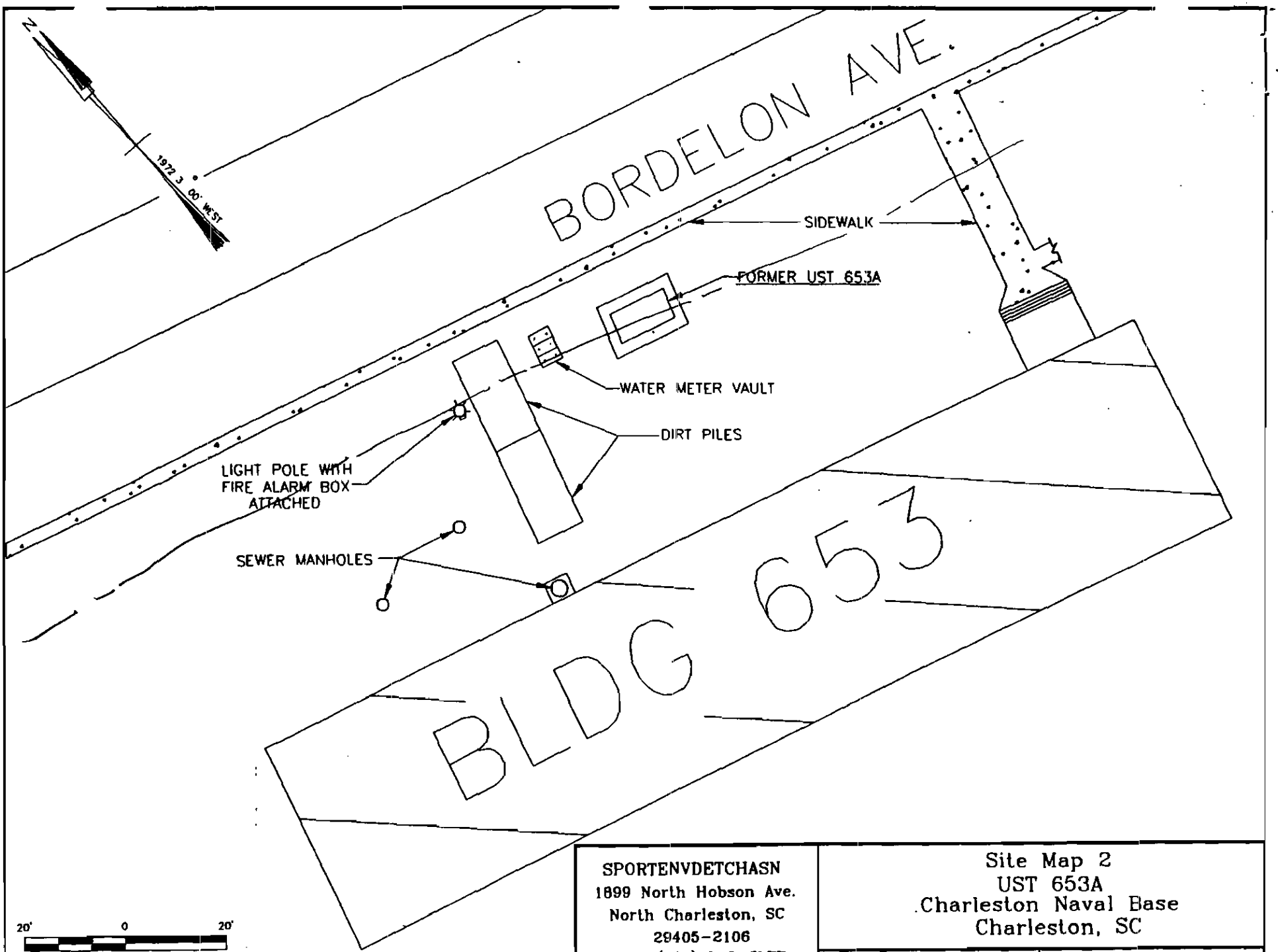
Site Maps 1, 2, 3, and 4
Photographs 1 and 2



SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC 29405-2106
Ph. (803) 743-6777

Site Map 1
UST 653A
Charleston Naval Base
Charleston, SC

DWG DATE: 3 JUN 97	DWG NAME: UST 653_1

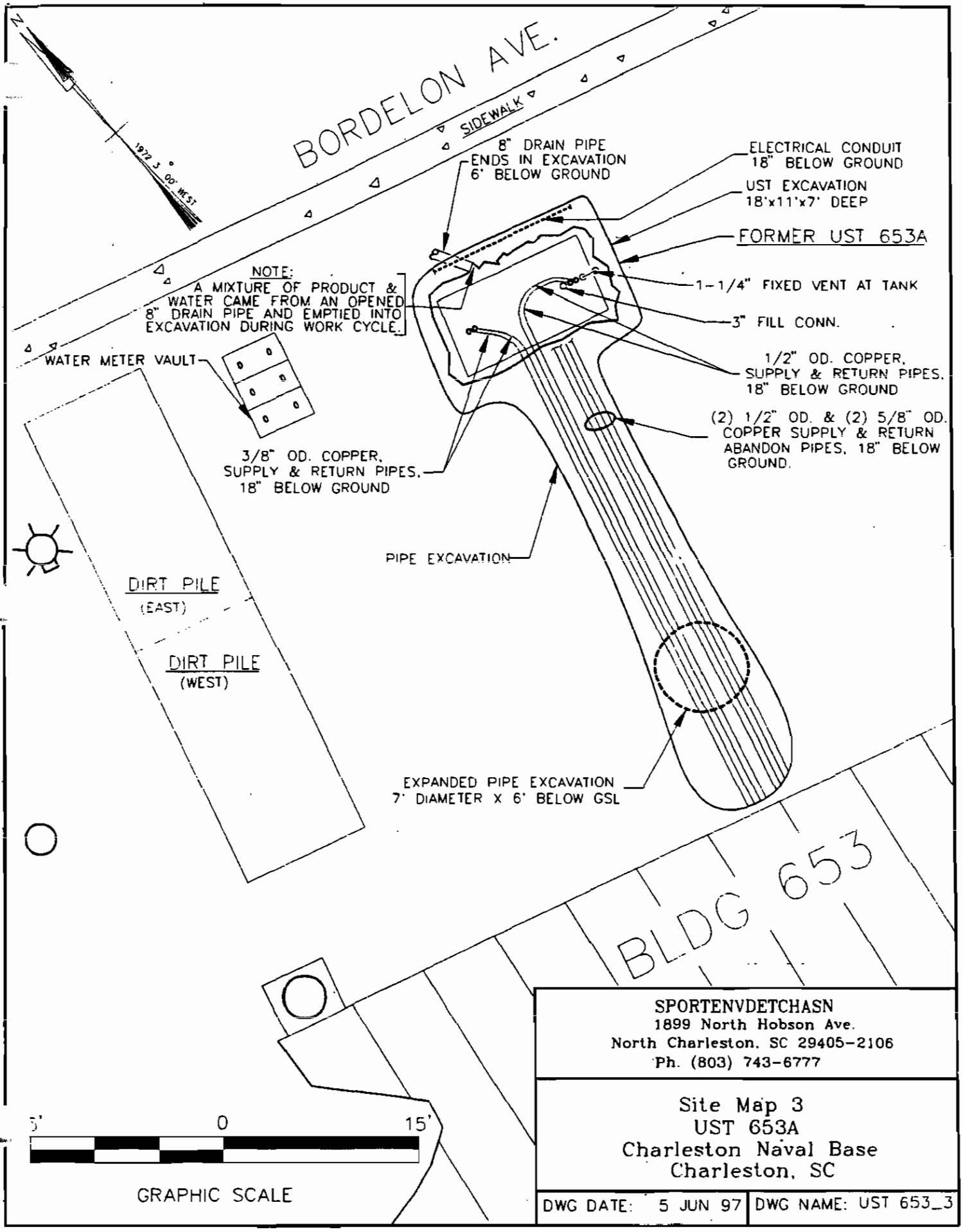


SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC
29405-2106
Ph. (803) 743-6777

Site Map 2
UST 653A
Charleston Naval Base
Charleston, SC

DWG DATE: 4 JUN 97

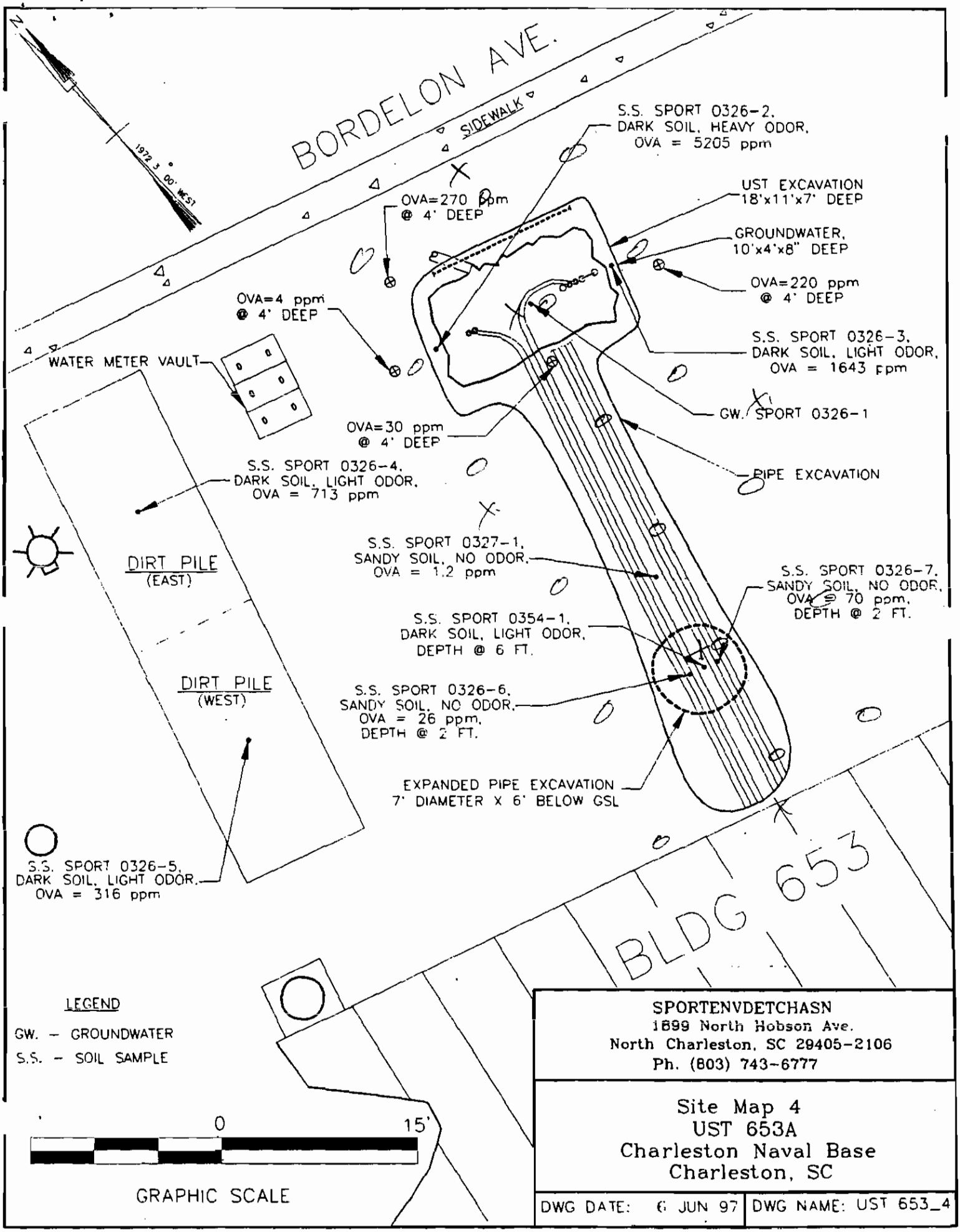
DWG NAME: UST 653_2



SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC 29405-2106
Ph. (803) 743-6777

Site Map 3
UST 653A
Charleston Naval Base
Charleston, SC

DWG DATE: 5 JUN 97	DWG NAME: UST 653_3



SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC 29405-2106
Ph. (803) 743-6777

Site Map 4
UST 653A
Charleston Naval Base
Charleston, SC

DWG DATE: 6 JUN 97 | DWG NAME: UST 653_4

UST 653A

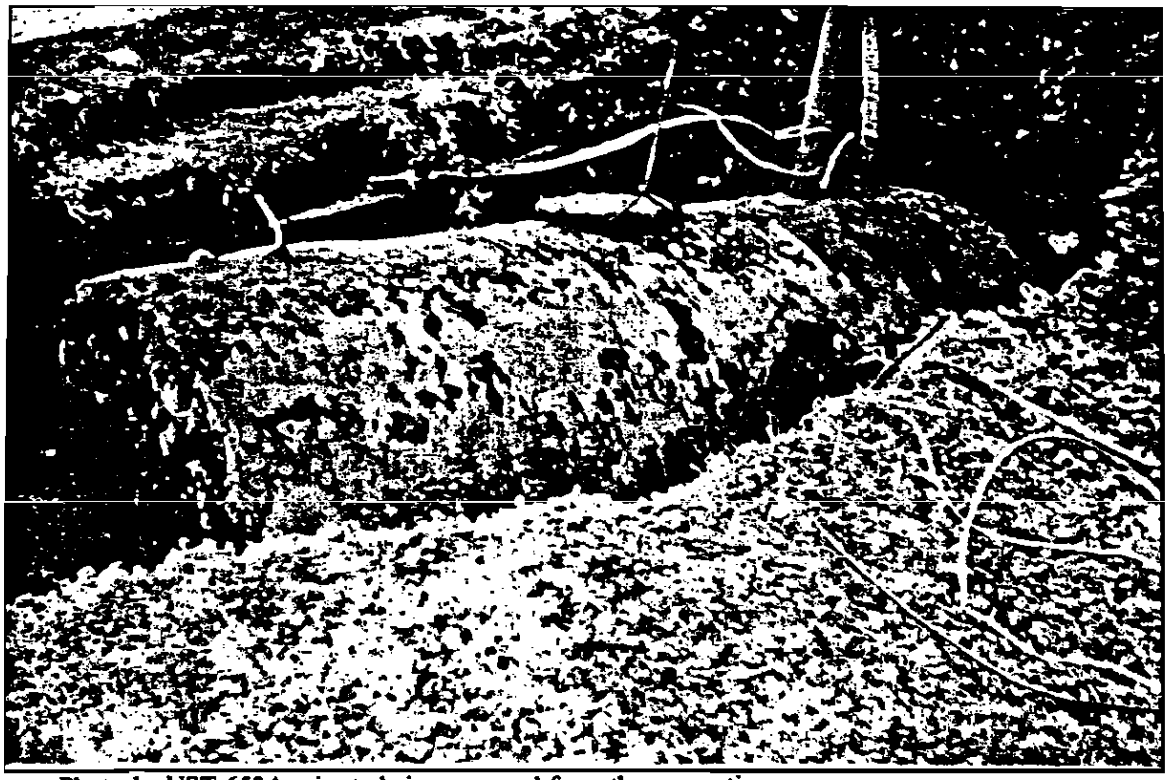


Photo 1: UST 653A prior to being removed from the excavation.

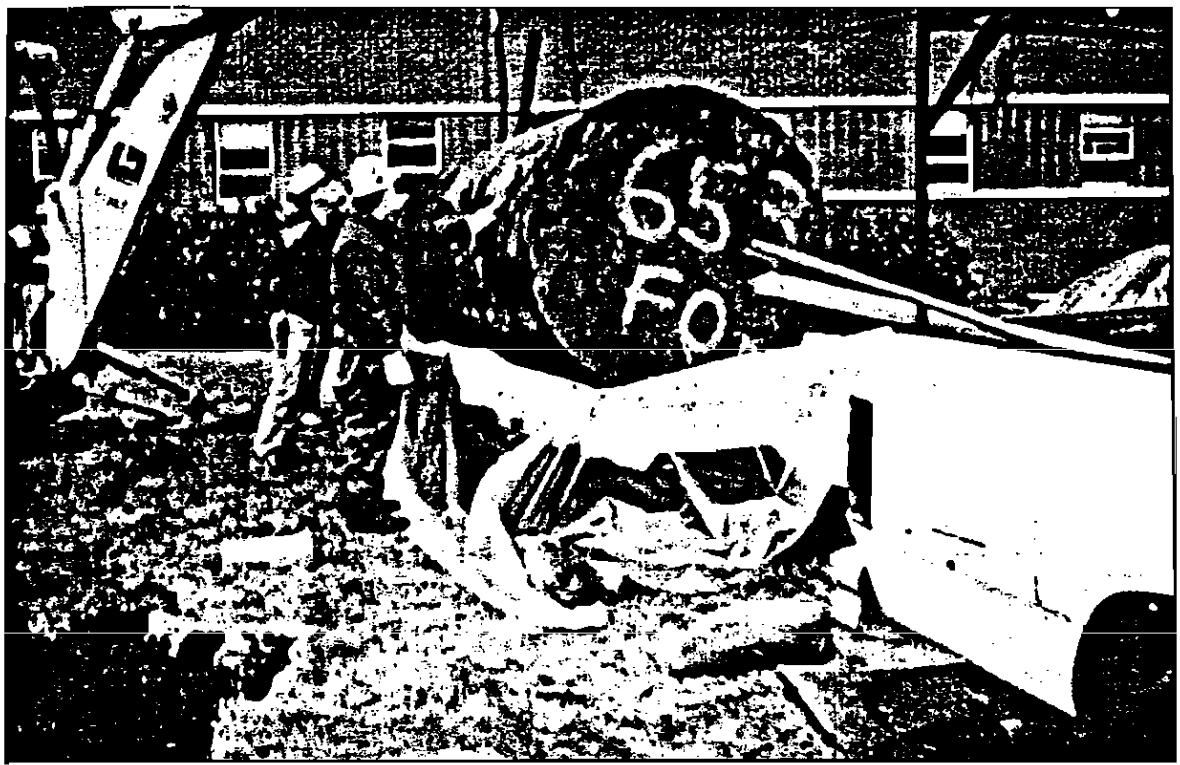


Photo 2: UST 653A being readied for transport to the cutting and cleaning pad.

