N61165.AR.003919
CNC CHARLESTON
5090.3a

RAPID ASSESSMENT REPORT FOR SITE 9 BUILDING 654 ZONE H CNC CHARLESTON SC

9/1/1999

TETRA TECH

Rev.1
09/21/99

Rapid Assessment Report For Site 9, Building 654

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

September 1999

Rev.1
09/21/99

RAPID ASSESSMENT REPORT
FOR
SITE 9, BUILDING 654

ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

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

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

SEPTEMBER 1999

PREPARED UNDER THE SUPERVISION OF:

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

APPROVED FOR SUBMITTAL BY:

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

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment (RA) for Site 9 (Building 654) which includes a closed underground storage tank (UST) system which supplied fuel oil to Building 654 at Charleston Naval Complex (CNC) Zone H, in North Charleston, South Carolina. The RA was performed under the direction of the South Carolina Department of Health and Environmental Control's (SCDHEC's) Rapid Assessment Plan approval letter dated November 4, 1998.

TtNUS performed the following actions during the RA:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, evaluate public and private potable wells, locate utilities, locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed the previously prepared Underground Storage Tank Assessment Report for UST 654 to determine boring locations and monitoring well placements;
- Conducted a site survey to identify utilities and to construct a site plan;
- Performed a direct push investigation to collect soil samples for field screening using an organic vapor analyzer and collect soil and groundwater samples for mobile lab screening analysis of benzene, toluene, ethyl benzene, total xylenes (BTEX), and diesel range organics.
- Installed three temporary monitoring wells to approximately 12 feet below land surface (bls);
- Installed six shallow permanent monitoring wells to approximately 12 feet bls, and a vertical delineation well to approximately 27 feet bls;
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260 and PAHs using USEPA Method 8270;
- Performed groundwater natural attenuation sampling;
- Collected soil samples for laboratory analysis for BTEX and naphthalene using USEPA Method 8260, polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270, total organic carbon (TOC) using USEPA Method 415.1, total recoverable petroleum hydrocarbons (TRPH) using USEPA Method 9071, and grain size analysis using sieve and hydrometer methods; and

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

Conclusion

Benzene was the only Chemicals of Concern (CoC) analyte detected in the soils at concentrations that exceed the SCDHEC Risk Based Screening Levels (RBSLs) for a sandy rich soil matrix less than 5 feet above groundwater. Benzene was detected above the SCDHEC RBSL of 5 μg/kg in samples collected from boring locations CNC09-B04 (33.5 μg/kg), CNC09-B02 (19.20 μg/kg), and CNC09-B05 (6.22 μg/kg). The soil benzene concentrations are less than the benzene Site-Specific Target Level (SSTL) of 307,154 mg/kg calculated for the leaching of benzene from subsurface soils to the groundwater. Groundwater analysis from the March 18, 1999 sampling event indicated no CoC analytes were detected in groundwater at concentrations that exceed the SCDHEC RBSLs. No free product was detected in the groundwater during the RA investigation.

Recommendation

No further action is recommended for this site since groundwater contamination is below the SCDHEC RBSLs and soil contamination is below the RBSLs or SSTLs concentrations.

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.

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 17132
GREGORY D. SWANSON

Approved By: 9/24/99

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

TABLE OF CONTENTS

SECTION		PAGE
1.0	**INTRODUCTION**	**1-1**
1.1	SITE DESCRIPTION	1-1
1.2	SITE HISTORY	1-2
1.3	RECEPTOR SURVEY RESULTS	1-3
1.4	REGIONAL GEOLOGY AND HYDROGEOLOGY	1-4
2.0	**ASSESSMENT INFORMATION**	**2-1**
2.1	SITE-SPECIFIC GEOLOGY AND HYDROGEOLOGY	2-1
2.1.1	Site Geology	2-1
2.1.2	Site Hydrogeology	2-1
2.2	ASSESSMENT RESULTS	2-2
2.3	FIELD SCREENING ASSESSMENT	2-3
2.3.1	Soil Vapor Assessment	2-3
2.3.2	Soil Mobile Lab Results	2-4
2.3.3	Groundwater Mobile Lab Results	2-4
2.4	CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER	2-5
2.4.1	Chemicals of Concern in Soil	2-5
2.4.2	Chemicals of Concern in Groundwater	2-5
2.5	ANALYTICAL DATA	2-5
2.6	AQUIFER CHARACTERISTICS AND EVALUATION	2-6
2.7	FATE AND TRANSPORT	2-7
2.8	PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN	2-7
3.0	**TIER 2 EVALUATION**	**3-1**
3.1	COMPARISON OF ANALYTICAL RESULTS WITH RBSLs	3-1
3.2	EXPOSURE SETTING CHARACTERIZATION	3-1
3.3	EXPOSURE PATHWAY ANALYSIS	3-1
3.3.1	On-Site Commercial Worker	3-2
3.3.2	On-Site Visitor	3-2
3.3.3	On-Site Construction Worker	3-2
3.3.4	On-Site Resident	3-2
3.3.5	Off-Site Resident	3-3
3.3.6	Surface Water	3-3
3.4	INDENTIFICATION OF DATA REQUIREMENTS	3-3
3.5	SITE-SPECIFIC TARGET LEVELS	3-3
3.6	RECOMMENDATIONS	3-3
4.0	**REFERENCES**	**4-1**

TABLE OF CONTENTS (Continued)

TABLES

1 GROUNDWATER ELEVATIONS
2 GROUNDWATER FIELD MEASUREMENTS
3 GROUNDWATER NATURAL ATTENUATION FIELD MEASUREMENTS
4 SUMMARY OF OVA SOIL SCREENING RESULTS
5 SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOIL
6 SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR GROUNDWATER
7 SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
8 SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
9 COMPARISON OF MAXIMUM CONCENTRATIONS TO RBSLS
10 EXPOSURE PATHWAY ASSESSMENT – CURRENT USE
11 EXPOSURE PATHWAY ASSESSMENT – FUTURE USE
12 FATE AND TRANSPORT INPUT PARAMETERS

FIGURES

1 Site Location Map
2 Site Vicinity Map
3 Site Map and Sampling Locations
4 Geologic Cross Section A to A[1]
5 Geologic Cross Section B to B[1]
6 Groundwater Potentiometric Map, February 23, 1999
7 Soil Benzene Concentration Map
8 Soil Ethylbenzene Concentration Map
9 Soil Total Xylenes Concentration Map
10 Soil Toluene Concentration Map
11 Soil Benzo(a)Anthracene Concentration Map
12 Soil Benzo(b)Fluoranthene Concentration Map
13 Soil Benzo(k)Fluoranthene Concentration Map
14 Soil Naphthalene Concentration Map
15 Soil Chrysene Concentration Map
16 Groundwater Naphthalene Concentration Map

APPENDICES

A UNDERGROUND STORAGE TANK ASSESSMENT REPORT - 654 UST
B GEOLOGIC BORING LOGS
C FIELD SAMPLING DATA SHEETS
D SOIL AND GROUNDWATER LABORATORY ANALYTICAL DATA
E AQUIFER CHARACTERIZATION GRAPHS
F SOIL LEACHABILITY MODEL

1.0 INTRODUCTION

Site 9 is a closed underground storage tank (UST) system located adjacent to Building 654 at the Charleston Naval Complex (CNC), Zone H in Charleston, South Carolina. This Rapid Assessment (RA) was performed by Tetra Tech NUS, Inc.'s (TtNUS'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 approval letter dated November 4, 1998. Fieldwork necessary to complete the RA was performed December 12-28, 1998; and January 11-24, February 17-23, and March 19-21, 1999, by TtNUS.

1.1 SITE DESCRIPTION

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

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

Building 654 is the former Charleston Naval Base Administration building. UST 654 was a 2,000-gallon steel tank which supplied heating oil to the building. The age of the UST 654 is unknown; however, "sti-P_3" markings identifed on the UST during the UST closure indicates the UST system was installed sometime between 1970 and 1975. Prior to this time period, records on Building 654 indicated the piping system was installed in 1962; and it is assumed the tank was replaced in the last 20 years due to failure. The date the UST system was last in operation was reported as unknown [Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston

(SPORTENDETCHASN), 1997. UST 654 is located approximately 15 feet southeast of Building 654. A concrete pad used as a containment base for a former aboveground storage tank (AST) is located approximately 8 feet west of UST 654, as shown on Figure 3. For purposes of this RA, UST 654 was designated as Site 9.