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

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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-1
Lab ID : 9701582-01
Matrix : GroundH2O
Date Collected : 01/29/97
Date Received : 01/30/97
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	10.0	20.0	ug/l	10.	RMB	02/07/97	1432	97505	1
Ethylbenzene	U	0.00	10.0	20.0	ug/l	10.					
Toluene	U	0.00	10.0	20.0	ug/l	10.					
Xylenes (TOTAL)	U	0.00	10.0	20.0	ug/l	10.					
Methyl Tert Butyl Ether	U	0.00	10.0	20.0	ug/l	10.					
Naphthalene		199	10.0	20.0	ug/l	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene		817	59.0	118	ug/l	10.	WAM	02/05/97	1830	97218	2
Acenaphthylene	U	0.00	59.0	118	ug/l	10.					
Anthracene		1100	59.0	118	ug/l	10.					
Benzo(a)anthracene		1300	59.0	118	ug/l	10.					
Benzo(a)pyrene		785	59.0	118	ug/l	10.					
Benzo(b)fluoranthene		897	59.0	118	ug/l	10.					
Benzo(ghi)perylene		269	59.0	118	ug/l	10.					
Benzo(k)fluoranthene		658	59.0	118	ug/l	10.					
Chrysene		1040	59.0	118	ug/l	10.					
Dibenzo(a,h)anthracene	U	0.00	59.0	118	ug/l	10.					
Fluoranthene		7360	590	1180	ug/l	100	WAM	02/07/97	0035	97218	2
Fluorene		1160	59.0	118	ug/l	10.	WAM	02/05/97	1830	97218	2
Indeno(1,2,3-c,d)pyrene		290	59.0	118	ug/l	10.					
Naphthalene		761	59.0	118	ug/l	10.					
Phenanthrene		7870	590	1180	ug/l	100	WAM	02/07/97	0035	97218	2
Pyrene		5400	590	1180	ug/l	100					

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

cc: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-1

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

The following prep procedures were performed:

GC/MS Base/Neutral Compounds GWL 02/01/97 1500 97218 3

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

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	0.00*	(43.0 - 108.)
Nitrobenzene-d5	M610	0.00*	(35.0 - 111.)
p-Terphenyl-d14	M610	0.00*	(33.0 - 125.)
Bromofluorobenzene	BTEX-8260	97.2	(73.8 - 128.)
Dibromofluoromethane	BTEX-8260	98.0	(63.9 - 139.)
Toluene-d8	BTEX-8260	111.	(77.1 - 121.)
Bromofluorobenzene	MTBE-8260	97.2	(73.8 - 128.)
Dibromofluoromethane	MTBE-8260	98.0	(63.9 - 139.)
Toluene-d8	MTBE-8260	111.	(77.1 - 121.)
Bromofluorobenzene	NAP-8260	97.2	(73.8 - 128.)
Dibromofluoromethane	NAP-8260	98.0	(63.9 - 139.)
Toluene-d8	NAP-8260	111.	(77.1 - 121.)

M = Method	Method-Description
M1	EPA 8260
M2	EPA 8270
M3	EPA 3510

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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-1

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

PO Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(803) 556-8171 • Fax (803) 766-1178

9701582-01

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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-2
Lab ID : 9701582-02
Matrix : Soil
Date Collected : 01/29/97
Date Received : 01/30/97
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	10.0	20.0	ug/kg	10.	JAC	02/04/97	1903	97389	1
Ethylbenzene	U	2.60	10.0	20.0	ug/kg	10.					
Toluene	U	0.00	10.0	20.0	ug/kg	10.					
Xylenes (TOTAL)	U	0.00	10.0	20.0	ug/kg	10.					
Naphthalene		678	10.0	20.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	J	3150	1640	3280	ug/kg	10.	WAM	02/05/97	2222	97266	2
Acenaphthylene	U	0.00	1640	3280	ug/kg	10.					
Anthracene		4530	1640	3280	ug/kg	10.					
Benzo(a)anthracene		5120	1640	3280	ug/kg	10.					
Benzo(a)pyrene	J	2790	1640	3280	ug/kg	10.					
Benzo(b)fluoranthene	J	2660	1640	3280	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	1640	3280	ug/kg	10.					
Benzo(k)fluoranthene	J	3080	1640	3280	ug/kg	10.					
Chrysene		4130	1640	3280	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1640	3280	ug/kg	10.					
Fluoranthene		17500	1640	3280	ug/kg	10.					
Fluorene		4460	1640	3280	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	1640	3280	ug/kg	10.					
Naphthalene	J	2850	1640	3280	ug/kg	10.					
Phenanthrene		19000	1640	3280	ug/kg	10.					
Pyrene		13000	1640	3280	ug/kg	10.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds MS 02/03/97 1000 97266 3

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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-2

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	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	102.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	84.4	(63.4 - 136.)
Toluene-d8	BTEX-8260	94.3	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	102.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	84.4	(63.4 - 136.)
Toluene-d8	NAP-8260	94.3	(72.1 - 137.)

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

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

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/T
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

Sample ID : SPORT0326-2

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

PO Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(803) 556-8171 • Fax (803) 766-1178

9701582-02

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

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: NPWC00196 Report Date: February 10, 1997

Sample ID	: SPORT0326-3
Lab ID	: 9701582-03
Matrix	: Soil
Date Collected	: 01/29/97
Date Received	: 01/30/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	5.00	10.0	ug/kg	5.0	JAC	02/06/97	1455	97389	1
Ethylbenzene	U	0.00	5.00	10.0	ug/kg	5.0					
Toluene	U	0.00	5.00	10.0	ug/kg	5.0					
Xylenes (TOTAL)	U	0.00	5.00	10.0	ug/kg	5.0					
Naphthalene		162	5.00	10.0	ug/kg	5.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	163	330	ug/kg	1.0	WAM	02/05/97	2254	97266	2
Acenaphthylene	U	0.00	163	330	ug/kg	1.0					
Anthracene	U	0.00	163	330	ug/kg	1.0					
Benzo(a)anthracene		443	163	330	ug/kg	1.0					
Benzo(a)pyrene	J	218	163	330	ug/kg	1.0					
Benzo(b)fluoranthene	J	218	163	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	163	330	ug/kg	1.0					
Benzo(k)fluoranthene	J	241	163	330	ug/kg	1.0					
Chrysene		388	163	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	163	330	ug/kg	1.0					
Fluoranthene		2100	163	330	ug/kg	1.0					
Fluorene	U	0.00	163	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	163	330	ug/kg	1.0					
Naphthalene	U	0.00	163	330	ug/kg	1.0					
Phenanthrene	J	293	163	330	ug/kg	1.0					
Pyrene		1540	163	330	ug/kg	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds MS 02/03/97 1000 97266 3

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	OEL	EPI
FL	E87156/87294	E87472/T
NC	233	
SC	10120	10582
TN	02934	02934

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

cc: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	79.9	(30.0 - 115.)
Nitrobenzene-d5	M610	78.9	(23.0 - 120.)
p-Terphenyl-d14	M610	84.7	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	93.6	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	103.	(63.4 - 136.)
Toluene-d8	BTEX-8260	96.0	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	93.6	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	103.	(63.4 - 136.)
Toluene-d8	NAP-8260	96.0	(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

PO Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(803) 556-8171 • Fax (803) 766-1178

9701582-03

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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-4
Lab ID : 9701582-04
Matrix : Soil
Date Collected : 01/29/97
Date Received : 01/30/97
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	02/06/97	1106	97389	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene		503	165	330	ug/kg	1.0	WAM	02/05/97	2326	97266	2
Acenaphthylene	U	0.00	165	330	ug/kg	1.0					
Anthracene		826	165	330	ug/kg	1.0					
Benzo(a)anthracene		1170	165	330	ug/kg	1.0					
Benzo(a)pyrene		734	165	330	ug/kg	1.0					
Benzo(b)fluoranthene		658	165	330	ug/kg	1.0					
Benzo(ghi)perylene		375	165	330	ug/kg	1.0					
Benzo(k)fluoranthene		721	165	330	ug/kg	1.0					
Chrysene		855	165	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	165	330	ug/kg	1.0					
Fluoranthene		2880	165	330	ug/kg	1.0					
Fluorene		740	165	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene		385	165	330	ug/kg	1.0					
Naphthalene	J	316	165	330	ug/kg	1.0					
Phenanthrene		3360	165	330	ug/kg	1.0					
Pyrene		2320	165	330	ug/kg	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds MS 02/03/97 1000 97266 3

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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	79.6	(30.0 - 115.)
Nitrobenzene-d5	M610	77.4	(23.0 - 120.)
p-Terphenyl-d14	M610	83.4	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	106.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	104.	(63.4 - 136.)
Toluene-d8	BTEX-8260	113.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	106.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	104.	(63.4 - 136.)
Toluene-d8	NAP-8260	113.	(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	E87472/87
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: NPWC00196 Report Date: February 10, 1997

Sample ID	: SPORT0326-5
Lab ID	: 9701582-05
Matrix	: Soil
Date Collected	: 01/29/97
Date Received	: 01/30/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	5.00	10.0	ug/kg	5.0	JAC	02/06/97	1242	97389	1
Ethylbenzene	U	0.00	5.00	10.0	ug/kg	5.0					
Toluene	U	0.00	5.00	10.0	ug/kg	5.0					
Xylenes (TOTAL)	U	0.00	5.00	10.0	ug/kg	5.0					
Naphthalene	U	0.00	5.00	10.0	ug/kg	5.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	165	330	ug/kg	1.0	WAM	02/05/97	2358	97266	2
Acenaphthylene	U	0.00	165	330	ug/kg	1.0					
Anthracene	U	0.00	165	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	165	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	165	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	165	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	165	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	165	330	ug/kg	1.0					
Chrysene	U	0.00	165	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	165	330	ug/kg	1.0					
Fluoranthene	U	0.00	165	330	ug/kg	1.0					
Fluorene	U	0.00	165	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	165	330	ug/kg	1.0					
Naphthalene	U	0.00	165	330	ug/kg	1.0					
Phenanthrene	U	0.00	165	330	ug/kg	1.0					
Pyrene	U	0.00	165	330	ug/kg	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds MS 02/03/97 1000 97266 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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-5

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

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

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	78.4	(30.0 - 115.)
Nitrobenzene-d5	M610	83.6	(23.0 - 120.)
p-Terphenyl-d14	M610	94.7	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	98.9	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	102.	(63.4 - 136.)
Toluene-d8	BTEX-8260	101.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	98.9	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	102.	(63.4 - 136.)
Toluene-d8	NAP-8260	101.	(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).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-5

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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9701582-05

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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-6
Lab ID : 9701582-06
Matrix : Soil
Date Collected : 01/29/97
Date Received : 01/30/97
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	02/06/97	1039	97389	
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	J	2200	1640	3280	ug/kg	10.	WAM	02/06/97	0031	97266	2
Acenaphthylene	U	0.00	1640	3280	ug/kg	10.					
Anthracene		4760	1640	3280	ug/kg	10.					
Benzo(a)anthracene		8100	1640	3280	ug/kg	10.					
Benzo(a)pyrene		6430	1640	3280	ug/kg	10.					
Benzo(b)fluoranthene		6430	1640	3280	ug/kg	10.					
Benzo(ghi)perylene		3640	1640	3280	ug/kg	10.					
Benzo(k)fluoranthene		5710	1640	3280	ug/kg	10.					
Chrysene		8300	1640	3280	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1640	3280	ug/kg	10.					
Fluoranthene		17400	1640	3280	ug/kg	10.					
Fluorene	J	2950	1640	3280	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene		3480	1640	3280	ug/kg	10.					
Naphthalene	U	0.00	1640	3280	ug/kg	10.					
Phenanthrene		15600	1640	3280	ug/kg	10.					
Pyrene		12800	1640	3280	ug/kg	10.					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds MS 02/03/97 1000 97266

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

cc: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-6

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	102.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	95.3	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	99.3	(63.4 - 136.)
Toluene-d8	BTEX-8260	103.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	95.3	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	99.3	(63.4 - 136.)
Toluene-d8	NAP-8260	103.	(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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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

Sample ID : SPORT0326-6

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

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9701582-06

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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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-7
Lab ID : 9701582-07
Matrix : Soil
Date Collected : 01/29/97
Date Received : 01/30/97
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	02/04/97	1653	97389	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	02/06/97	0944	97389	1
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	164	330	ug/kg	1.0	WAM	02/06/97	0103	97266	2
Acenaphthylene	U	0.00	164	330	ug/kg	1.0					
Anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	164	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	164	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Chrysene	U	0.00	164	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	164	330	ug/kg	1.0					
Fluoranthene	U	0.00	164	330	ug/kg	1.0					
Fluorene	U	0.00	164	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	164	330	ug/kg	1.0					
Naphthalene	U	0.00	164	330	ug/kg	1.0					
Phenanthrene	U	0.00	164	330	ug/kg	1.0					
Pyrene	U	0.00	164	330	ug/kg	1.0					

The following prep procedures were performed:
GC/MS Base/Neutral Compounds MS 02/03/97 1000 97266 3

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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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	81.6	(30.0 - 115.)
Nitrobenzene-d5	M610	86.0	(23.0 - 120.)
p-Terphenyl-d14	M610	91.6	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	132.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	92.0	(63.4 - 136.)
Toluene-d8	BTEX-8260	120.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	132.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	92.0	(63.4 - 136.)
Toluene-d8	NAP-8260	120.	(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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9701582-07

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: NPWC00196 Report Date: February 10, 1997

Sample ID	: SPORT0326-8
Lab ID	: 9701582-08
Matrix	: Soil
Date Collected	: 01/29/97
Date Received	: 01/30/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	02/06/97	1011	97389	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Methyl Tert Butyl Ether	U	0.00	1.00	2.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	91.7	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	101.	(63.4 - 136.)
Toluene-d8	BTEX-8260	102.	(72.1 - 137.)
Bromofluorobenzene	MTBE-8260	91.7	(53.5 - 154.)
Dibromofluoromethane	MTBE-8260	101.	(63.4 - 136.)
Toluene-d8	MTBE-8260	102.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	91.7	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	101.	(63.4 - 136.)
Toluene-d8	NAP-8260	102.	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260

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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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-8

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.

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Karen Blakeney
Reviewed By

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9701582-08

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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: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-9
Lab ID : 9701582-09
Matrix : GroundH2O
Date Collected : 01/29/97
Date Received : 01/30/97
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/l	1.0	RMB	02/06/97	1539	97505	1
Ethylbenzene	U	0.00	1.00	2.00	ug/l	1.0					
Toluene	U	0.00	1.00	2.00	ug/l	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/l	1.0					
Methyl Tert Butyl Ether	U	0.00	1.00	2.00	ug/l	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	94.8	(73.8 - 128.)
Dibromofluoromethane	BTEX-8260	107.	(63.9 - 139.)
Toluene-d8	BTEX-8260	114.	(77.1 - 121.)
Bromofluorobenzene	MTBE-8260	94.8	(73.8 - 128.)
Dibromofluoromethane	MTBE-8260	107.	(63.9 - 139.)
Toluene-d8	MTBE-8260	114.	(77.1 - 121.)
Bromofluorobenzene	NAP-8260	94.8	(73.8 - 128.)
Dibromofluoromethane	NAP-8260	107.	(63.9 - 139.)
Toluene-d8	NAP-8260	114.	(77.1 - 121.)

M = Method	Method-Description
M 1	EPA 8260

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9701582-09

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/1
NC	233	
SC	10120	10582
TN	02934	02934

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

cc: NPWC00196 Report Date: February 10, 1997

Sample ID : SPORT0326-9

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.

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Karen Blakeney
Reviewed By

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9701582-09

NC00196

CHAIN OF CUSTODY RECORD

970582

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Charleston, South Carolina 29417
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Page 1 of 1

Client Name/Facility Name: SPORTENY DETCHASN

Collected by/Company: R Jenkins SPORTENY DETCHASN

CCL 25387

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX + NAPTH	AAH	Remarks
01	SPORTO326-1	1/29/97	1400				X	5																Y	X	UST NS653-1 GW
02	SPORTO326-2	1/29/97	1410		X		X	2																a	X	UST NS653-2 SOIL
03	SPORTO326-3	1/29/97	1420		X		X	2																a	X	UST NS653-3 SOIL
04	SPORTO-326-4	1/29/97	1430		X	X	X	2																a	X	UST NS653-4 SOIL DIRT PILE
05	SPORTO326-5	1/29/97	1440		X	X		2																a	X	UST NS653-5 SOIL DIRT PILE
06	SPORTO326-6	1/29/97	1450		X		X	2																a	X	UST NS653-6 SOIL
07	SPORTO326-7	1/29/97	1500		X		X	2																a	X	UST NS653-7 SOIL
08	SPORTO326-8	1/27/97	1117		X		X	1																X		UST NS653 TRIP BLANK SOIL
09	SPORTO326-9	1/29/97	1117				X	3																X		UST NS653 TRIP BLANK WATER

a) BTEX + NAPTH

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

Remarks

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	1/30/97	0945	[signature]	[signature]	1/30/97	1440	Crystal Henderson
Relinquished by: Crystal Henderson	Date: 1-30-97	Time: 15:15	Received by lab by: Dionne Francis	Date: 1/30/97	Time: 15:0	Remarks:	

White = sample collector Yellow = file Pink = with report

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	CHL	EPI
FL	E87156/87294	E87472/87495
NC	233	
SC	10120	10582
TN	02934	02934

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

cc: NPWC00196 Report Date: February 12, 1997

Sample ID	: SPORT0927-1
Lab ID	: 9702026-01
Matrix	: Soil
Date Collected	: 01/31/97
Date Received	: 02/03/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	SHJ	02/10/97	1713	97652	1
Ethylbenzene	J	1.66	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene		2.84	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	165	330	ug/kg	1.0	JCB	02/07/97	1918	97421	2
Acenaphthylene	U	0.00	165	330	ug/kg	1.0					
Anthracene	U	0.00	165	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	165	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	165	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	165	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	165	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	165	330	ug/kg	1.0					
Chrysene	U	0.00	165	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	165	330	ug/kg	1.0					
Fluoranthene	U	0.00	165	330	ug/kg	1.0					
Fluorene	U	0.00	165	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	165	330	ug/kg	1.0					
Naphthalene	U	0.00	165	330	ug/kg	1.0					
Phenanthrene	U	0.00	165	330	ug/kg	1.0					
Pyrene	U	0.00	165	330	ug/kg	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	MS	02/06/97	1200	97421	3

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9702026-01

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPA
FL	E87156/87294	EE87472/87458
NC	233	
SC	10120	10931
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

Sample ID : SPORT0327-1

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	81.2	(30.0 - 115.)
Nitrobenzene-d5	M610	76.6	(23.0 - 120.)
p-Terphenyl-d14	M610	92.3	(37.5 - 128.)
Bromofluorobenzene	BTEX-8260	113.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	100.	(63.4 - 136.)
Toluene-d8	BTEX-8260	101.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	113.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	100.	(63.4 - 136.)
Toluene-d8	NAP-8260	101.	(72.1 - 137.)