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 [Ensafe/Allan & Hoshall, Inc. (E/A&H), 1996].

In 1993, major cuts in defense spending, as a result in part to the end of the cold war, caused CNC to be added to the list of bases scheduled for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure and transition of property back to the community (E/A&H, 1996). With the scheduled closure of the base, operations were scaled back and environmental cleanup proceeded to make the property available for redevelopment after closure. As part of the environmental cleanup process, the UST at Building 654 was removed in February 1997.

The UST system for Building 654 was removed, cleaned, and recycled as scrap metal during the tank closure performed between January and February 1997. At the time of the removal, UST 654 and the fuel supply and return lines were reported to be in very good condition with no visible signs of corrosion, pitting, or holes in the tank or piping. The depth to the base of the UST was 7 feet below land surface (bls) and the fuel lines were located approximately 1 foot bls. The fuel supply lines were constructed of copper tubing (SPORTENDETCHASN, 1997). The analytical results and UST Assessment report (SPORTENDETCHASN, 1997) are included in Appendix A.

During excavation of UST 654 a mild petroleum odor was reported from soils excavated from the tank pit. Soil samples collected during the tank removal identified polynuclear aromatic hydrocarbons (PAHs) in samples collected near the fuel supply and return lines and tank pit area. Soils excavated during the UST removal were transported to Building 1601 for disposal or remediation (SPORTENDETCHASN, 1997).

1.3 RECEPTOR SURVEY RESULTS

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

- Water utility, sanitary sewer utility: A sanitary sewer line originates on the southeast side of Building 654 and flows south-southeast. A sanitary sewer line also extends from the parking lot area of Building 654 to Building 686, located west-southwest of the site. This sanitary sewer line also extends toward the northeast connecting to the sanitary sewer line which borders the southwest side of Partridge Avenue. The nearest downgradient sanitary sewer line is located approximately 45 feet west-southwest of the UST 654 area. A water line enters Building 654 on the northeast side of the building approximately 20 feet northeast of the UST 654 area. This water line connects with a water main which borders the southwest side of Partridge Avenue.

- Storm sewer utility: A storm sewer utility line and storm water drains are located in the parking lot area for Building 654. This storm sewer drain and line are located approximatley 135 feet south-southeast and downgradient of the UST 654 area. A storm sewer utility line and stormwater drain is also located northwest of Building 654 on the southside of West Osprey Street. This storm sewer utility line extends from the storm drain on West Osprey Street and enters beneath Building 654 prior to connecting to the storm drain system in the parking lot. The storm sewer utility line is located approximately 100 feet west-southwest of the UST 654 area.

- Electrical utility: A subsurface electrical utility line is located approximately 15 feet south and downgradient of the UST 654 area. The subsurface electrical line services two electrical transformers located west and southwest of UST 654. The subsurface electrical utility extends toward the east and ties into the overhead electical system. A subsurface electrical utility is also located along the southwest edge of Partridge Avenue.

A survey of groundwater users within a seven-mile radius of CNC was performed for the Final RCRA Facility Investigation Report for Zone H (E/A&H, 1996). According to this report, a survey of groundwater users within a seven-mile radius of CNC was conducted by the South Carolina Water Resources Commission to ascertain the extent of any shallow groundwater usage. Results of the water use investigation revealed that no drinking water wells, which utilize the shallow aquifer, are located within a four-mile radius of CNC. Irrigation wells were not identified within 1,000 feet of the site. Numerous monitoring wells are located within 1,000 feet of the site. The nearest surface water body to the site is Cooper River located approximately 1,300 feet north-northeast from the site.

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

1.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

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

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

Groundwater occurs under water table or poorly confined conditions within the recent or Pliestocene deposits overlying the Ashley Formation of the Cooper Group. 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 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 9 under the supervision of a TtNUS geologist between December 17, 1998, and January 12, 1999 (Figure 3). These borings ranged in depth from 4 to 12 feet bls and provided soil samples to characterize the subsurface lithology. On February 17, 1999 six monitoring wells were installed to a depth of 12 feet bls and grab samples were collected to describe the subsurface lithology. On February 18 and 19, 1999 a vertical delineation well was installed and during the drilling process lithologic samples were collected using a split spoon sampler to characterize the subsurface lithology from 14 to 26 feet bls.