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

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

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

Karen Blakeney
Reviewed By

GENERAL ENGINEERING LABORATORIES

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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: NPWC00196 Report Date: February 12, 1997

Sample ID	: SPORT0327-2
Lab ID	: 9702026-02
Matrix	: Soil
Date Collected	: 01/31/97
Date Received	: 02/03/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	SHJ	02/10/97	1557	97652	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	101.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	96.1	(63.4 - 136.)
Toluene-d8	BTEX-8260	92.4	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	101.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	96.1	(63.4 - 136.)
Toluene-d8	NAP-8260	92.4	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260

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9702026-02

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	ERI
FL	E87156/87284	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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

cc: NPWC00196 Report Date: February 12, 1997 Page 2 of 2

Sample ID : SPORT0327-2

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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9702026-02

NPW 3196

CHAIN OF CUSTODY RECORD

9702026

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Charleston, South Carolina 29414
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

Page 1 of 1

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: SPORTENVDETCHASN

CCL 25442

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrate/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX PIUS NAPTHALENE	PAH	Remarks
01	SPORTΦ327-1	1/31/97	145Φ		X		X	2																X	X	UST NS 653-8 Soil
02	SPORTΦ327-2	1/31/97	1437		X		X	1																X		UST NS653 VOA Soil TripBlank

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

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

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Kendall Jenkins	1/31/97	1515	W. R. Hiers, Jr.	W. R. Hiers, Jr.	2/3/97	1434	[illegible]
[illegible]	2357	1600	Dionne Frazier		2/3/97	1600	

Remarks:

White = sample collector Yellow = file Pink = with report

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: NPWC00196 Report Date: March 05, 1997

Sample ID : SPORT0354-1
Lab ID : 9702511-01
Matrix : Soil
Date Collected : 02/24/97
Date Received : 02/25/97
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	SHJ	02/28/97	1251	98465	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	J	1.14	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	165	329	ug/kg	10.	WAM	02/27/97	2012	98365	2
Acenaphthylene	U	0.00	165	329	ug/kg	10.					
Anthracene	U	0.00	165	329	ug/kg	10.					
Benzo(a)anthracene		691	165	329	ug/kg	10.					
Benzo(a)pyrene	U	59.2	165	329	ug/kg	10.					
Benzo(b)fluoranthene	U	118	165	329	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	165	329	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	165	329	ug/kg	10.					
Chrysene	U	0.00	165	329	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	165	329	ug/kg	10.					
Fluoranthene	U	0.00	165	329	ug/kg	10.					
Fluorene	U	0.00	165	329	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	165	329	ug/kg	10.					
Naphthalene	U	0.00	165	329	ug/kg	10.					
Phenanthrene	U	0.00	165	329	ug/kg	10.					
Pyrene	U	0.00	165	329	ug/kg	10.					

e following prep procedures were performed:
GC/MS Base/Neutral Compounds MCS 02/27/97 1306 98365 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: NPWC00196 Report Date: March 05, 1997

Sample ID : SPORT0354-1

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
Fluorobiphenyl	M610	64.2	(30.0 - 115.)
Nitrobenzene-d5	M610	32.1	(23.0 - 120.)
p-Terphenyl-d14	M610	100.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	131.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	122.	(63.4 - 136.)
Toluene-d8	BTEX-8260	104.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	131.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	122.	(63.4 - 136.)
Toluene-d8	NAP-8260	104.	(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
NC	233	
SC	10120	10582
TN	02934	02934

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

cc: NPWC00196 Report Date: March 05, 1997

Sample ID : SPORT0354-1

M = Method	Method-Description

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

Karen Blakeney

Reviewed By

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9702511-01

NPVC 00196

UST - 653

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Charleston, South Carolina 29414
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9702511

Page 1 of 1

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	PCB's	Cyanide	Coliform - specify type	BTEX & NAPTHALENE	MW	Remarks
01 SPORTΦ354-1	2/24/97	1500		X		X	2																X	X	UST-653 ADJACENT TANK
																									NOTE: SOIL TRIP BLANK USED FROM AST 655 (SPORTΦ351-5)
																									NOTE: SEE ATTACHED SHEET FOR LEVELS.

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

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

CCL 25874

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	2/24/97	1535	[signature]	[signature]	2/25/97	1430	[signature]
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
[signature]	2/25/97	14:55	Dionne Frazier	2/25/97	1455		

White = sample collector Yellow = file Pink = with report

Attachment III

Certificate of Disposal (tank)

UST Certificate of Disposal

CONTRACTOR

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

Telephone (803) 743-6482

TANK ID & LOCATION

653A; Building 653, Bordelon Ave., Charleston Naval Base, N. Charleston, SC

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

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

CLEANING/DISPOSAL METHOD

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

DISPOSAL CERTIFICATION

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

Sidney C. Ladson — 6/4/97 (Date)

UST Certificate of Disposal

CONTRACTOR

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

Telephone (803) 743-6482

TANK ID & LOCATION

UST Bldg 650, Charleston Naval Base, Halsey St., N. Charleston, SC.

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

TYPE OF TANK	SIZE (GAL)
Fuel oil	1000 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 11-7-97

Sidney Ladson (Name) (Date)

APPENDIX B

GEOLOGIC BORING LOGS

SOUTHNAVFAC

LOG OF BORING CNC07-B01

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
*	*		ND							
		DP	RECOVERY				SC	SC	Clayey Sand, Brown, fine to medium grained	
5									Silty Clay, Dark gray face of fine to medium sand, soft, wet	
				T.O.B.						
10										
									Field Screening Data	
									* Collect 075FB01/01	
									Collect 07GFB01	
20										
25										
30										
35										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CWC07-B02

Page 1 of 1

PROJECT NO: 7912	PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE	SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
*	*	↑ DP	ND				SP	SP	Sand, Brownish tan, very fine to fine sand, damp	
5			Water Screen						Clayey Sand, Dark Brown, Clayey (~10-15%) very fine to fine Sand	
			E.O.B.							
10										
15									* Field Screening Data Collect 07SFB0201 Collect 07GFB02	
20										
25										
30										
35										
40										

SITE NUMBER:

SOUTHNAVFAC

LOG OF BORING CWC07-B03

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0		↑	ND				SP	SP	Sand, Tan, very fine to fine sand, damp (SP) (wet at 2-3 feet).	
*	*	DP	ND							
5			ND				SC		Clayey Sand, Dark Gray, clayey (~20%) very fine to fine sand, wet	
			E.O.B.							
10										
20										
25										
30										
35										
40										

Field Screening Data

+ Collect 075FB0302

Collect 076WB03

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-B04

Page 1 of 1

PROJECT NO: 7912	PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE	SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
*	*	DP	NO NO (2 WET SCREEN)				SM	sm	Silty Sand, Black to Dark Brown, - Silty (~15-20%) Very fine to fine sand, damp Clayey Sand, Dark Brown, (~30 to 45%) fine to very fine sand) wet	
5										
			E.O.B.							
10										
15										
20									Field Screening Data + collect 075FB0402 Collect 076FB04	
25										
30										
35										
40										

ACE NUMBER

SOUTHNAVFAC

LOG OF BORING CXC07-B05

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 633
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0		↑	ND				SC/CL	SC/CL	Clayey Sand and Sandy Clay ... Dark Brown, fine to very fine sand, damp	
X	X	DP	ND				CL		Silty Clay, Dark Gray silty clay, dense, wet	
5										
		↓	E.O.B.							
10										
15										
20									Field Screening Data	
									X Collect 075FB0502	
25									Collect 076FB05	
30										
35										
40										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-806

Page 1 of 1

PROJECT NO: 7912	PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 11/5/99
DRILLING COMPANY: US PROBE	SURFACE ELEVATION: Feet -
DRILLING METHOD: DIRECT PUSH	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0	x		ND ND				CL	CL	Sandy Clay, Brown, fine to medium sand, ~20% Clay, damp (wet at 2 to 3 feet)	
5										
		E.O.B								
10										
15										
20									Field Screening Data * Collect 07SFB0602 Collect 07GFB06	
25										
30										
35										
40										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-B07

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet -
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0	*		1 2				SM	SM	Silty Sand, Brown, silty (30%) fine to fine sand w/shell fragments and some gravel (Assembler Fill) damp	
5										
		E	0.0							
10										
15										
20										
25										
30										
35										
40										

Field Screening Data

* Collect 07SFB0702
collect 07GFB07

USCE NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-B08

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet ~
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			ND				sp	SP	Sand, Tan, fine to very fine sand, damp, loose. (SP)	
*	x		ND							
5							sm	sm	Silty Sand, Dark Grey to Dark Brown, silty (~45%), fine to very fine sand, damp (wet 2 to 3 feet)	
		E.O.B.								
10										
15										
20										
25										
30										
35										
40										

Field Screening Data

* Collect 07SFB0802
Collect 07GFB08

CS NUMBER:

SOUTHNAVFAC

LOG OF BORING RNC07-B09

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/15/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet -
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
		↑	ND				SM	SM	Clayey Silty Sand, Dark Brown, Clayey	
*	*	DP	ND				SP	SP	(~10-15%) silty vr. fine sand, damp, loose Sand, Brown, very fine to fine sand with trace of silt.	
5							SM/CL	SM/CL	Silty Sand/Clayey Sand, Brown, Dark Grey, very fine to fine sand, (wet at 2 to 3 feet)	
		T.D.B.								
10										
									Field Screening Data	
20									* Collect 07SFB0902	
									Collect 07GFB09	
25										
30										
35										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-B10

Page 1 of 1

PROJECT NO: 7912	PROJECT NAME: SITE 7 BUILDING
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H	DATE DRILLED: 1/19/99
DRILLING COMPANY: US PROBE	SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH	BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE	GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0		↑	ND						Light Brown Sand well graded, <10% CLAY F to MF. Poorly Cohesive	
			370						Silty CLAY, light Gray, (60% clay) ~~Poorly~~ Very Cohesive,	
*	*	4pp	2500		E.O.B.					
5									CLAY, Gray Somewhat Silty (90%) very Cohesive, firm, damp	
10										
15										
20									Field Screening Data	
									* Collect 07SFB1003	
25									Collect 07GFB100	
30										
35										
40										

CE NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-B11

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/19/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0		↑ DP ↓	2 190 Good						Sand, Black to Dark Brown, M-Sub ~55% well graded, some organics	
5			E.O.B						Clayey Sand, Brown, fine grained (~30%) clay, somewhat cohesive	
10										
20										
25										
30										
35										
40										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING SWC07-B12

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/20/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: Pam Jackson

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0		↑ DP ↓ E.O.B	ND 2 50						Sand, Black medium grained, clayey sand, light grey, (40%) clay, Clay, Dark Grey, root material,	
5										
10										
15										
20										
25										
30										
35										
40										

ICE NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-B13

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: site 7 Building 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, Zone 14
DATE DRILLED: 1/19/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet
DRILLING METHOD: Direct Push
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: Pam Jackson

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0		↑ OP ↓	2						Sand, BLACK, fine grained	
			48							
			190						Clayey Sand, Brown, ~30% clay somewhat Cohesive, (wet at 2 to 3 Feet)	
5			E	.O.B	—					
10										
									Field Screening Data collect 076FB13	
20										
25										
30										
35										
40										

JCE NUMBER

SOUTHNAVFAC

LOG OF BORING CWC07-BH

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/23/99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0		↑ OP							Black clayey Sand	
5		E.O.B							(clayey Sand, Gray (50 clay) Sandy Clay, moist	
10										
15									Field Screening Data	
20									Collect 076FB14	
25										
30										
35										
40										

CE NUMBER:

SOUTHNAVFAC

LOG OF BORING CNC07-B15

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1/23/97
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH / HAND AUGER
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
5		Hand Auger							Hand Auger Boring to 8' to install temporary piezometer.	
	E.O.B								Field Screening Data	
10									Collect 076FB15	
20										
25										
30										
35										
4										

JOB NUMBER

SOUTHNAVFAC

LOG OF BORING CNC07-B16

Page 1 of 1

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1-24-99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: Pam Jackson

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0									Sand, Black 0-2 FT	
									clayey Sand, Black 2-4 FT	
5									clayey Silt and Clay, grey, and sticky 4-8.5 FT	
			E.O.B.							
10									Field Screening Data	
15									Collect 07GFB16	
20										
25										
30										
35										
40										

CE NUMBER

SOUTHNAVFAC — LOG OF BORING

Page of

PROJECT NO: 7912
PROJECT NAME: SITE 7, BUILDING 653
PROJECT LOCATION: CHARLESTON NAVAL COMPLEX, ZONE H
DATE DRILLED: 1-24-99
DRILLING COMPANY: US PROBE
SURFACE ELEVATION: Feet —
DRILLING METHOD: DIRECT PUSH
BORING DIAMETER: 2 Inches
DRILLING RIG: 5400 TRUCK MOUNTED GEOPROBE
GEOLOGIST: PAM JACKSON

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm) Sample	PID (ppm) B. Zone	PID (ppm) Borehole	PID (ppm) Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
0									Sand, black 0-2 FT	
									Sand, brown, wet,	
5									Sand wet already from heavy rains overnight	
									Field Screening Data	
10									Collect 076FB17	
15										
20										
25										
30										
35										
40										

ICE NUMBER

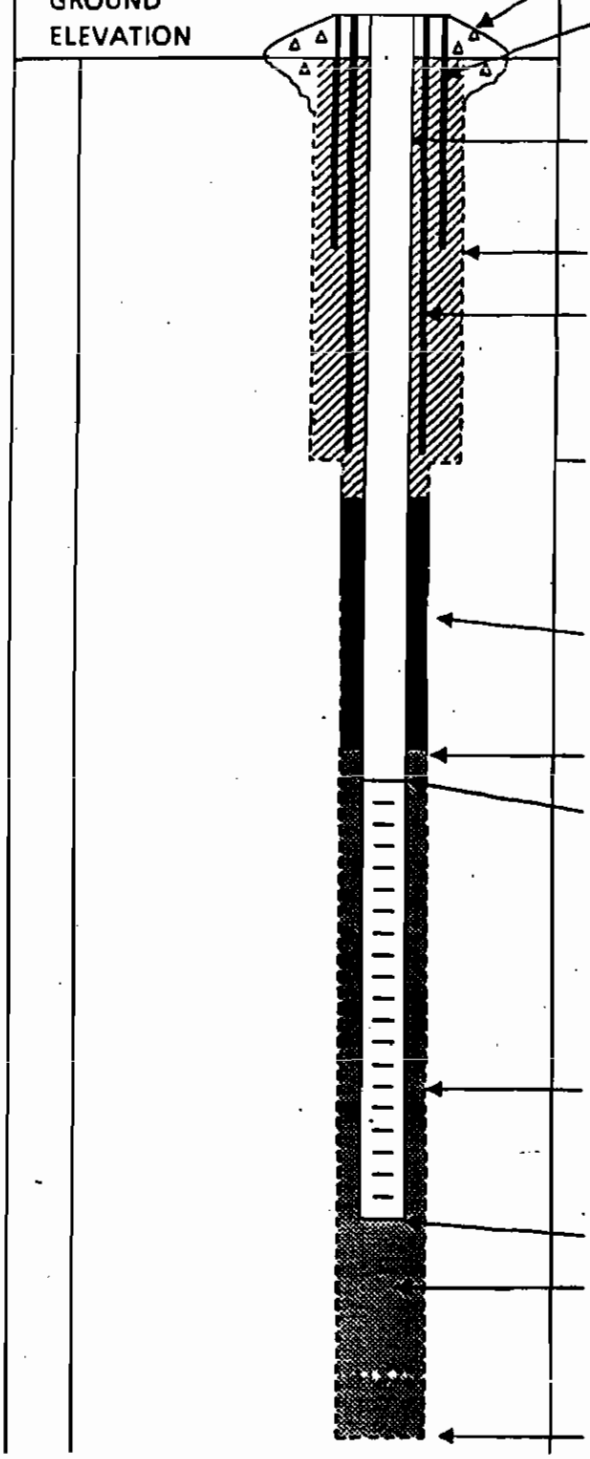
BORING NO.: _____

MONITORING WELL SHEET

PROJECT CNC Zone H
PROJECT NO. STO 0068/7912
ELEVATION T.O.C. 9.99
FIELD GEOLOGIST Pam Jackson

LOCATION Site 7, Building 653
BORING CNC07-MO7
DATE 2/16/99

DRILLER Custer Drilling
DRILLING METHOD Hollow Stem Auger
DEVELOPMENT METHOD Over Pumping (5 7/8-inch rotary)



TYPE OF SURFACE SEAL: Concrete Mix

I.D. OF SURFACE CASING: 8-inch well Vault
TYPE OF SURFACE CASING: with Steel Manhole Covers

RISER PIPE I.D. 2-inches
TYPE OF RISER PIPE: SCH 40

BOREHOLE DIAMETER: 10-inches

PERM. CASING I.D. SCH 40 PVC (6-inch Dia)
TYPE OF CASING & BACKFILL: Portland Type I Cement

ELEVATION / DEPTH BOTTOM OF CASING: 20FT/ BLS

ELEVATION / DEPTH TOP OF SEAL: 19 FT/
TYPE OF SEAL: 1-Foot Bentonite Pellet Seal Set 19 to 20' BLS

DEPTH TOP OF SAND PACK: 20 FT

ELEVATION/DEPTH TOP OF SCREEN: 22 FT/
TYPE OF SCREEN: SCH 40 PVC 0.010 SLOT

TYPE OF SAND PACK: 20/30 Standard Silica Sand

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 27 FT/

ELEVATION / DEPTH BOTTOM OF SAND PACK: 27.5 /
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 Standard Silica Sand

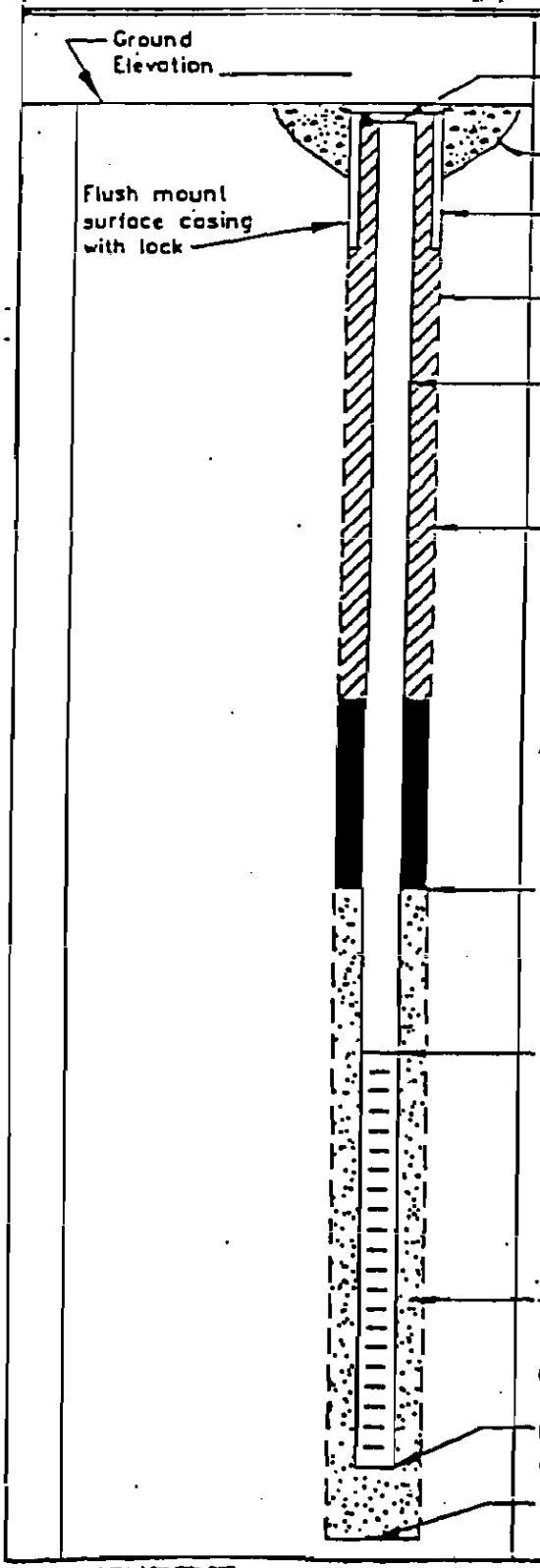
ELEVATION / DEPTH OF HOLE: 27.5 /

MONITORING WELL SHEET

PROJECT CNC Zone H
PROJECT NO. CTO 0068/7912
ELEVATION T.O.C. 10.12
FIELD GEOLOGIST Pam Jackson

LOCATION Site 7, Building 653
BORING CNC07-M01
DATE 2/15/99

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



ELEVATION TOP OF RISER: 10.12

TYPE OF SURFACE SEAL: Concrete Mix

TYPE OF PROTECTIVE CASING: Steel Manhole

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8-inches

TYPE OF RISER PIPE: Sch 40 PVC

RISER PIPE I.D.: 2-inches

TYPE OF BACKFILL/SEAL: Portland Cement Type II

30/65 Standard Silica Sand Seal .5FT / BLS

DEPTH/ELEVATION TOP OF SAND: 1 FT / BLS

DEPTH/ELEVATION TOP OF SCREEN: 2 FT / BLS

TYPE OF SCREEN: Sch. 40 PVC

SLOT SIZE x LENGTH: 0.010-inch x 10 FT

TYPE OF SAND PACK: 20/30 Standard Silica Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 FT / BLS