Based on lithologic descriptions from the soil borings and monitoring wells, the subsurface soils generally consists of silty sand and clayey sand interlayers from the surface to approximately 8 feet bls. Underlying these deposits a dark gray mucky clay was encountered to a depth of 27 feet bls. A general view of the subsurface lithology is presented in Figures 4 and 5. Boring logs are presented in Appendix B.

2.1.2 Site Hydrogeology

Six shallow water table monitoring wells, CNC09-M01, CNC09-M02, CNC09-M03, CNC09-M04, CNC09-M05 and CNC09-M06, and one deep vertical delineation monitoring well, CNC09-M07, were installed as part of this RA investigation (see Figure 3). The shallow monitoring wells were completed to a depth of 12 feet bls. Each shallow monitoring well was completed using 10 feet of 0.01-inch machine- slotted Schedule 40 polyvinyl chloride (PVC) screen that bracketed the water table. Monitoring well CNC08-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 27 feet and a 2-inch-diameter PVC monitoring well was installed with a 5-foot, 0.01-inch machine-slotted PVC screen. Well construction logs for the RA monitoring wells are presented in Appendix B. At the completion of the well installations, a South Carolina registered professional surveyor surveyed each monitoring well location and the top of casing elevation.

Three temporary small diameter PVC piezometers, CNC09-P01, CNC09-P02, and CNC09-P03, were installed in borings CNC09-B02, CNC09-B07, and CNC09-B10, respectively. Each piezometer was

constructed of 1-1/4-inch-diameter Schedule 80 PVC threaded casing and well screen. The screen section of each piezometer was installed to bracket the water table. Each piezometer was completed at a depth of approximately 12 feet bls and contained a 10-foot PVC screen section that bracketed the water table. Each piezometer top of casing elevation was surveyed by a TtNUS geologist to a local reference point. The groundwater elevation data obtained from the piezometers was used in conjunction with the field screening data to aid in the placement of permanent monitoring wells.

In the site area, groundwater generally occurs under unconfined conditions at depths of approximately 4 to 6 feet bls. Groundwater elevation measurements were recorded on February 21, 1999, and 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 south toward East Osprey Street,

As part of the Final RFI Report for Zone H (E/A&H, 1996), a tidal influence investigation was conducted. The objective of the investigation was to provide long-term water level monitoring to determine the effects of the tidal fluctuation on wells and groundwater flow throughout Zone H. During the tidal study water levels were recorded in 19 wells throughout Zone H over a period of four days. Measurements were recorded every hour using data loggers. The four-day period spanned nine high and nine low tide cycles.

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

2.2 ASSESSMENT RESULTS

Nineteen soil borings were completed as part of the screening portion of the soil investigation at Site 9. Five soil borings were completed to collect soil samples for analysis at a fixed base laboratory to confirm the Chemicals of Concern (CoC). Seventeen 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. Two hand augered borings were installed to provide sampling points for collecting mobile laboratory groundwater

field screening data. The soil and groundwater samples collected for mobile laboratory screening were analyzed for benzene, toluene, ethyl benzene, and total 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 PAHs using EPA Method 8270. One sample was collected for total organic carbon (TOC) analysis using EPA Method 415.1, total recoverable petroleum hydrocarbons (TRPH) using EPA Method 9071, and grain-size analysis using sieve and hydrometer methods. The sample collection was conducted in accordance with The SCDHEC guidance document "Standard Limited Assessment" (June 1997). Lithologic logs for each soil boring are presented in Appendix B. The soil boring locations are shown on Figure 3 and the assessment results are presented in Section 2.4.1.

A comprehensive groundwater monitoring event was conducted on March 18, 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 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. Three of the groundwater samples were also analyzed for the following natural attenuation parameters: dissolved oxygen, alkalinity, carbon dioxide, sulfide, ferrous iron, nitrite, manganese, nitrogen/nitrate, sulfate, and methane. The natural attenuation parameters are summarized in Table 3.

2.3 FIELD SCREENING ASSESSMENT

2.3.1 Soil Vapor Assessment

Seventeen soil borings were completed to evaluate soil vapor concentrations as part of the soil screening assessment at Site 9. Organic vapor analyzer (OVA) headspace measurements were recorded at 1-foot intervals to the top of the water table. Table 4 summarizes the soil vapor screening results. Figure 3 presents the soil boring locations.

Soil vapor concentrations ranged from not detected to 1,100 parts per million (ppm). Six soil borings contained vapor concentrations ranging from 50 ppm to 600 ppm. Soil vapor generally increased with depth with the highest vapor concentrations detected from 2 to 3 feet bls and the highest concentrations

reported at the water table. This is generally indicative of soil vapor concentrations resulting from contaminated groundwater as opposed to a contaminated soil source area.

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

2.3.2 Soil Mobile Lab Results

Soil samples were collected from soil borings CNC09-B01 through CNC09-B05 for analysis by a mobile laboratory. The samples were analyzed 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 criteria that the samples originate in the vadose zone above the water table. Table 5 presents a summary of the analytical data from the mobile laboratory.

Analytical results from the soil mobile laboratory field screening reported BTEX and diesel range organics below detection limits as summarized in Table 5.

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

One groundwater sample was collected from each soil boring (and/or piezometer), except soil boring CNC09-B01, and analyzed in a mobile laboratory for BTEX and diesel range organics using EPA Method 8260. Table 6 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 6, benzene and toluene concentrations were reported below detection limits in all samples. Ethylbenzene was detected in samples at four borings ranging in concentrations from 0.70 parts per billion (ppb) to 64.53 ppb. Total xylenes were detected in samples at two borings at concentrations of 0.05 ppb and 2.6 ppb. Diesel range organics in groundwater were detected at eight borings with concentrations ranging from 248.31 ppb to 163,604.24 ppb.

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

2.4 CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER

2.4.1 Chemicals of Concern in Soil

Six subsurface soil samples were collected at Site 9 for fixed base laboratory analysis. The soil boring locations are shown on Figure 3, and Table 7 summarizes the CoCs detected in the soil samples. All of the soil CoCs, with the exception of dibenzo(a,h)anthracene, were detected in one or more of the soil samples. However, benzene was the only analyte detected at concentrations above the Risk Based Screening Levels (RBSLs). Benzene was detected in samples 09SLB0203 (19.2 µg/kg), 09SLB0403 (33.5µg/kg), and 09SLB0501 (6.22 µg/kg) at concentrations exceeding the RBSL of 5 µg/kg for sandy clay soils. The RBSL for clayey sand soils was used based on a grain-size analysis completed on sample 09SLB0103 indicating a clayey sand matrix (Appendix D). Figure 7 shows the detected benzene concentrations and the approximate isoconcentrations. Figures 8 through 15 illustrate the areal distribution of CoCs detected in the soil samples.

2.4.2 Chemicals of Concern in Groundwater

Groundwater analytical data sheets for the March 1999 field event are presented in Appendix C. Table 8 presents the analytical results for CoCs detected in the groundwater samples. Only one of the groundwater CoCs, naphthalene, was detected above method detection limits in the groundwater samples. The detected naphthalene concentrations ranged from estimated1.74 ug/L to estimated 3.28 ug/L . All detected naphthalene concentrations are less than the RBSL for groundwater of 40 µg/l. Figure 16 presents the detected concentrations of naphthalene for the March 19, 1999, sampling event. None of the CoCs were detected above method detection limits in the on-site deep monitoring well CNC09-M07.

2.5 ANALYTICAL DATA

All analytical data from the 1997 Underground Storage Tank Assessment Report for UST 654 are presented in Appendix A. Soil analytical data generated during this RA are summarized in Table 7. Groundwater analytical data generated during this RA are summarized in Table 8. The soil and groundwater analytical reports for this RA are included in Appendix D.

2.6 AQUIFER CHARACTERISTICS AND EVALUATION

Groundwater levels were measured on February 22, 1999. Water level contours plotted on Figure 6 indicate that the groundwater flows toward the south. The hydraulic gradient between monitoring wells CNC09-M02 and CNC09-M05 on February 22, 1999, was 0.0055 feet per foot.