DEPTH/ELEVATION BOTTOM OF SAND: 12.5 FT / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12.5 FT / BLS

BACKFILL MATERIAL BELOW SAND: 12.5 FT BLS

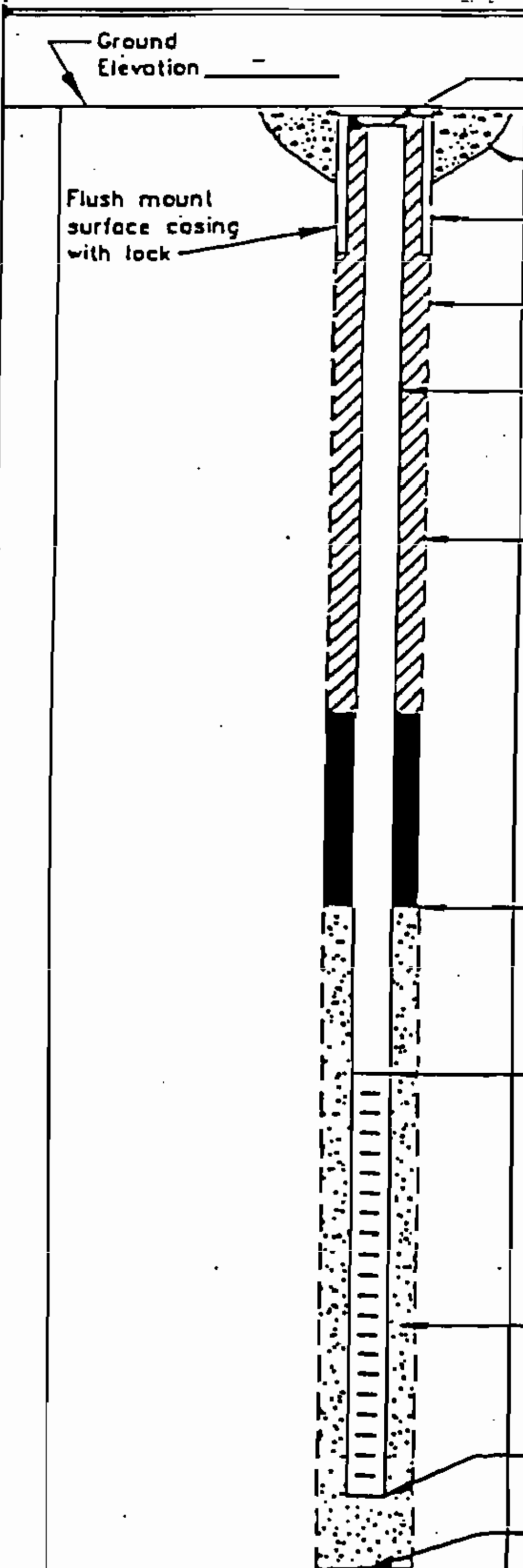
BORING NO.: ________

MONITORING WELL SHEET

PROJECT: CNC Zone H
PROJECT NO.: CTO 0068/7912
ELEVATION: T.O.C. 10.00
FIELD GEOLOGIST: Pam Jackson

LOCATION: Site 7, Building 653
BORING: CNC07-M02
DATE: 2/15/99

DRILLER: Custom Drilling
DRILLING METHOD: Hollow Stem Auger
DEVELOPMENT METHOD: Over Pumping



ELEVATION TOP OF RISER: 10.00

TYPE OF SURFACE SEAL: Concrete Mix

TYPE OF PROTECTIVE CASING: Steel Manhole

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8-inches

TYPE OF RISER PIPE: SCH 40 PVC

RISER PIPE I.D.: 2-inches

TYPE OF BACKFILL/SEAL: Portland Cement Type II

30/65 Standard Silica Sand Seal .5 FT / BLS

DEPTH/ELEVATION TOP OF SAND: 1 FT / BLS

DEPTH/ELEVATION TOP OF SCREEN: 2 FT / BLS

TYPE OF SCREEN: Sch. 40 PVC

SLOT SIZE x LENGTH: 0.010-inch x 10 FT

TYPE OF SAND PACK: 20/30 Standard Silica Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 FT / BLS

DEPTH/ELEVATION BOTTOM OF SAND: 12.5 FT / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12.5 FT / BLS

BACKFILL MATERIAL BELOW SAND: 12.5 FT BLS

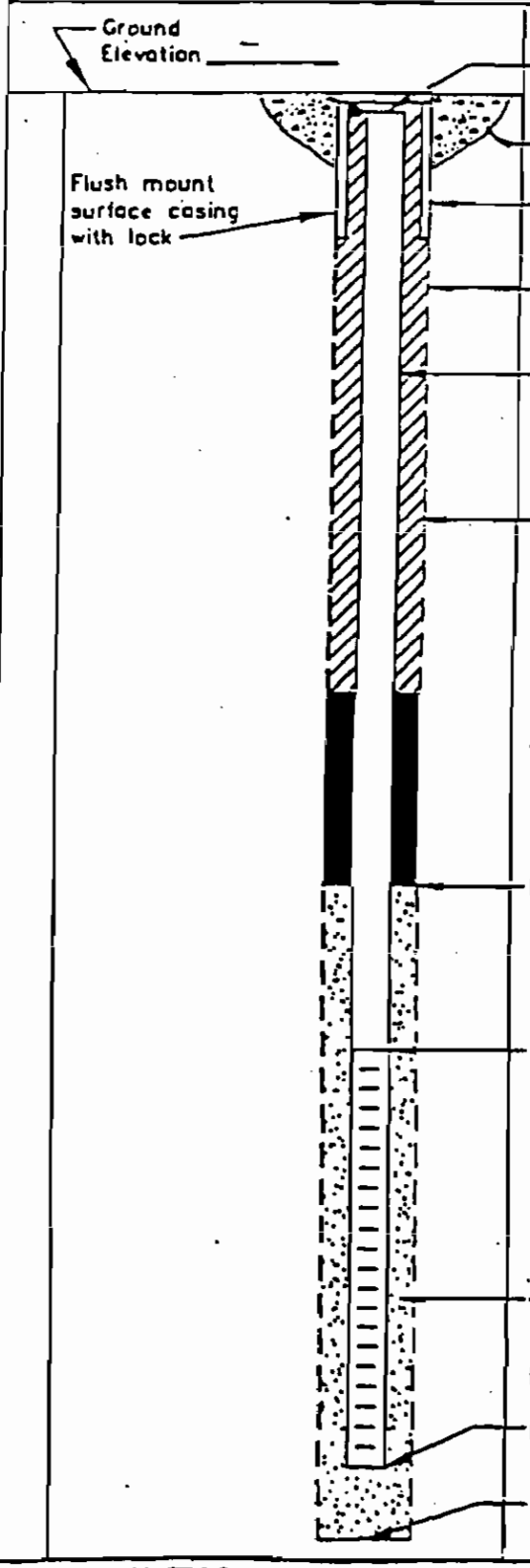
ACFILE: L870\GEOL\DBURGH.DWG

MONITORING WELL SHEET

PROJECT CNC Zone H
PROJECT NO. CTO 0068/7912
ELEVATION T.O.C. 9.72
FIELD GEOLOGIST Pam Jackson

LOCATION Site 7, Building 653
BORING CNC07-M03
DATE 2/16/99

DRILLER Custer Drilling
DRILLING METHOD Hollow Stem Auger
DEVELOPMENT METHOD Over Pumping



ELEVATION TOP OF RISER: 9.72

TYPE OF SURFACE SEAL: Concrete Mix

TYPE OF PROTECTIVE CASING: Steel Manhole

I.O. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8-inches

TYPE OF RISER PIPE: Sch 40 PVC

RISER PIPE I.D.: 2-inches

TYPE OF BACKFILL/SEAL: Portland Cement Type II

30/65 Standard Silica Sand Seal .5 FT / BLS

DEPTH/ELEVATION TOP OF SAND: 1 FT / BLS

DEPTH/ELEVATION TOP OF SCREEN: 2 FT / BLS

TYPE OF SCREEN: Sch. 40 PVC

SLOT SIZE x LENGTH: 0.010-inch x 10 FT

TYPE OF SAND PACK: 20/30 Standard Silica Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 FT / BLS

DEPTH/ELEVATION BOTTOM OF SAND: 12.5 FT / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12.5 FT / BLS

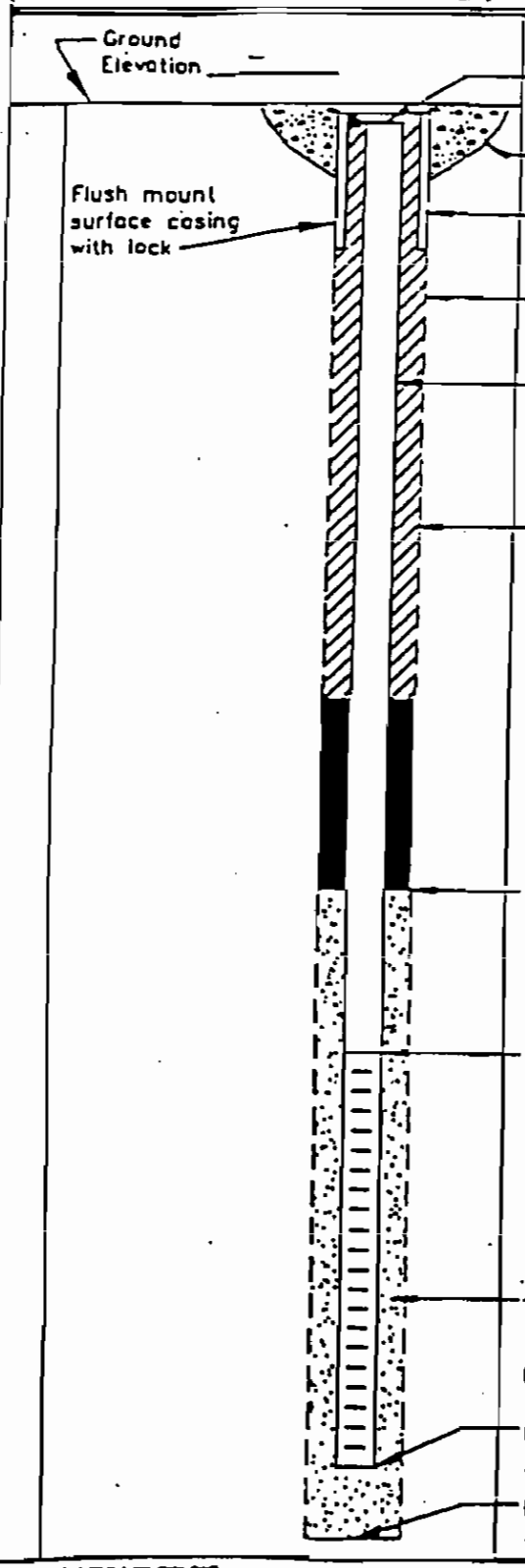
BACKFILL MATERIAL BELOW SAND: 12.5 FT BLS

MONITORING WELL SHEET

PROJECT CNC Zone H
PROJECT NO. CTO 0068/7912
ELEVATION T.O.C. 9.33
FIELD GEOLOGIST Pam Jackson

LOCATION Site 7, Building 653
BORING CNC07-M04
DATE 2/16/99

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



ELEVATION TOP OF RISER: 9.33

TYPE OF SURFACE SEAL: Concrete Mix

TYPE OF PROTECTIVE CASING: Steel Manhole

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8-inches

TYPE OF RISER PIPE: Sch 40 PVC

RISER PIPE I.D.: 2-inches

TYPE OF BACKFILL/SEAL: Portland Cement Type II

30/65 Standard Silica Sand Seal .5FT / BGS

DEPTH/ELEVATION TOP OF SAND: 1FT / BGS

DEPTH/ELEVATION TOP OF SCREEN: 2FT / BGS

TYPE OF SCREEN: Sch. 40 PVC

SLOT SIZE x LENGTH: 0.010-inch x 10 FT

TYPE OF SAND PACK: 20/30 Standard Silica Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 12FT / BGS

DEPTH/ELEVATION BOTTOM OF SAND: 12.5FT / BGS

DEPTH/ELEVATION BOTTOM OF HOLE: 12.5FT / BGS

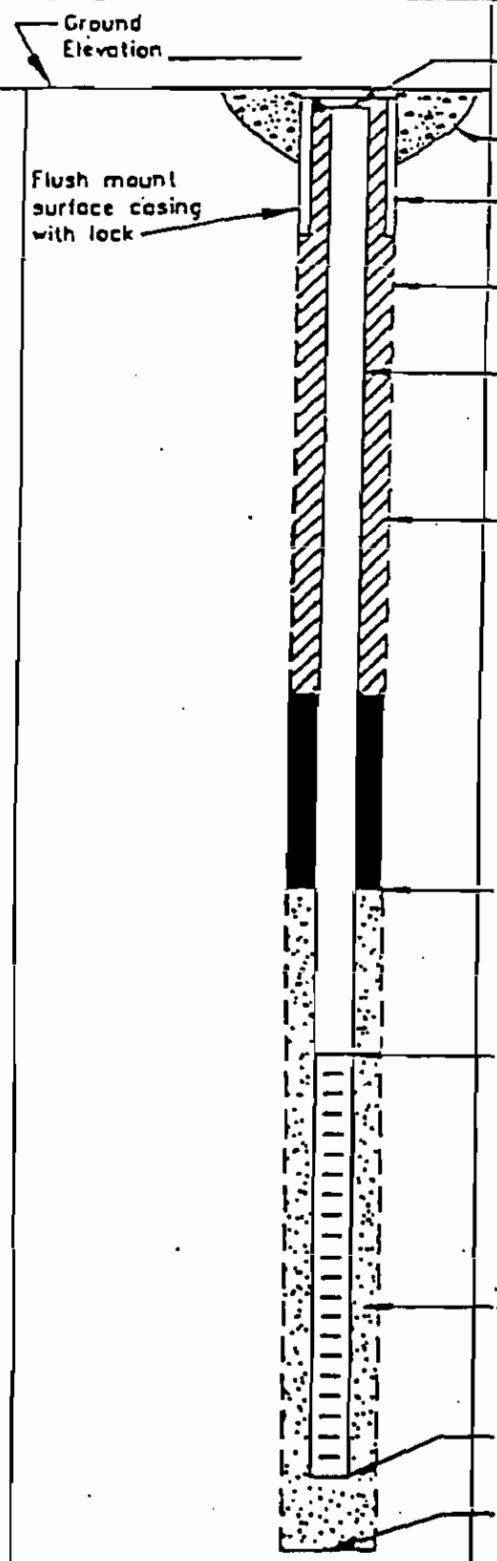
BACKFILL MATERIAL BELOW SAND: 12.5 FT BGS

MONITORING WELL SHEET

PROJECT CNC Zone H
PROJECT NO. CTO 0068/7912
ELEVATION T.O.C. 9.86
FIELD GEOLOGIST Pam Jackson

LOCATION Site 7, Building 653
BORING CNC07-MW5
DATE 2/16/99

DRILLER Custer Drilling
DRILLING METHOD Hollow Stem Auger
DEVELOPMENT METHOD Over Pumping



ELEVATION TOP OF RISER: 9.86

TYPE OF SURFACE SEAL: Concrete mix

TYPE OF PROTECTIVE CASING: Steel Manhole

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8 inches

TYPE OF RISER PIPE: SCH 40 PVC

RISER PIPE I.D.: 2 inches

TYPE OF BACKFILL/SEAL: Portland Cement Type II

30/65 Standard Silica Sand Seal .5FT/BLS

DEPTH/ELEVATION TOP OF SAND: 1 FT/BLS

DEPTH/ELEVATION TOP OF SCREEN: 2 FT/BLS

TYPE OF SCREEN: Sch. 40 PVC

SLOT SIZE x LENGTH: 0.010-inch x 10 FT

TYPE OF SAND PACK: 20/30 Standard Silica Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 FT/BLS

DEPTH/ELEVATION BOTTOM OF SAND: 12.5 FT/BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12.5 FT/BLS

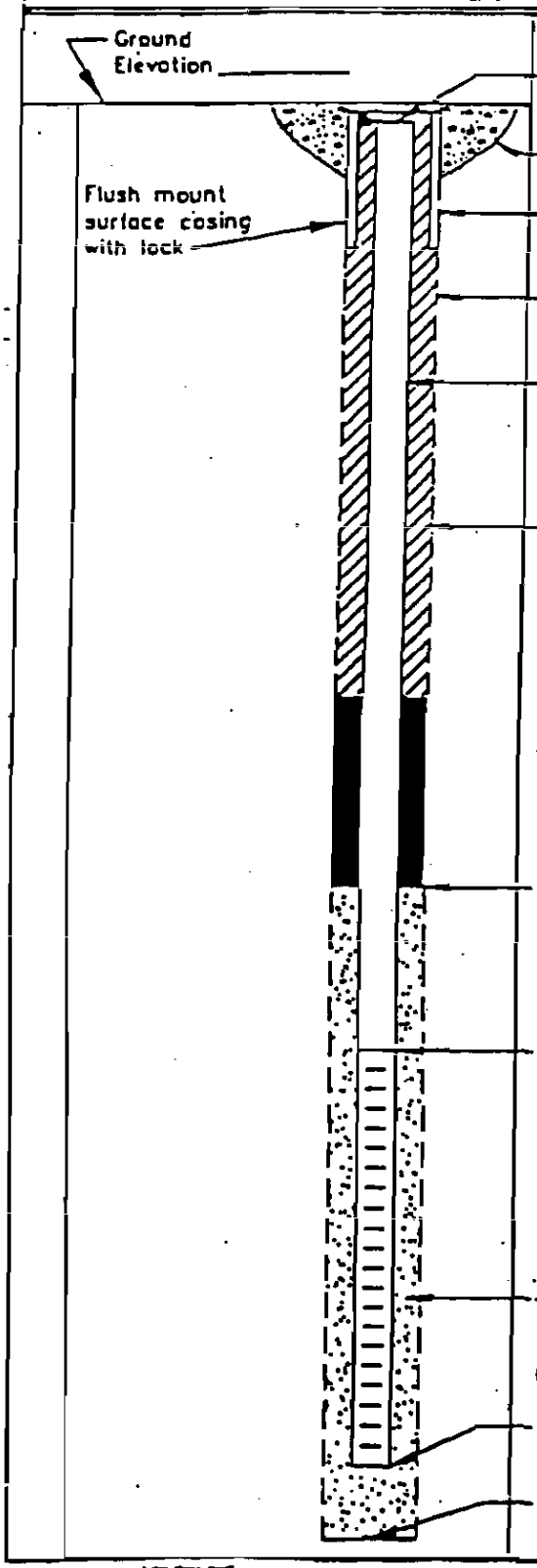
BACKFILL MATERIAL BELOW SAND: 12.5 FT BLS

MONITORING WELL SHEET

PROJECT CNC Zone H
PROJECT NO. CTO 0068/7912
ELEVATION T.O.C. 10.09
FIELD GEOLOGIST Pam Jackson

LOCATION Site 7, Building 653
BORING CNC07-M06
DATE 2/16/99

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



ELEVATION TOP OF RISER: 10.09

TYPE OF SURFACE SEAL: Concrete mix

TYPE OF PROTECTIVE CASING: Steel Manhole

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8-inches

TYPE OF RISER PIPE: Sch 40 PVC

RISER PIPE I.D.: 2-inches

TYPE OF BACKFILL/SEAL: Portland Cement Type II

30/65 Standard Silica Sand Seal .5FT/BGS

DEPTH/ELEVATION TOP OF SAND: 1 FT/BGS

DEPTH/ELEVATION TOP OF SCREEN: 2 FT/BGS

TYPE OF SCREEN: Sch. 40 PVC

SLOT SIZE x LENGTH: 0.010-inch x 10 FT

TYPE OF SAND PACK: 20/30 Standard Silica Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 12FT/BGS

DEPTH/ELEVATION BOTTOM OF SAND: 12.5FT/BGS

DEPTH/ELEVATION BOTTOM OF HOLE: 12.5FT/BGS

BACKFILL MATERIAL BELOW SAND: 12.5 FT BGS

APPENDIX C

FIELD SAMPLING DATA SHEETS

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 7
Project No.: 7912

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

Sample ID No.: 07GLM0101
Sample Location: CNC07 M01
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/17/99 Time: 1805	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/17/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.41	.638	17.0	-10		.02	
Monitor Reading (ppm):	1	7.27	.655	17.5	-10		.02	3 gal
Well Casing Diameter: 2"	2	7.42	.752	17.9	-10		.03	6 gal
Well Casing Material: PVC	3	7.47	.699	17.7	-10		.02	
Total Well Depth (TD):								
Static Water Level (WL): 3.91								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 9G								

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

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

Signature(s):

Gwsamp

SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 7
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 07GLM0101
Sample Location: CNC07M01
Duplicate: ☐

SAMPLING DATA:

Date: 3/17/99	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	Sal. (%)	
Time: 1805								
Method: Peristaltic pump								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT

Analysis Time: 1329

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
55	x 0.01	= 0.55
	x 0.02	=

Notes: Chloride 0.6

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

Analysis Time: 1423

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	0 & 166	x 2.0	= 332
☐	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	0 mg/L	0 mg/L	332 mg/L

Notes: Phenolics 225 w/ 100 to 1000 range

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT

Analysis Time: 1455

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count		Concentration
☐	10-50 mg/L	200 ml	0.3636 N	0.1		x 0.1	=
☐	20-100 mg/L	100 ml	0.3636 N	0.2		x 0.2	=
☑	100-400 mg/L	200 ml	3.636 N	1.0	190	x 1.0	= 190
☐	200-1000 mg/L	100 ml	3.636 N	2.0		x 2.0	=

Notes: Phenolics 13.7 w/ 10 to 100 range

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 7
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 07GLM0101
Sample Location: CNC07M01
Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter HS-C Color Chart Analysis Time: 1545
Program No.:
Concentration: 0.02 mg/L Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter IR-18C Color Wheel Analysis Time: 1630
Program No.: 1.20
Concentration: [illegible] mg/L Filtered: ☐
Notes:

Nitrite:

Equipment: HACH DR-890 Colorimeter Analysis Time: 1655
Program No.: 0.016
Concentration: [illegible] mg/L Reagent Blank Correction: ☐
Standard Solution: ☐ Results:
Notes:

Nitrate: Na

Equipment: HACH DR-890 Colorimeter Analysis Time: 1705
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:

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: ZONE H/SITE 7
Project No.: 7412

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

Sample ID No.: 07GLMQ101
Sample Location: MO1
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/22/99 Time: 0955	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/22/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic Pump	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter: 2"	2							
Well Casing Material: PVC	3							
Total Well Depth (TD): 11.88								
Static Water Level (WL): 3.82'								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs): 955								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 7G								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Methane		(3) 40 ml	✓
Nitrate, Sulfate		(1) 500 ml	✓

OBSERVATIONS / NOTES

* returned to site 7 to sample for Methane and Anions.

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 7
Project No.: 7912

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

Sample ID No.: 07GLM02-01
Sample Location: CNC07M02
Sampled By: SA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/17/99 Time: 1735	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/17/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.42	1.85	17.0	-10		.08	
Monitor Reading (ppm):	1	7.44	1.50	17.5	-10		.06	5941
Well Casing Diameter: 2"	2	7.40	1.57	17.0	-10		.07	7991
Well Casing Material: PVC	3	7.35	.779	17.8	56		.03	5 82
Total Well Depth (TD):								
Static Water Level (WL): 3.84								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 96								

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

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

Signature(s):

Gwsamp

SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 7
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 07GLMD201
Sample Location: CNC07M02
Duplicate: ☐

SAMPLING DATA:

		Color	pH	S.C.	Temp.	Turbidity	DO	Sal.	
Date: 3/17/99		(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	
Time: 1735									
Method:	Peristaltic pump								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT

Analysis Time: 1341

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
76	x 0.01	= 0.76
	x 0.02	=

Notes: Chemets 0.4

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

Analysis Time: 1430

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	0 & 250	x 2.0	= 500
☐	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	0 mg/L	0 mg/L	500 mg/L

Notes: Chemetrics 450 w/ 100 to 1000 range

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT

Analysis Time: 1500

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	=
275	x 1.0	= 275
	x 2.0	=

Notes: 25 w/ 100 to 1000 range Chemetrics

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 7
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 07GLM0201
Sample Location: CNC07M02
Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter HS-C Color Chart
Analysis Time: 1545
Program No.:
Concentration: 0.02 mg/L
Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter IR-18C Color Wheel
Analysis Time: 1630
Program No.:
Concentration: 0.09 mg/L
Filtered: ☐
Notes:

Nitrite:

Equipment: HACH DR-890 Colorimeter
Analysis Time: 1655
Program No.: 0.053
Concentration: ~~0.05~~ mg/L
Reagent Blank Correction: ☐
Standard Solution: ☐ Results:
Notes:

~~Nitrate:~~ Mn

Equipment: HACH DR-890 Colorimeter
Analysis Time: 1705
Program No.:
Concentration: 0.0 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: ZONE H / SITE 7
Project No.: 7912

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

Sample ID No.: 07GLM0201
Sample Location: M02
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/22/99 Time: 1000	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/22/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter:	2							
Well Casing Material:	3							
Total Well Depth (TD): 11.87'								
Static Water Level (WL): 3.77'								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs): 1000								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 7G								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Methane		(3) 40ml	✓
Nitrate, Sulfate		(1) 500ml	✓

OBSERVATIONS / NOTES

* Returned to site 7 for methane and Anions.

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 7
Project No.: 7912

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

Sample ID No.: 07GLMD301
Sample Location: CNC07M03
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/17/99 Time: 1920	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/17/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.38	1.98	19.1	-10		.09	
Monitor Reading (ppm):	1	7.37	1.85	19.2	-10		.08	5 gal
Well Casing Diameter: 2"	2	7.37	1.99	18.6	65		.09	3 gal
Well Casing Material: PVC	3	7.44	1.83	14.1	-10		.09	9 9
Total Well Depth (TD):								
Static Water Level (WL): 3.56								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 9G								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOC, MTBE, Naphthalene	HCl	(3) 40 ml	
PAH	—	(1) 1000 ml	

OBSERVATIONS / NOTES

Circle If Applicable:
MS/MSD
Duplicate ID No.:

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 7
Project No.: 7912

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

Sample ID No.: 07GLM0401
Sample Location: CNC07M04
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/17/99 / Time: 1750	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/17/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.22	1.09	19.4	65		0.04	1G
Monitor Reading (ppm):	1	6.92	1.14	19.8	78		0.05	3G
Well Casing Diameter: 2"	2	6.85	1.14	19.7			0.05	
Well Casing Material: PVC	3	7.12	1.16	20.7	~10		0.05	7G
Total Well Depth (TD):								
Static Water Level (WL): 3.25'								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 7G								

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

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

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 7
Project No.: 7912

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

Sample ID No.: 07GLM0501
Sample Location: ENC07M05
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/17/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1845								
Method:								

PURGE DATA

Date: 3/17/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.53	.938	17.6	999		.04	
Monitor Reading (ppm):	1	7.01	1.02	18.6	56		.04	
Well Casing Diameter: 2"	2	6.99	.964	18.9	-10		.04	
Well Casing Material: PVC	3	6.98	1.04	18.5	-10		0.04	
Total Well Depth (TD):								
Static Water Level (WL): 3.66								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 7G								

1 gal
3
4G
7G

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOC, MTBE, Naphthalene	HCl	(3) 40ml	V
PAH	—	(1) 1000ml	V

OBSERVATIONS / NOTES

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

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 7
Project No.: 7912

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

Sample ID No.: 07GLM0601
Sample Location: CNC07 m06
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/17/99 Time: 1720	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/17/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.20	1.25	17.2	10		.05	
Monitor Reading (ppm):	1	7.28	1.21	16.3	67		.03	
Well Casing Diameter: 2"	2	7.47	1.22	16.6	682		.05	
Well Casing Material: PVC	3	7.42	1.27	16.7	~10		.05	
Total Well Depth (TD):								
Static Water Level (WL): 3.85'								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 8 G								

@ 500ml
1 G
4 G
6 G
8 G

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES:

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

Signature(s):

Gyrsamp

SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 7 | Sample ID No.: 07GLM06D1
Project No.: 7912 | Sample Location: CNC07M06
Sampled By: JA / BDH | Duplicate: ☐

SAMPLING DATA:

Date: 3/17/99	Color	pH	S.C.	Temp.	Turbidity	DO	Sal.	
Time: 1720	(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: 1318

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
26	x 0.01	= 0.26
	x 0.02	=

Notes: Chemetrics 0.5

Alkalinity:

Equipment: HACH Digital Titrator AL-DT | Analysis Time: 1407

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	0 & 295	x 2.0	= 590
☐	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	0 & 53	x 10.0	= 530

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	590 mg/L

Notes: Chemetrics 450 w/ 100 to 1000 range kit

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT | Analysis Time: 1445

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	=
250	x 1.0	= 250
	x 2.0	=

Notes: Chemetrics 10 to 100 range = 15.3, 100 to 1000 range did not change to color before vial filled up

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 7 | Sample ID No.: 07GLM06D1
Project No.: 7912 | Sample Location: CNL07M06
Sampled By: JA / BDH | Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter | HS-C Color Chart | Analysis Time: 1544
Program No.:
Concentration: 0.02 mg/L | Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter | IR-18C Color Wheel | Analysis Time: 1630
Program No.:
Concentration: 1.12 mg/L | Filtered: ☐
Notes:

~~Nitrite:~~

Equipment: HACH DR-890 Colorimeter | Analysis Time: 1655
Program No.: .016
Concentration: ~~0.028~~ mg/L | Reagent Blank Correction: ☐
Standard Solution: ☐ | Results:
Notes:

~~Nitrate:~~ Mn

Equipment: HACH DR-890 Colorimeter | Analysis Time: 1705
Program No.: 0.2
Concentration: ~~0.46~~ 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: ZONE H/SITE 7
Project No.:

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

Sample ID No.: 07GLM0601
Sample Location: M06
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/22/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 0945								
Method:								

PURGE DATA

Date: 3/22/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic Pump	Initial							
Monitor Reading (ppm): 0	1							
Well Casing Diameter: 2"	2							
Well Casing Material: PVC	3							
Total Well Depth (TD): 11.90'								
Static Water Level (WL): 3.75'								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs): 945								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 7G								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Methane		(3) 40 ml	✓
Sulfate, Nitrate		(1) 500 ml	✓

OBSERVATIONS / NOTES:

* returned to site 7 to sample for Methane and Anions.

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

Signature(s): By Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 7
Project No.: 7912

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

Sample ID No.: 07GLM0701
Sample Location: CNC07M07
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/17/99 Time: 1935	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Method:								

PURGE DATA

Date: 3/17/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.43	27.8	18.3	999		1.71	dry after 1 volume
Monitor Reading (ppm):	1							
Well Casing Diameter: 2"	2							
Well Casing Material: PVC	3							
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOC, MTBE, Naphthalene	HCl	(3) 40 ml	✓
PAH	~	(1) 1000 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

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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 11, 1999

Sample ID	: ZHTL00701
Lab ID	: 9901703-08
Matrix	: Water
Date Collected	: 01/22/99
Date Received	: 01/22/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
EX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.300	5.00	ug/l	1.0	RMB	02/01/99	1548	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	J	0.504	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	82.3	(60.2 - 139.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	96.0	(70.6 - 152.)
Toluene-d8	BTEX/NAP/MTBE-8260B	84.8	(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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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 11, 1999

Sample ID : ZHTL00701

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

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

cc: TETR00498 Report Date: February 08, 1999

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

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

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Laboratory Certifications

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

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

cc: TETR00498 Report Date: February 08, 1999

Sample ID : ZHRL00201

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
The following prep procedures were performed:											
GC/MS Base/Neutral Compounds							ES	01/22/99	1300	140430	4

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

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

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

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, 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: February 11, 1999

Sample ID : 07SLB0201
Lab ID : 9901703-07
Matrix : Soil
Date Collected : 01/22/99
Date Received : 01/22/99
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	0.576	5.00	ug/kg	1.0	RMB	01/30/99	1912	141138	1
ETHYLBENZENE	U	ND	0.346	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.205	6.40	ug/kg	1.0					
NAPHTHALENE	U	ND	0.781	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.20	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.320	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		27.0	1.00	1.00	wt%	1.0	GJ	01/25/99	1700	140630	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	219	457	ug/kg	1.0	TSD	01/27/99	0013	140571	3
ACENAPHTHYLENE	U	ND	202	457	ug/kg	1.0					
ANTHRACENE	U	ND	120	457	ug/kg	1.0					
BENZO(A)ANTHRACENE	U	ND	93.7	457	ug/kg	1.0					
BENZO(A)PYRENE	U	ND	98.3	457	ug/kg	1.0					
BENZO(B)FLUORANTHENE	U	ND	195	457	ug/kg	1.0					
BENZO(G,H,I)PERYLENE	U	ND	112	457	ug/kg	1.0					
BENZO(K)FLUORANTHENE	U	ND	181	457	ug/kg	1.0					
CHRYSENE	U	ND	74.9	457	ug/kg	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	114	457	ug/kg	1.0					
FLUORANTHENE	U	ND	89.6	457	ug/kg	1.0					
FLUORENE	U	ND	157	457	ug/kg	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	110	457	ug/kg	1.0					
PHENANTHRENE	U	ND	82.3	457	ug/kg	1.0					
PYRENE	U	ND	98.7	457	ug/kg	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: February 11, 1999

Sample ID : 07SLB0201

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

The following prep procedures were performed:

Volatiles 8260 High Level	RMB	02/01/99		141138	4
GC/MS Base/Neutral Compounds	CPU	01/25/99	2345	140571	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	62.0	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	57.0	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	87.7	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	101.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	106.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	91.7	(72.1 - 137.)

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

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

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

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Laboratory Certifications

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

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

cc: TETR00498 Report Date: February 11, 1999

Sample ID : 07SLB0201

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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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 11, 1999

Sample ID	: 07SLB0502
Lab ID	: 9901703-06
Matrix	: Soil
Date Collected	: 01/22/99
Date Received	: 01/22/99
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	0.794	0.644	5.00	ug/kg	1.0	RMB	01/30/99	1837	141138	1
ETHYLBENZENE	U	ND	0.386	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER	U	ND	0.229	7.15	ug/kg	1.0					
NAPHTHALENE	U	ND	0.872	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.34	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.358	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		29.0	1.00	1.00	wt%	1.0	GJ	01/25/99	1700	140630	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	225	469	ug/kg	1.0	TSD	01/26/99	2342	140571	3
ACENAPHTHYLENE	U	ND	207	469	ug/kg	1.0					
ANTHRACENE	U	ND	123	469	ug/kg	1.0					
BENZO(A)ANTHRACENE	U	ND	96.1	469	ug/kg	1.0					
BENZO(A)PYRENE	U	ND	101	469	ug/kg	1.0					
BENZO(B)FLUORANTHENE	U	ND	200	469	ug/kg	1.0					
BENZO(G,H,I)PERYLENE	U	ND	114	469	ug/kg	1.0					
BENZO(K)FLUORANTHENE	U	ND	186	469	ug/kg	1.0					
CHRYSENE	U	ND	76.9	469	ug/kg	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	117	469	ug/kg	1.0					
FLUORANTHENE	U	ND	91.9	469	ug/kg	1.0					
FLUORENE	U	ND	161	469	ug/kg	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	113	469	ug/kg	1.0					
PHENANTHRENE	U	ND	84.4	469	ug/kg	1.0					
PYRENE	U	ND	101	469	ug/kg	1.0					

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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 11, 1999

Sample ID : 07SLB0502

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

The following prep procedures were performed:

Volatiles 8260 High Level			RMB	02/01/99	141138 4
GC/MS Base/Neutral Compounds			CPU	01/25/99 2345	140571 2

Surrogate Recovery	Test	Percent%	Acceptable Limits
Fluorobiphenyl	M610-TETR	58.1	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	54.7	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	87.3	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	86.6	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	101.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	84.7	(72.1 - 137.)

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

Notes:
The qualifiers in this report are defined as follows:
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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

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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 11, 1999

Sample ID : 07SLB0502

M = Method **Method-Description**

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Valerie L Davis

Reviewed By

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

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

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

cc: TETR00498 Report Date: February 11, 1999

Sample ID : 07SLB0602
Lab ID : 9901703-02
Matrix : Soil
Date Collected : 01/22/99
Date Received : 01/22/99
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	1.48	0.594	5.00	ug/kg	1.0	RMB	01/30/99	1652	141138	1
ETHYLBENZENE	U	ND	0.356	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.211	6.60	ug/kg	1.0					
NAPHTHALENE	U	ND	0.805	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.24	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.330	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		19.0	1.00	1.00	wt%	1.0	GJ	01/25/99	1700	140630	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	791	1650	ug/kg	4.0	TSD	01/26/99	2207	140571	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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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)

Sample ID : 07SLB0602

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
The following prep procedures were performed:											
Volatiles 8260 High Level							RMB	02/01/99		141138	4
GC/MS Base/Neutral Compounds							CPU	01/25/99	2345	140571	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
?-Fluorobiphenyl	M610-TETR	50.2	(30.0 - 115.)
itrobenzene-d5	M610-TETR	42.5	(23.0 - 120.)
-Terphenyl-d14	M610-TETR	85.3	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	98.1	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	105.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	90.4	(72.1 - 137.)