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 9. To make this determination the screened interval, lithology, and proximity to the site were evaluated. Based on this evaluation, monitoring well NBCH666001 was selected as the most representative well. NBCH666001 is located approximately 100 feet east of Site 9 and is completed to a depth of approximately 15 feet with a 10-foot screened interval. The boring log indicates that the lithology consists of alternating silt, fine-grained sand and clay, similar to the lithology observed in other monitoring wells at Site 9. The geometric mean of the rising and falling head conductivities for well NBCH666001 was 0.563 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 = 0.563 ft/day
n	=	effective porosity = 0.46 (from sieve results of 44.7% sand & 30.5% clay and Figure C1 in SCDHEC, 1998)
i	=	average hydraulic gradient = 0.0055 ft/ft

therefore:

$$V = \left(\frac{0.563\ \text{ft/day}}{0.46}\right) x\ 0.0055\ \text{ft/ft}$$

$$V = 0.0067\ \text{ft/day}$$

In summary, the seepage velocity of the surficial aquifer was calculated to be approximately 2.5 feet per year based on a hydraulic conductivity of 0.563 feet per day, a hydraulic gradient of 0.0055 feet per foot, and a porosity of 46% for clayey sand. Aquifer characterization graphs are provided in Appendix E.

2.7 FATE AND TRANSPORT

No groundwater concentrations exceeded the SCDHEC RBSLs; therefore, fate and transport modeling is not required.

2.8 PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN

The most recent groundwater-gauging event shows that groundwater flow is primarily toward the south. There were no detections in any well of BTEX, MTBE, or PAHs except for naphthalene. Naphthalene was detected in three monitoring wells, CNC09-M01, CNC09-M02, and CNC09-M06, at concentrations less than the RBSL but greater than the detection limit. Figure 16 shows the current extent of the naphthalene concentrations. Since fate and transport modeling was not performed, prediction and attenuation of COCs was not evaluated.

3.0 TIER 2 EVALUATION

3.1 COMPARISON OF ANALYTICAL RESULTS WITH RBSLs

Soil samples were collected on January 13, 1999. The samples were analyzed for BTEX and PAH. Benzene was detected in sample CNC09-B04/09SLB0403 at 33.5 μg/kg. This is above the SCDHEC RBSL of 5 μg/kg for leaching to groundwater in sand-rich soils. Benzene was also detected above RBSL in sample CNC09-B02/09SLB0203 at 19.20 μg/kg, and sampleCNC09-B05/09SLB0501 at 6.22 μg/kg. Toluene, ethylbenzene, and xylenes were detected in several subsurface soil samples; however, none of the detections exceeded their respective RBSLs. Additional PAH compounds [naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene] were detected in the subsurface soil at the site. None exceeded their respective RBSLs.

Groundwater sampling was conducted on March 19, 1999. The samples were analyzed for BTEX, MTBE, and PAH. Naphthalene was detected in three monitoring wells, with a maximum concentration in CNC09-M01 at 3.28 μg/L. This concentration is below the SCDHEC RBSL of 10 μg/L. No other analytes were detected. A comparison of soil and groundwater concentrations to RBSLs is summarized in Table 9.

3.2 EXPOSURE SETTING CHARACTERIZATION

This section focuses on the current and future land use issues concerning the site. Figure 1 shows that the site is surrounded by the City of North Charleston and therefore is in an urban setting. Building 654 served as the Naval Base Administration Building 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 Charleston provides drinking water for CNC. A water well survey conducted as part of the UST Closure in 1997 did not reveal the presence of any water supply wells or surface water within 1,000 feet of the site. Groundwater at this site flows south.

3.3 EXPOSURE PATHWAY ANALYSIS

This section presents the receptor characterizations of the potentially exposed populations in the vicinity of the site and identifies the potentially complete exposure pathways for those receptors. SCDHEC requires that only those exposure pathways with CoC concentrations exceeding Tier 1 RBSL concentrations are

examined in a Tier 2 Risk-Based Corrective Action Report. Tables 10 and 11 present the exposure pathway assessments for current and future use scenarios.

3.3.1 On-Site Commercial Worker

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

3.3.2 On-Site Visitor

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

3.3.3 On-Site Construction Worker

An on-site construction worker is defined as a laborer who would be involved in intrusive activities in the soil on or around the site, particularly in the area of subsurface utilities. On-site construction workers could be exposed to constituents in soil by the following pathways: inhalation of vapors from volatiles, dermal contact, and incidental ingestion. Benzene concentrations in soil are not above its RBSL for ingestion or dermal contact. In addition, benzene in soil does not exceed its RBSL for inhalation. Therefore, this receptor was not considered further.