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

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

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

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Laboratory Certifications

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

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

cc: TETR00498 Report Date: February 11, 1999

Sample ID : 07SLB0602

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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9901703-02

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 11, 1999

Sample ID	: 07SLB0602D
Lab ID	: 9901703-03
Matrix	: Soil
Date Collected	: 01/22/99
Date Received	: 01/22/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
atile Organics											
TEX/NAP/MTBE - 6 items											
BENZENE	J	0.985	0.590	5.00	ug/kg	1.0	RMB	01/30/99	1727	141138	1
ETHYLBENZENE	U	ND	0.354	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.210	6.55	ug/kg	1.0					
NAPHTHALENE	U	ND	0.799	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.23	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.328	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		23.0	1.00	1.00	wt%	1.0	GJ	01/25/99	1700	140630	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	208	433	ug/kg	1.0	TSD	01/26/99	2238	140571	3
ACENAPHTHYLENE	U	ND	191	433	ug/kg	1.0					
ANTHRACENE	U	ND	114	433	ug/kg	1.0					
BENZO(A)ANTHRACENE	U	ND	88.8	433	ug/kg	1.0					
BENZO(A)PYRENE	U	ND	93.1	433	ug/kg	1.0					
BENZO(B)FLUORANTHENE	U	ND	184	433	ug/kg	1.0					
BENZO(G,H,I)PERYLENE	U	ND	106	433	ug/kg	1.0					
BENZO(K)FLUORANTHENE	U	ND	171	433	ug/kg	1.0					
CHRYSENE	U	ND	71.0	433	ug/kg	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	108	433	ug/kg	1.0					
FLUORANTHENE	J	108	84.9	433	ug/kg	1.0					
FLUORENE	U	ND	149	433	ug/kg	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	104	433	ug/kg	1.0					
PHENANTHRENE	U	ND	77.9	433	ug/kg	1.0					
PYRENE	U	ND	93.5	433	ug/kg	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: February 11, 1999

Sample ID : 07SLB0602D

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

The following prep procedures were performed:

Volatiles 8260 High Level	RMB	02/01/99		141138	4
GC/MS Base/Neutral Compounds	CPU	01/25/99	2345	140571	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	62.0	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	56.4	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	87.4	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	92.1	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	102.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	86.7	(72.1 - 137.)

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

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

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

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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)

Sample ID : 07SLB0602D

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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9901703-03

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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 11, 1999

Sample ID	: 07SLB0802
Lab ID	: 9901703-01
Matrix	: Soil
Date Collected	: 01/22/99
Date Received	: 01/22/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
!atile Organics											
TEX/NAP/MTBE - 6 items											
ɔENZENE	J	2.04	0.590	5.00	ug/kg	1.0	RMB	01/30/99	1617	141138	1
ETHYLBENZENE	U	ND	0.354	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.210	6.55	ug/kg	1.0					
NAPHTHALENE	U	ND	0.799	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.23	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.328	5.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	60.1	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	51.0	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	94.1	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	86.3	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	95.4	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	82.5	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 8260B

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

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

cc: TETR00498 Report Date: February 11, 1999

Sample ID : 07SLB0802

M = Method **Method-Description**

Notes:
The qualifiers in this report are defined as follows:
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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
accordance with General Engineering Laboratories
andard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Valerie S Davis

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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 11, 1999

Sample ID	: 07SLB0802
Lab ID	: 9901703-01
Matrix	: Soil
Date Collected	: 01/22/99
Date Received	: 01/22/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	J	115	64.0	128	mg/kg	1.0	AAT	02/04/99	1500	141510	1

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	60.1	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	51.0	(23.0 - 120.)
erphenyl-d14	M610-TETR	94.1	(37.3 - 128.)
mofluorobenzene	BTEX/NAP/MTBE-8260B	86.3	(53.5 - 154)
romofluoromethane	BTEX/NAP/MTBE-8260B	95.4	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	82.5	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 9071A

Notes:
The qualifiers in this report are defined as follows:
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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	E87472/87458
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 11, 1999

Sample ID : 07SLB0802

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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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 11, 1999

Sample ID : 07SLB0902
Lab ID : 9901703-04
Matrix : Soil
Date Collected : 01/22/99
Date Received : 01/22/99
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	0.504	5.00	ug/kg	1.0	RMB	01/30/99	1802	141138	1
ETHYLBENZENE	U	ND	0.302	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.179	5.60	ug/kg	1.0					
NAPHTHALENE	U	ND	0.683	5.00	ug/kg	1.0					
TOLUENE	U	ND	1.05	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.280	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		18.0	1.00	1.00	wt%	1.0	GJ	01/25/99	1700	140630	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	781	1630	ug/kg	4.0	TSD	01/26/99	2310	140571	3
ACENAPHTHYLENE	U	ND	718	1630	ug/kg	4.0					
ANTHRACENE	U	ND	428	1630	ug/kg	4.0					
BENZO(A)ANTHRACENE	J	387	334	1630	ug/kg	4.0					
BENZO(A)PYRENE	J	428	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	491	267	1630	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	ND	405	1630	ug/kg	4.0					
FLUORANTHENE	J	884	319	1630	ug/kg	4.0					
FLUORENE	U	ND	558	1630	ug/kg	4.0					
INDENO(1,2,3-CD)PYRENE	J	714	392	1630	ug/kg	4.0					
PHENANTHRENE	J	441	293	1630	ug/kg	4.0					
PYRENE	J	745	352	1630	ug/kg	4.0					

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 11, 1999

Sample ID : 07SLB0902

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

The following prep procedures were performed:

Volatiles 8260 High Level			RMB	02/01/99	141138 4
GC/MS Base/Neutral Compounds			CPU	01/25/99 2345	140571 2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	60.2	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	52.3	(23.0 - 120.)
Terphenyl-d14	M610-TETR	93.4	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	89.2	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	105.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	87.1	(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.
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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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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 11, 1999

Sample ID : 07SLB0902

M = Method **Method-Description**

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

Valerie S. Davis

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9901703-04

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 11, 1999

Sample ID	: 07SLB1202
Lab ID	: 9901703-05
Matrix	: Soil
Date Collected	: 01/22/99
Date Received	: 01/22/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep											
VAPORATIVE LOSS @ 105 C		34.0	1.00	1.00	wt%	1.0	GJ	01/25/99	1700	140630	1
neral Chemistry											
Total Organic Carbon		14200	43.1	100	mg/kg	1.0	LS	02/08/99	1423	141409	2

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

Notes:
The qualifiers in this report are defined as follows:
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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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9901703-05

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 11, 1999

Sample ID : 07SLB1202

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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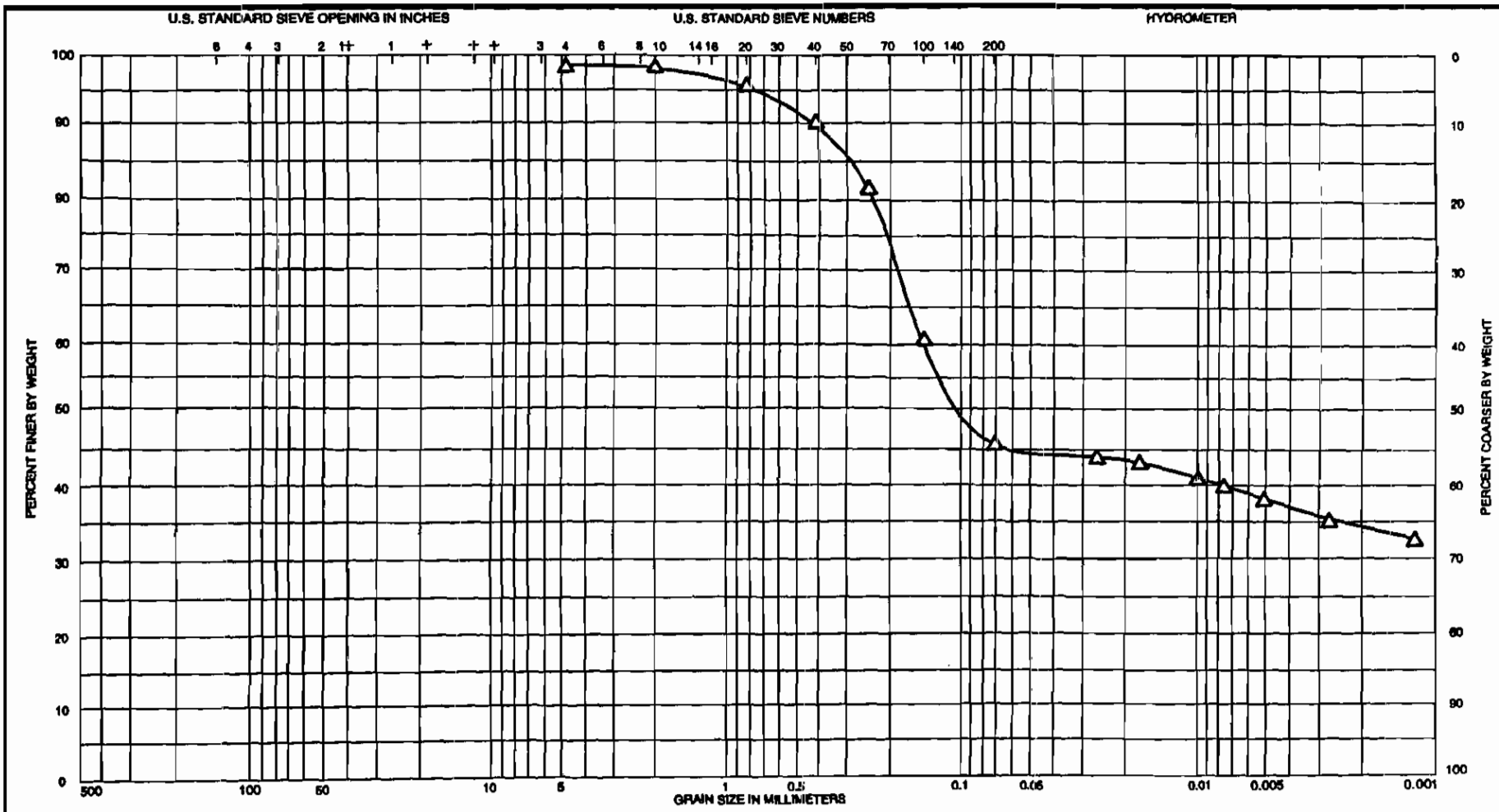
9901703-05

GEOTECHNICAL ANALYSIS



Sample No.	Specific Gravity	Classification	Nat w %	LL	PL	PI
9901703-01	---	ML	276.91			
07SLB0802		% GRAVEL = 0.0				
		% SAND = 51.3				
		% SILT = 8.7				
		% CLAY = 38.0				

GRADATION CURVES

GENERAL ENGINEERING
A Division of General Engineering Laboratories, Inc.

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

GEOTECHNICAL SPREADSHEET

Project Number:	tetr00498	Depth:	UNKNOWN
Sample Number:	9901703-01	Tested By:	M. Yates
Boring Number:	NA	Date:	2/11/99
Location:	NA		

GRAIN-SIZE ANALYSIS

HYGROSCOPIC MOISTURE CONTENT DETERMINATION

weight of total air dried sample=	117.73
weight of container + air-dried soil=	32.41
weight of container + oven-dried soil=	31.28
weight of container=	7
weight of water=	1.13
weight of oven-dried soil=	24.28
weight of air-dried soil=	25.41
hygroscopic moisture correction factor=	0.96
weight of oven-dried sample for hydro. anal.=	113.02

SIEVE ANALYSIS

weight of oven-dried sample= 113.02

Sieve #	Weight Ret.	Weight Passed	% Passing
4	2.29	110.73	98.0
10	0	110.73	98.0
20	1.85	108.88	96.3
40	6.14	102.74	90.9
60	10.01	92.73	82.0
100	23.51	69.22	61.2
200	16.41	52.81	46.7
230	0.33	52.48	46.4
pan	0.02	52.46	46.4

HYDROMETER ANALYSIS

weight	113.02
SG	2.45

TIME	ACTUAL READING	TEMP.	COMPOSITE CORRECTION	R	LENGTH	K	DIAMETER	P
2	1.033	22	0.00325	1.02975	7.6	0.01421	.02762	44.5
5	1.032	22	0.00325	1.02875	7.8	0.01421	.01777	43.0
15	1.031	22	0.00325	1.02775	8.1	0.01421	.01043	41.5
30	1.03	22	0.00325	1.02675	8.4	0.01421	.00750	40.0
60	1.029	22	0.00325	1.02575	8.6	0.01421	.00538	38.5
250	1.027	21	0.00350	1.02350	9.1	0.01438	.00275	35.1
1440	1.025	21	0.00350	1.02150	9.7	0.01438	.00118	32.1

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Charleston, South Carolina 29407
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Charleston, South Carolina 29417
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Page 1 of 1

CHAIN OF CUSTODY RECORD

9901703

Client Name/Facility Name: TetraTech NUS / CNC

Collected by/Company: James R. Hill

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/TOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	PAH	TPH	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Grain Size	Remarks
01	Ø75LBØ8Ø2	1-22-99	0845		✓	✓		8						3		1	1							3	.1
02	Ø75LBØ6Ø2	"	0920		✓	✓		4						3		1									.2
03	Ø75LBØ6Ø2D	"	0920		✓	✓		4						3		1									Dupe
04	Ø75LBØ4Ø2	"	0955		✓	✓		4						3		1									
05	Ø75LB12Ø2	"	1007		✓	✓		1		1				3		1									.3
06	Ø75LBØ5Ø2	"	1035		✓	✓		4						3		1									.2
07	Ø75LBØ2Ø1	"	1055		✓	✓		4						3		1									
08	ZHTLØØ7Ø1	"	1157			✓		3						3											Trip Blank .4

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

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
James R. Hill	1-22-99		[illegible]	1/22/99		VOC = BTEX, MTBE, Standard Turnaround

White = sample collector Yellow = file Pink = with report

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: April 05, 1999

Sample ID : ZHTL01801
Lab ID : 9903642-01
Matrix : Water
Date Collected : 03/17/99
Date Received : 03/18/99
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	MAP	03/24/99	0945	145147	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	MAP	03/24/99	0945	145147	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	MAP	03/24/99	0945	145147	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		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 05, 1999

Sample ID : ZHTL01801

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	MAP	03/24/99	0945	145147	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	EDB-8260B	70.1*	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	111.	(66.0 - 117.)
Toluene-d8	EDB-8260B	80.9	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	70.1*	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	111.	(66.0 - 117.)
Toluene-d8	MTBE-8260B	80.9	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	70.1*	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	111.	(66.0 - 117.)
Toluene-d8	NAP-8260B	80.9	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	70.1*	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	111.	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	80.9	(73.0 - 122.)

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

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 05, 1999

Sample ID : ZHTL01801

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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9903642-01

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: April 09, 1999

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

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

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

cc: TETR00498 Report Date: April 09, 1999

Sample ID : ZHRL00601 (RINSE BLANK)

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

The following prep procedures were performed:

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

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

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)

Sample ID : ZHRL00601 (RINSE BLANK)

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

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

Notes:
The qualifiers in this report are defined as follows:
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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.

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 09, 1999

Sample ID : ZHRL00601 (RINSE BLANK)

M = Method **Method-Description**

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

Reviewed By

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9903846-02

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: April 05, 1999

Sample ID : 07GLM0101
Lab ID : 9903642-02
Matrix : Water
Date Collected : 03/17/99
Date Received : 03/18/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	5.00	5.00	ug/l	5.0	MAP	03/24/99	1243	145147	1
ERT-BUTYL METHYL ETHER		ND	18.0	25.0	ug/l	5.0					
APHTHALENE		178	3.00	5.00	ug/l	5.0	MAP	03/24/99	1243	145147	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	1.00	5.00	ug/l	5.0	MAP	03/24/99	1243	145147	1
1,1,2,2-TETRACHLOROETHANE		ND	2.50	5.00	ug/l	5.0					
1,1,2-TRICHLOROETHANE	U	ND	2.00	5.00	ug/l	5.0					
1,1-DICHLOROETHANE	U	ND	2.00	5.00	ug/l	5.0					
1,1-DICHLOROETHENE	U	ND	3.50	5.00	ug/l	5.0					
1,2-DICHLOROBENZENE	U	ND	2.00	5.00	ug/l	5.0					
1,2-DICHLOROETHANE	U	ND	1.00	5.00	ug/l	5.0					
1,2-DICHLOROPROPANE	U	ND	1.00	5.00	ug/l	5.0					
TRANS-1,2-DICHLOROETHENE		ND	3.50	5.00	ug/l	5.0					
1,3-DICHLOROBENZENE	U	ND	1.50	5.00	ug/l	5.0					
1,4-DICHLOROBENZENE	U	ND	1.50	5.00	ug/l	5.0					
BENZENE		25.6	1.50	5.00	ug/l	5.0					
BROMOFORM	U	ND	2.00	5.00	ug/l	5.0					
CARBON TETRACHLORIDE	U	ND	1.00	5.00	ug/l	5.0					
CHLOROBENZENE		10.4	1.50	5.00	ug/l	5.0					
CHLORODIBROMOMETHANE	U	ND	1.50	5.00	ug/l	5.0					
CHLOROETHANE	U	ND	1.50	5.00	ug/l	5.0					
CHLOROFORM	U	ND	3.50	5.00	ug/l	5.0					
BROMODICHLOROMETHANE	U	ND	2.00	5.00	ug/l	5.0					
DICHLORODIFLUOROMETHANE		ND	6.00	25.0	ug/l	5.0					
ETHYLBENZENE	J	2.63	1.50	5.00	ug/l	5.0					
BROMOMETHANE	U	ND	1.50	5.00	ug/l	5.0					
CHLOROMETHANE	U	ND	1.00	5.00	ug/l	5.0					
METHYLENE CHLORIDE	U	ND	6.00	25.0	ug/l	5.0					

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)

Sample ID : 07GLM0101

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
TETRACHLOROETHYLENE	U	ND	3.50	5.00	ug/l	5.0					
TOLUENE		7.53	2.50	5.00	ug/l	5.0	MAP	03/24/99	1243	145147	1
TRICHLOROETHYLENE (TCE)	U	ND	3.00	5.00	ug/l	5.0					
TRICHLOROFLUOROMETHANE		ND	8.50	25.0	ug/l	5.0					
VINYL CHLORIDE	U	ND	2.00	5.00	ug/l	5.0					
XYLENES, TOTAL	U	ND	5.50	10.0	ug/l	5.0					
CIS-1,3-DICHLOROPROPENE	U	ND	1.50	5.00	ug/l	5.0					
TRANS-1,3-DICHLOROPROPENE		ND	1.50	5.00	ug/l	5.0					
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE		86.6	2.24	10.2	ug/l	1.0	TSD	03/27/99	1727	144885	3
ACENAPHTHYLENE	J	2.04	1.33	10.2	ug/l	1.0					
ANTHRACENE	J	2.54	2.35	10.2	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.86	10.2	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.04	10.2	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.79	10.2	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.55	10.2	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.65	10.2	ug/l	1.0					
CHRYSENE	U	ND	2.24	10.2	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.24	10.2	ug/l	1.0					
FLUORANTHENE	U	ND	3.16	10.2	ug/l	1.0					
FLUORENE		46.7	2.14	10.2	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.47	10.2	ug/l	1.0					
PHENANTHRENE		21.2	1.84	10.2	ug/l	1.0					
PYRENE	U	ND	2.55	10.2	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	ES	03/19/99	1445	144885	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	70.4	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	68.8	(35.3 - 108.)

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)

Sample ID : 07GLM0101

Surrogate Recovery	Test	Percent %	Acceptable Limits
p-Terphenyl-d14	M610-TETR	62.7	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	74.2	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	114.	(66.0 - 117.)
Toluene-d8	EDB-8260B	85.1	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	74.2	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	114.	(66.0 - 117.)
Toluene-d8	MTBE-8260B	85.1	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	74.2	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	114.	(66.0 - 117.)
uene-d8	NAP-8260B	85.1	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	74.2	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	114.	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	85.1	(73.0 - 122.)

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

Notes:
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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.

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 05, 1999

Sample ID : 07GLM0101

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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9903642-02

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 07, 1999

Sample ID	: 07GLM0101
Lab ID	: 9903788-12
Matrix	: Water
Date Collected	: 03/22/99
Date Received	: 03/22/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
NITROGEN, NITRATE	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/22/99	2345	145119	1
SULFATE (AS SO4)		9.48	0.0380	0.200	mg/l	1.0					

M = Method	Method-Description
M 1	EPA 300.0

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, Valerie Davis at (843) 769-7391.

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9903788-12

GENERAL ENGINEER LABORATORY

Client Sample ID: 07GL40101

GC Volatiles

Lot-Sample #...:	I9C230133-005	Work Order #...:	CRVWE101	Matrix.....:	WATER
Date Sampled...:	03/22/99 09:55	Date Received..:	03/23/99		
Prep Date.....:	03/30/99	Analysis Date..:	03/30/99		
Prep Batch #...:	9090364	Analysis Time..:	09:41		
Dilution Factor:	1				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	460 B,E	0.50	ug/L

NOTE(S):

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

E Estimated result. Result concentration exceeds the calibration range.

GENERAL ENGINEER LABORATORY

Client Sample ID: 07GLM0101

GC Volatiles

Lot-Sample #...:	I9C230133-005	Work Order #...:	CRVWE201	Matrix.....:	WATER
Date Sampled...:	03/22/99 09:55	Date Received..:	03/23/99		
Prep Date.....:	03/31/99	Analysis Date..:	03/31/99		
Prep Batch #...:	9092227	Analysis Time..:	10:21		
Dilution Factor:	100				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	6100 B,D	50	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.

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 05, 1999

Sample ID : 07GLM0201
Lab ID : 9903642-03
Matrix : Water
Date Collected : 03/17/99
Date Received : 03/18/99
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	MAP	03/24/99	1015	145147	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	MAP	03/24/99	1015	145147	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	MAP	03/24/99	1015	145147	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 05, 1999

Sample ID : 07GLM0201

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	MAP	03/24/99	1015	145147	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					
·actable Organics											
·yaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.27	10.3	ug/l	1.0	TSD	03/27/99	1757	144885	3
ACENAPHTHYLENE	U	ND	1.34	10.3	ug/l	1.0					
ANTHRACENE	U	ND	2.37	10.3	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.88	10.3	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.06	10.3	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.84	10.3	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.58	10.3	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.68	10.3	ug/l	1.0					
CHRYSENE	U	ND	2.27	10.3	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.27	10.3	ug/l	1.0					
FLUORANTHENE	U	ND	3.19	10.3	ug/l	1.0					
FLUORENE	U	ND	2.16	10.3	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.50	10.3	ug/l	1.0					
PHENANTHRENE	U	ND	1.85	10.3	ug/l	1.0					
PYRENE	U	ND	2.58	10.3	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds ES 03/19/99 1445 144885 4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	77.0	(41.2 - 107.)
trobenzene-d5	M610-TETR	71.8	(35.3 - 108.)

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)

Sample ID : 07GLM0201

Surrogate Recovery	Test	Percent %	Acceptable Limits
p-Terphenyl-d14	M610-TETR	57.2	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	82.6	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	116.	(66.0 - 117.)
Toluene-d8	EDB-8260B	89.8	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	82.6	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	116.	(66.0 - 117.)
Toluene-d8	MTBE-8260B	89.8	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	82.6	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	116.	(66.0 - 117.)
Toluene-d8	NAP-8260B	89.8	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	82.6	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	116.	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	89.8	(73.0 - 122.)

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

Notes:
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* 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)

Sample ID : 07GLM0201

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 07, 1999

Sample ID	: 07GLM0201
Lab ID	: 9903788-13
Matrix	: Water
Date Collected	: 03/22/99
Date Received	: 03/22/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
NITROGEN, NITRATE	J	0.0190	0.0127	0.0500	mg/l	1.0	RWS	03/22/99	2359	145119	1
SULFATE (AS SO4)		2.91	0.0380	0.200	mg/l	1.0					

M = Method	Method-Description
M 1	EPA 300.0

Notes:
The qualifiers in this report are defined as follows:
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9903788-13

GENERAL ENGINEER LABORATORY

Client Sample ID: 07GLM0201

GC Volatiles

Lot-Sample #...:	I9C230133-006	Work Order #...:	CRVWK101	Matrix.....:	WATER
Date Sampled...:	03/22/99 10:00	Date Received..:	03/23/99		
Prep Date.....:	03/30/99	Analysis Date..:	03/30/99		
Prep Batch #...:	9090364	Analysis Time..:	09:47		
Dilution Factor:	1				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	440 B,E	0.50	ug/L

NOTE(S):

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

E Estimated result. Result concentration exceeds the calibration range.

GENERAL ENGINEER LABORATORY

Client Sample ID: 07GLM0201

GC Volatiles

Lot-Sample #...:	I9C230133-006	Work Order #...: CRVWK201	Matrix.....: WATER
Date Sampled...:	03/22/99 10:00	Date Received..: 03/23/99	
Prep Date.....:	03/31/99	Analysis Date..: 03/31/99	
Prep Batch #...:	9092227	Analysis Time..: 10:33	
Dilution Factor:	200		
		Method.....: RSK SOP-175	

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	8000 B,D	100	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.

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 05, 1999

Sample ID : 07GLM0301
Lab ID : 9903642-04
Matrix : Water
Date Collected : 03/17/99
Date Received : 03/18/99
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	MAP	03/23/99	1735	145147	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE		27.9	0.600	5.00	ug/l	1.0	MAP	03/23/99	1735	145147	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	MAP	03/23/99	1735	145147	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 05, 1999

Sample ID : 07GLM0301

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	MAP	03/23/99	1735	145147	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	J	3.89	2.27	10.3	ug/l	1.0	TSD	03/27/99	1828	144885	3
ACENAPHTHYLENE	U	ND	1.34	10.3	ug/l	1.0					
ANTHRACENE	U	ND	2.37	10.3	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.88	10.3	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.06	10.3	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.84	10.3	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.58	10.3	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.68	10.3	ug/l	1.0					
CHRYSENE	U	ND	2.27	10.3	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.27	10.3	ug/l	1.0					
FLUORANTHENE	U	ND	3.19	10.3	ug/l	1.0					
FLUORENE	U	ND	2.16	10.3	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.50	10.3	ug/l	1.0					
PHENANTHRENE	U	ND	1.85	10.3	ug/l	1.0					
PYRENE	U	ND	2.58	10.3	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds ES 03/19/99 1445 144885 4

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	79.2	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	72.7	(35.3 - 108.)

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 05, 1999

Sample ID : 07GLM0301

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	49.2	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	74.7	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	112.	(66.0 - 117.)
Toluene-d8	EDB-8260B	83.4	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	74.7	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	112.	(66.0 - 117.)
Toluene-d8	MTBE-8260B	83.4	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	74.7	(73.0 - 129.)
`romofluoromethane	NAP-8260B	112.	(66.0 - 117.)
.uene-d8	NAP-8260B	83.4	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	74.7	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	112.	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	83.4	(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 05, 1999

Sample ID : 07GLM0301

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	
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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 05, 1999

Sample ID : 07GLM0401
Lab ID : 9903642-05
Matrix : Water
Date Collected : 03/17/99
Date Received : 03/18/99
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	MAP	03/24/99	1044	145147	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	J	3.31	0.600	5.00	ug/l	1.0	MAP	03/24/99	1044	145147	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	MAP	03/24/99	1044	145147	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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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 05, 1999

Sample ID : 07GLM0401

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	MAP	03/24/99	1044	145147	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	J	8.18	2.20	10.0	ug/l	1.0	TSD	03/27/99	1859	144885	3
ACENAPHTHYLENE	U	ND	1.30	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.30	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.80	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.00	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.70	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.50	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.60	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.20	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.20	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.10	10.0	ug/l	1.0					
FLUORENE	U	ND	2.10	10.0	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.40	10.0	ug/l	1.0					
PHENANTHRENE	U	ND	1.80	10.0	ug/l	1.0					
PYRENE	U	ND	2.50	10.0	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds ES 03/19/99 1445 144885 4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	78.7	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	76.5	(35.3 - 108.)

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STATE	GEL	EPI
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SC	10120	10582
TN	02934	02934

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

Sample ID : 07GLM0401

Surrogate Recovery	Test	Percent %	Acceptable Limits
p-Terphenyl-d14	M610-TETR	43.8	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	80.9	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	116.	(66.0 - 117.)
Toluene-d8	EDB-8260B	88.4	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	80.9	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	116.	(66.0 - 117.)
Toluene-d8	MTBE-8260B	88.4	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	80.9	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	116.	(66.0 - 117.)
Toluene-d8	NAP-8260B	88.4	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	80.9	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	116.	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	88.4	(73.0 - 122.)

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

Notes:
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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 05, 1999

Sample ID : 07GLM0401

M = Method	Method-Description

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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 05, 1999

Sample ID	: 07GLM0501
Lab ID	: 9903642-06
Matrix	: Water
Date Collected	: 03/17/99
Date Received	: 03/18/99
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	MAP	03/24/99	1114	145147	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
PHTHALENE		84.7	0.600	5.00	ug/l	1.0	MAP	03/24/99	1114	145147	2
Priority Pollutant Volatiles - 32 uems											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	MAP	03/24/99	1114	145147	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	J	0.506	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	J	0.762	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					
THYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

Client: Tetra Tech NUS, Inc.
794 South Military Trail
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Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Report Date: April 05, 1999

Sample ID : 07GLM0501

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	MAP	03/24/99	1114	145147	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		186	9.06	41.2	ug/l	4.0	TSD	03/29/99	1238	144885	3
ACENAPHTHYLENE	U	ND	1.34	10.3	ug/l	1.0	TSD	03/27/99	1930	144885	3
ANTHRACENE	J	2.56	2.37	10.3	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.88	10.3	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.06	10.3	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.84	10.3	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.58	10.3	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.68	10.3	ug/l	1.0					
CHRYSENE	U	ND	2.27	10.3	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.27	10.3	ug/l	1.0					
FLUORANTHENE	U	ND	3.19	10.3	ug/l	1.0					
FLUORENE		74.1	2.16	10.3	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.50	10.3	ug/l	1.0					
PHENANTHRENE		18.7	1.85	10.3	ug/l	1.0					
PYRENE	U	ND	2.58	10.3	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds ES 03/19/99 1445 144885 4

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	78.4	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	71.2	(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)

Sample ID : 07GLM0501

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	52.5	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	79.8	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	119.*	(66.0 - 117.)
Toluene-d8	EDB-8260B	87.5	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	79.8	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	119.*	(66.0 - 117.)
Toluene-d8	MTBE-8260B	87.5	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	79.8	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	119.*	(66.0 - 117.)
Toluene-d8	NAP-8260B	87.5	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	79.8	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	119.*	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	87.5	(73.0 - 122.)

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

Notes:
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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 05, 1999

Sample ID : 07GLM0501

M = Method	Method-Description

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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 05, 1999

Sample ID : 07GLM0601
Lab ID : 9903642-07
Matrix : Water
Date Collected : 03/17/99
Date Received : 03/18/99
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	MAP	03/24/99	1144	145147	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
PHTHALENE		29.9	0.600	5.00	ug/l	1.0	MAP	03/24/99	1144	145147	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	MAP	03/24/99	1144	145147	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	J	0.654	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					
THYLENE CHLORIDE	U	ND	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	
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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)

Sample ID : 07GLM0601

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	MAP	03/24/99	1144	145147	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	J	9.24	2.20	10.0	ug/l	1.0	TSD	03/27/99	2001	144885	3
ACENAPHTHYLENE	U	ND	1.30	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.30	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.80	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.00	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.70	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.50	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.60	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.20	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.20	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.10	10.0	ug/l	1.0					
FLUORENE	U	ND	2.10	10.0	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.40	10.0	ug/l	1.0					
PHENANTHRENE	U	ND	1.80	10.0	ug/l	1.0					
PYRENE	U	ND	2.50	10.0	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds ES 03/19/99 1445 144885 4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	55.9	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	52.1	(35.3 - 108.)

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 05, 1999

Sample ID : 07GLM0601

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	42.8	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	78.2	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	117.	(66.0 - 117.)
Toluene-d8	EDB-8260B	85.9	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	78.2	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	117.	(66.0 - 117.)
Toluene-d8	MTBE-8260B	85.9	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	78.2	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	117.	(66.0 - 117.)
uene-d8	NAP-8260B	85.9	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	78.2	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	117.	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	85.9	(73.0 - 122.)

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

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

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Laboratory Certifications

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

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

Sample ID : 07GLM0601

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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(843) 556-8171 • Fax (843) 766-1178

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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 07, 1999

Sample ID : 07GLM0601
Lab ID : 9903788-11
Matrix : Water
Date Collected : 03/22/99
Date Received : 03/22/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
NITROGEN, NITRATE	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/22/99	2331	145119	1
SULFATE (AS SO4)		2.86	0.0380	0.200	mg/l	1.0					

M = Method	Method-Description
M 1	EPA 300.0

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.

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Reviewed By

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9903788-11

GENERAL ENGINEER LABORATORY

Client Sample ID: 07GLM0601

GC Volatiles

Lot-Sample #...:	I9C230133-004	Work Order #...:	CRVWD101	Matrix.....:	WATER
Date Sampled...:	03/22/99 09:45	Date Received..:	03/23/99		
Prep Date.....:	03/30/99	Analysis Date..:	03/30/99		
Prep Batch #...:	9090364	Analysis Time..:	09:34		
Dilution Factor:	1				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	430 B,E	0.50	ug/L

NOTE(S):

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

E Estimated result. Result concentration exceeds the calibration range.

GENERAL ENGINEER LABORATORY

Client Sample ID: 07GLM0601

GC Volatiles

Lot-Sample #...:	I9C230133-004	Work Order #...:	CRVWD201	Matrix.....:	WATER
Date Sampled...:	03/22/99 09:45	Date Received..:	03/23/99		
Prep Date.....:	03/31/99	Analysis Date..:	03/31/99		
Prep Batch #...:	9092227	Analysis Time..:	10:15		
Dilution Factor:	100				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	4500 B,D	50	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.

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 05, 1999

Sample ID : 07GLM0701
Lab ID : 9903642-08
Matrix : Water
Date Collected : 03/17/99
Date Received : 03/18/99
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	MAP	03/24/99	1213	145147	1
TERT-BUTYL METHYL ETHER	U	ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	J	1.29	0.600	5.00	ug/l	1.0	MAP	03/24/99	1213	145147	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	MAP	03/24/99	1213	145147	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		1.90	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	1.61	1.20	5.00	ug/l	1.0					

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 05, 1999

Sample ID : 07GLM0701

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	MAP	03/24/99	1213	145147	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	2.29	10.4	ug/l	1.0	TSD	03/27/99	2032	144885	3
ACENAPHTHYLENE	U	ND	1.35	10.4	ug/l	1.0					
ANTHRACENE	U	ND	2.39	10.4	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.91	10.4	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.08	10.4	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.89	10.4	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.60	10.4	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.70	10.4	ug/l	1.0					
CHRYSENE	U	ND	2.29	10.4	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.29	10.4	ug/l	1.0					
FLUORANTHENE	U	ND	3.22	10.4	ug/l	1.0					
FLUORENE	U	ND	2.18	10.4	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.54	10.4	ug/l	1.0					
PHENANTHRENE	U	ND	1.87	10.4	ug/l	1.0					
PYRENE	U	ND	2.60	10.4	ug/l	1.0					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	ES	03/19/99	1445	144885 4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	52.6	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	58.2	(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)

Sample ID : 07GLM0701

Surrogate Recovery	Test	Percent %	Acceptable Limits
p-Terphenyl-d14	M610-TETR	30.0*	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	75.9	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	115.	(66.0 - 117.)
Toluene-d8	EDB-8260B	85.1	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	75.9	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	115.	(66.0 - 117.)
Toluene-d8	MTBE-8260B	85.1	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	75.9	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	115.	(66.0 - 117.)
Toluene-d8	NAP-8260B	85.1	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	75.9	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	115.	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	85.1	(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:
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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)

Sample ID : 07GLM0701

M = Method	Method-Description

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

Reviewed By

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

CHAIN OF CUSTODY RECORD

9903642%

Page_____ of _____

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

Collected by/Company: T+ NUS

	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			Remarks
01	ZHTL01801	3/17/99	1700					3			●			3												Trip Blank
02	07GLM0101	3/17/99	1805					5			2			3												
03	07GLM0201	3/17/99	1735					5			2			3												
04	07GLM0301	3/17/99	1820					5			2			3												
05	07GLM0401	3/17/99	1750					5			2			3												
06	07GLM0501	3/17/99	1845					5			2			3												
07	07GLM0601	3/17/99	1720					5			2			3												
08	07GLM0701	3/17/99	1835					5			2			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

3905
-1
.2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Bryan Howe	3/18/99	0800					
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
			P. Howell	3/18/99	8:00	VOC = 8260 w/ MTBE + naphthalene	

White = sample collector Yellow = file Pink = with report

PAH = 8270

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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 05, 1999

Sample ID : 07GLM0701

M = Method **Method-Description**

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Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page_____ of _____

9903642%

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

Collected by/Company: T+ 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			Remarks
01	ZHTL01801	3/17/99	1700					3			•			3												Trip Blank
02	07GLM0101	3/17/99	1805					5			2			3												
03	07GLM0201	3/17/99	1735					5			2			3												
04	07GLM0301	3/17/99	1820					5			2			3												
05	07GLM0401	3/17/99	1750					5			2			3												
06	07GLM0501	3/17/99	1845					5			2			3												
07	07GLM0601	3/17/99	1720					5			2			3												
08	07GLM0701	3/17/99	1835					5			2			3												

3909
-1
-2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Bryan Monge	3/18/99	0800					
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
			P. Powell	3/18/99	8:00	VOC = 8260 w/ MTBE + naphthalene	

White = sample collector Yellow = file Pink = with report

PAH = 8270

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

CHAIN OF CUSTODY RECORD

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	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	P MCH/NP	P Anions	Remarks
12	07GLM0101	3/22/99	0955	X			X	4																3	1	
13	07GLM0201	3/22/99		X			X	4																3	1	

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

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
	3/22/99	1300		3/22/99	1300	

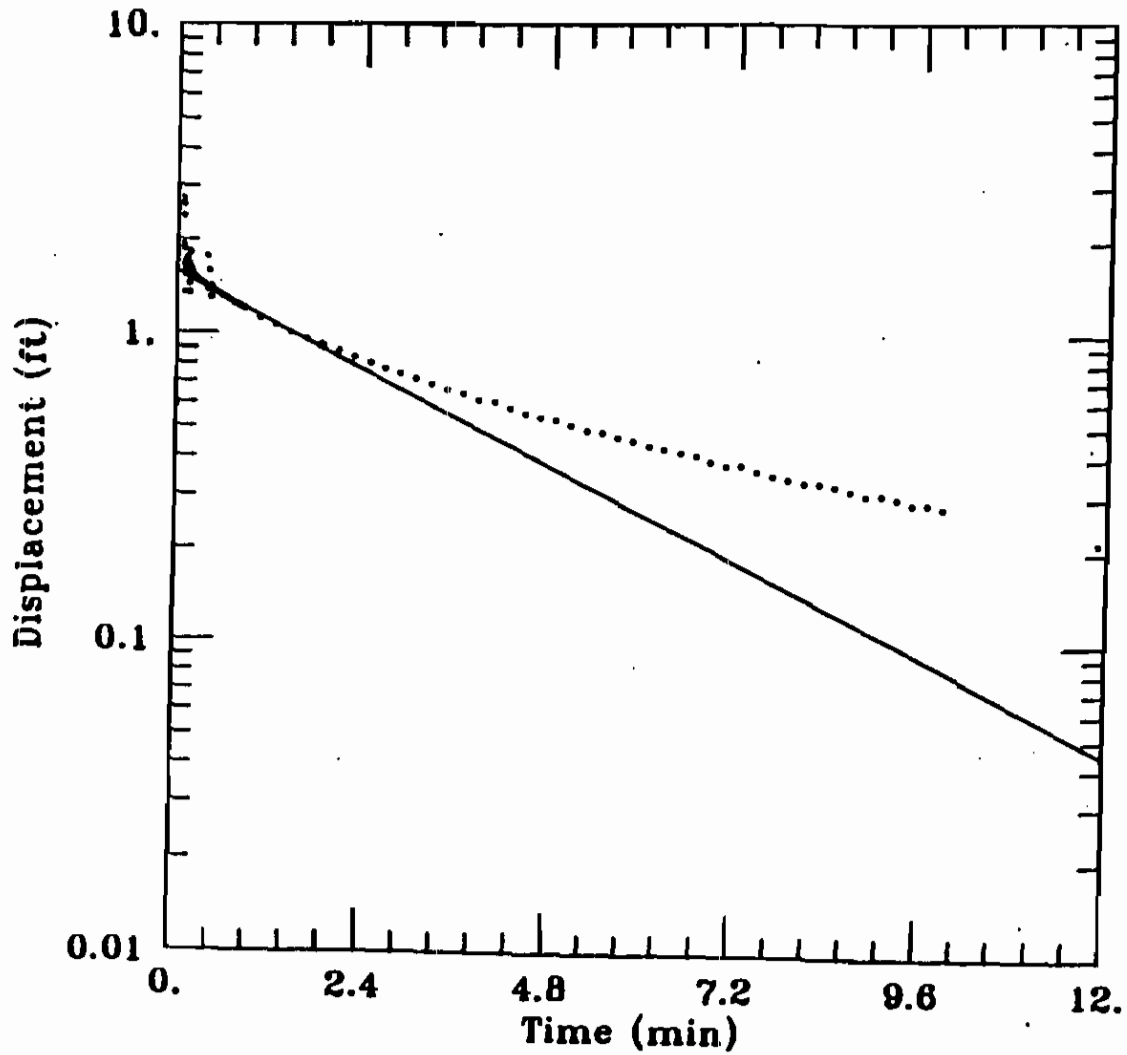
White = sample collector Yellow = file Pink = with report

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

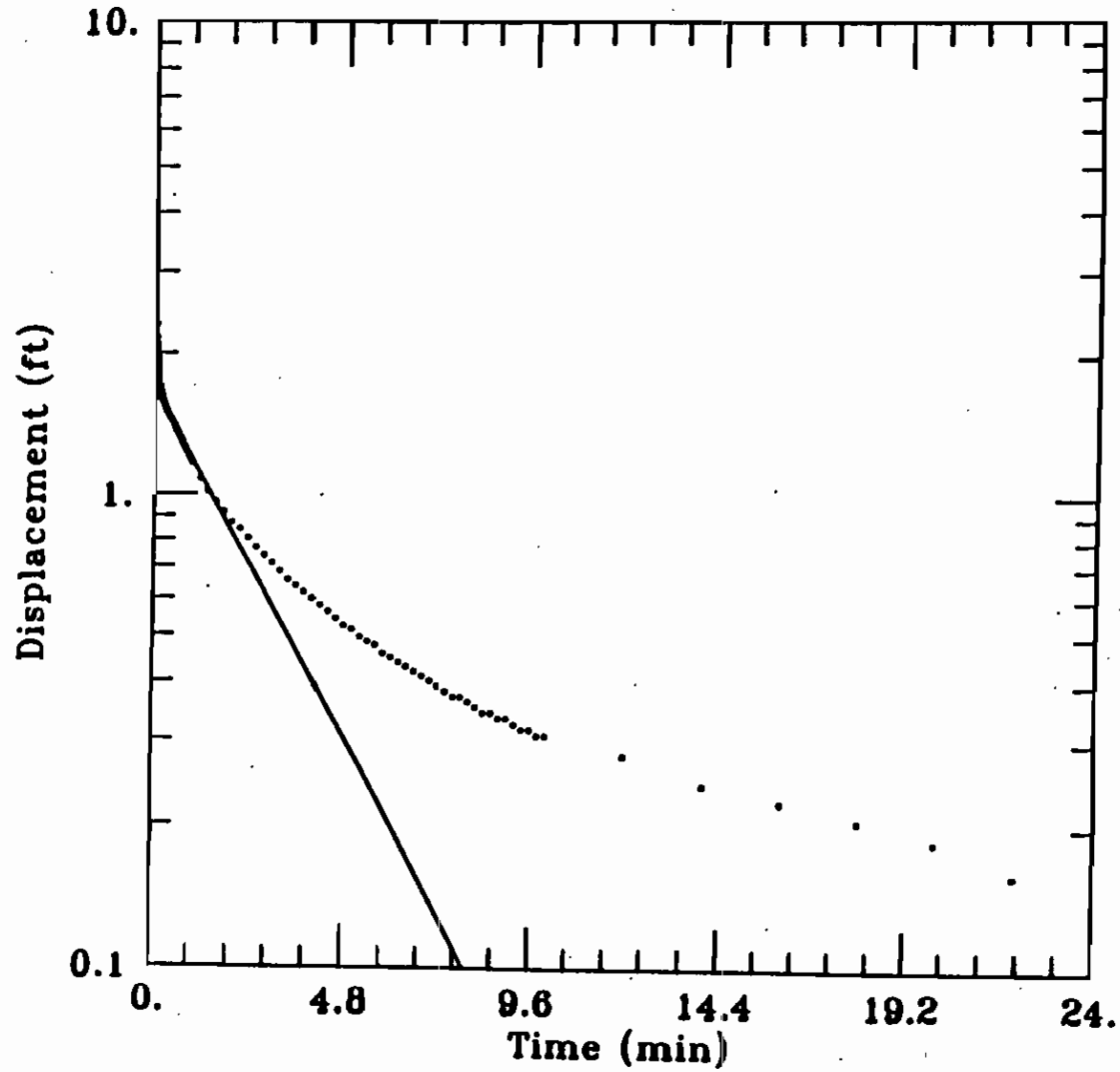
TEST DATA:
H0 = 0.5886 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 10. ft
b = 12. ft
H = 12. ft

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

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

DOMENICO MODEL CALCULATIONS

SITE 07, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATIDN FOR GROUNDWATER TRANSPORT

Predicted 10-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
I = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s I)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without *Biological* Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ m^3/cm	ρ_s g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{OC} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-soil	V m/sec	R_c	C_{POE}/C_{SOURCE}
Benzene	2.5	0.76201	15	2	3.15E+08	1.5350E-06	0.0021	0.44	1.6	0.08	0.03	0.00	1.42E-02	81	1.1502	7.33E-09	5.183	1.125E-01
Naphthalene	2.5	0.76201	15	2	3.15E+08	1.5350E-06	0.0021	0.44	1.60	0.08	0.03	0.00	1.42E-02	1543	21.9106	7.33E-09	80.675	0.000E+00

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATIDN MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_x \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L
Benzene	0.026	0.003
Naphthalene	0.178	0.0000

Prepared By: _____

Reviewed By: _____

SITE 07, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNOWATER TRANSPORT

Predicted 20-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
I = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s I)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE}	X_{POE}	Y	Z	t	K_s	I	θ	ρ_s	α_x	α_y	α_z	f_{oc}	k_{oc}	k_D	V	R_c	C_{POE}/C_{SOURCE}
	ft	m	m	m	sec	m/sec	m/m	m^3/cm	g/cm^3	m	m	m	g-C/g-soil	cm^3-H_2O/g-C	cm^3-H_2O/g-soil	m/sec		
Benzene	4.2	1.28018	15	2	6.31E+08	1.5350E-03	0.0021	0.44	1.6	0.13	0.04	0.01	1.42E-02	81	1.1502	7.33E-09	5.183	2.080E-01
Naphthalene	2.5	0.76201	15	2	6.31E+08	1.5350E-03	0.0021	0.44	1.6	0.25	0.03	0.01	1.42E-02	1543	21.9106	7.33E-09	80.875	1.802E-05

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1999. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L
Benzene	0.026	0.005
Naphthalene	0.178	0.000

Prepared By: _____

Reviewed By: _____

SITE 07, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Site-Specific Target Level Calculations for Groundwater: Construction Worker Exposure to CNC07-M01

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
I = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_o = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s I)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE}	X_{POE}	Y	Z	t	K_s	I	θ	ρ_s	α_x	α_y	α_z	f_{oc}	k_{oc}	k_o	V	R_c	C_{POE}/C_{SOURCE}
	ft	m	m	m	sec	m/sec	m/m	cm^3/cm^3	g/cm^3	m	m	m	g-C/g-soil	cm^3-H_2O/g-C	cm^3-H_2O/g-soil	m/sec		
Benzene	85	25.9083	15	2	7.88E+09	1.5350E-06	0.0021	0.44	1.6	2.59	0.86	0.13	1.42E-02	61	1.1502	7.33E-09	5.183	1.075E-02
Naphthalene	85	25.9083	15	2	7.88E+09	1.5350E-06	0.0021	0.44	1.6	2.59	0.86	0.13	1.42E-02	1543	21.9106	7.33E-09	80.675	2.293E-17

Constituent	X_{COMP}	X_{COMP}	Y	Z	t	K_s	I	θ	ρ_s	α_x	α_y	α_z	f_{oc}	k_{oc}	k_o	V	R_c	C_{POE}/C_{COMP}
	ft	m	m	m	sec	m/sec	m/m	cm^3/cm^3	g/cm^3	m	m	m	g-C/g-soil	cm^3-H_2O/g-C	cm^3-H_2O/g-soil	m/sec		
Benzene	35	10.6681	15	2	7.88E+09	1.5350E-06	0.0021	0.44	1.6	1.07	0.36	0.05	1.42E-02	61	1.1502	7.33E-09	5.183	5.029E-01
Naphthalene	35	10.6681	15	2	7.88E+09	1.5350E-06	0.0021	0.44	1.6	1.07	0.36	0.05	1.42E-02	1543	21.9106	7.33E-09	80.675	3.626E-16

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	RBSL at POE	$SSTL_{SOURCE}$	$SSTL_{COMP}$
	mg/L	mg/L	mg/L
Benzene	0.005	0.4651	0.0099
Naphthalene	0.010	4.361E+14	2.758E+13

Prepared By: _____

Reviewed By: _____

SITE 07, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Site-Specific Target Level Calculations for Groundwater: Construction Worker Exposure to CNC07-M05

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{source}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{comp}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{comp} = x = Distance from POE to Compliance Point (along Centerline)	m
V = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
I = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s I)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE}	X_{POE}	Y	Z	t	K_s	I	θ	ρ_s	α_x	α_y	α_z	f_{oc}	k_{oc}	k_D	V	R_c	C_{POE}/C_{source}
	ft	m	m	m	sec	m/sec	m/m	cm^3/cm^3	g/cm^3	m	m	m	g-C/g-soil	cm^3-H_2O/g-C	cm^3-H_2O/g-soil	m/sec		
Naphthalene	40	12.1521	15	2	7.88E+09	1.5350E-06	0.0021	0.44	1.6	1.22	0.41	0.06	1.42E-02	1543	21.9106	7.33E-09	80.675	4.905E-17

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	POE RBSL mg/L	$SSTL_{source}$ mg/L
Naphthalene	0.010	2.039E+14

Prepared By: _____

Reviewed By: _____

SITE 07, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Site-Specific Target Level Calculations for Groundwater: Potential Future Off-Site Ingestion

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{source}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{comp}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{poe} = x = Distance from Plume Source to POE (along Centerline)	m
X_{comp} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
I = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_b = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_d = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s I)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE}	X_{POE}	Y	Z	t	K_s	I	θ	ρ_b	α_x	α_y	α_z	f_{oc}	k_{oc}	k_d	V	R_c	C_{POE}/C_{SOURCE}
	ft	m	m	m	sec	m/sec	m/m	cm^3/cm^3	g/cm^3	m	m	m	g-C/g-soil	cm^3-H_2O/g-C	cm^3-H_2O/g-soil	m/sec		
Benzene	1000	304.804	15	2	1.00E+15	1.5350E-06	0.0021	0.44	1.6	30.48	10.16	1.52	1.42E-02	83	1.1786	7.33E-09	5.286	3.972E-03
Naphthalene	1000	304.804	15	2	1.00E+15	1.5350E-06	0.0021	0.44	1.6	30.48	10.16	1.52	1.42E-02	1290	18.318	7.33E-09	67.611	3.972E-03

Constituent	X_{COMP}	X_{COMP}	Y	Z	t	K_s	I	θ	ρ_b	α_x	α_y	α_z	f_{oc}	k_{oc}	k_d	V	R_c	C_{POE}/C_{COMP}
	ft	m	m	m	sec	m/sec	m/m	cm^3/cm^3	g/cm^3	m	m	m	g-C/g-soil	cm^3-H_2O/g-C	cm^3-H_2O/g-soil	m/sec		
Benzene	985	300.232	15	2	1.00E+15	1.5350E-06	0.0021	0.44	1.6	30.02	10.01	1.50	1.42E-02	83	1.1786	7.33E-09	5.286	4.094E-03
Naphthalene	985	300.232	15	2	1.00E+15	1.5350E-06	0.0021	0.44	1.6	30.02	10.01	1.50	1.42E-02	1290	18.318	7.33E-09	67.611	4.094E-03

Source: South Caroline Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	POE RBSL	$SSTL_{SOURCE}$	$SSTL_{COMP}$
	mg/L	mg/L	mg/L
Benzene	0.005	1.259	1.221
Naphthalene	0.010	2.518	2.443

Reviewed By: _____

HYDROCARBON CONSTITUENT CONCENTRATIONS IN WATER BASED ON RAOULT'S LAW

Parameter Descriptions:	Units
C_W = Aqueous Solubility of Organic Constituents Dissolved from Product	mg/L
C_F = Concentration of the Constituent in the Fuel	mg/L
K_{FW} = Fuel/Water Partition Coefficient	
P_F = Density of the Product	g/mL
MW_F = Molecular Weight of the Product	g/mol
C_{SAT} = Aqueous Solubility of the Constituent	mol/L
MW_C = Molecular Weight of the Constituent	g/mol
$K_{FW} = (10^3(mL/L)\ p_F)/(MW_F * C_{SAT}/(MW_C * 1000))$	
$C_W = C_F/K_{FW}$	mg/L

Source: "Solubility, Sorption, and Transport of Hydrophobic Organic Chemicals in Complex Mixtures," EPA Environmental Research Brief, EPA/600/M-91/009, Robert S. Kerr Environmental Research Laboratory, ADA, Oklahoma.

Key Assumptions:

MW_F : Molecular Weight of Weathered Product, Source: "A Practical Approach to the Design, Operation, and Monitoring of In-Situ Soil Venting Systems", Shell Development/Shell Oil Company, Houston, Texas.
P_F : Density of the Product, Source: Conoco Material Safety Data Sheet for unleaded gasoline.

Concentration of Hydrocarbon Constituents in Water Based on Molar Solubility

Constituent	MW_F g/mol	C_{SAT} mg/L	MW_C g/mol	P_F g/mL	K_{FW}	C_F mg/L	C_W mg/L
Benzene	111.00	1,750	78	0.77	309.19	18,480.0	59.77
Toluene	111.00	535	92	0.77	1192.89	115,500.0	96.82
Ethylbenzene	111.00	152	106	0.77	4837.60	15,400.0	3.18
Xylene	111.00	198	106	0.77	3713.71	92,400.0	24.88
Naphthalene	111.00	40	128.2	0.77	22232.88	5,852.0	0.26

SITE 07, BUILDING 653
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Groundwater SSTLs for CNC07-M01

Constituent	POE RBSLs mg/L	Maximum Concentration of Constituents mg/L	$SSTL_{SOURCE}$ mg/L	$SSTL_{COMP}$ mg/L
Benzene	0.005	0.0256	0.4651	0.0099
Naphthalene	0.01	0.178	4.361E+14	2.758E+13

$SSTL_{SOURCE}$ - Groundwater SSTLs in the source area protective of RBSLs at the off-site POE.
$SSTL_{COMP}$ - Groundwater SSTLs at the compliance well that are protective of RBSLs at the off-site POE.

Groundwater SSTLs for CNC07-M05

Constituent	POE RBSLs mg/L	Maximum Concentration of Constituents mg/L	$SSTL_{SOURCE}$ mg/L	$SSTL_{COMP}$ mg/L
Naphthalene	0.01	0.0847	2.039E+14	NA

$SSTL_{SOURCE}$ - Groundwater SSTLs in the source area protective of RBSLs at the off-site POE.
$SSTL_{COMP}$ - Groundwater SSTLs at the compliance well that are protective of RBSLs at the off-site POE.

Prepared By: _____ Reviewed By: _____