3.3.4 On-Site Resident

An on-site resident is defined as any person making his or her home at the site. This site is expected to remain a commercial/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 be used for commercial and industrial purposes; therefore, this potential receptor was not considered further.

3.3.6 Surface Water

There are no surface waters within 1000 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

An SSTL was calculated for the subsurface soil for benzene leaching to groundwater using the SCDHEC Soil Leachability Model. Input parameters for the model were determined using the figures in the SCDHEC RBCA Guidelines, January 1998 and are presented in Table 12. The soil leaching SSTL calculated for benzene is 3.07×10^5 mg/kg, which is well above the maximum benzene concentration detected (0.0192 mg/kg).

Appendix F provides the leachability model calculations generating SSTL.

3.6 RECOMMENDATIONS

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

4.0 REFERENCES

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

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

SCDHEC, 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, Charleston Naval Base Complex, North Charleston, South Carolina, February 25, 1997.

SPORTENDETCHASN, 1999, Personal Contact between Paul Calligan TtNUS and Copes Wannamacker SPORTENDETCHASN, June 17, 1999.

TABLE 1

GROUNDWATER ELEVATIONS
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL BASE COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well #	Total Depth of Well (ft)	Top of Casing Elevation (MSL)	Date Measured	Depth to Water (BTOC)	Groundwater Elevation (MSL)
CNC09-M01	12	9.09	2/21/99	5.05	4.04
			2/21/99	4.79	4.30
CNC09-M02	12	9.27	2/21/99	4.96	4.31
			2/21/99	4.78	4.49
CNC09-M03	12	8.24	2/21/99	4.20	4.04
			2/21/99	3.92	4.32
CNC09-M04	12	8.28	2/21/99	4.37	3.91
			2/21/99	4.15	4.13
CNC09-M05	12	8.53	2/21/99	4.55	3.98
			2/21/99	4.30	4.23
CNC09-M06	12	9.12	2/21/99	5.11	4.01
			2/21/99	4.85	4.27
CNC09-M07	27	9.26	2/21/99	7.10	2.16
			2/21/99	*25.12	*-15.88
CNC09-P01	12	NR	1/11/99	6.93	NA
			2/5/99	5.57	NA
CNC09-P02	11.5	NR	1/11/99	5.79	NA
			2/5/99	4.55	NA
CNC09-P03	12.0	NR	1/11/99	5.72	NA
			2/5/99	4.44	NA

Notes:
MSL - Mean Sea Level
BTOC - Below Top of Casing
NR - Not Referenced to MSL
NA - Not Available
* Groundwater Level Recovering at Time of Measurement - Well Purged Dry
(Depth to water - product thickness) x .88 (density of karosene) = adjusted depth of water

TABLE 2

GROUNDWATER FIELD MEASUREMENTS
SITE 9, BUILDING 654
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)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
CNC09-M01	3/19/99	PP	5.0	19.9	7.12	1.68	1.14	8
CNC09-M02	3/19/99	PP	5.0	20.5	7.58	0.372	0.56	14
CNC09-M03	3/19/99	PP	5.0	19.8	6.67	0.630	1.40	20
CNC09-M04	3/19/99	PP	5.0	18.7	7.09	2.26	0.91	<10
CNC09-M05	3/19/99	PP	5.0	19.3	7.54	2.34	0.40	<10
CNC09-M06	3/19/99	PP	5.0	18.4	6.27	0.766	0.72	< 10
CNC09-M07	3/19/99	PP	3.5	21.4	9.41	14.90	1.21	34

Notes:
(°C) - Degrees Celcius
PP - Peristaltic pump, low flow technique.
mg/L - Milligrams per liter
uMHOS/cm - Micro HOS per centimeter
NTU - Nephelometric turbidity units

TABLE 3

GROUNDWATER NATURAL ATTENUATION FIELD MEASUREMENTS
SITE 9, BUILDING 654
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)
CNC09-M01	3/19/99	0.00	386	247	0.04	0.16	0.046	0.0	ND	18.0	E7200
CNC09-M03	3/19/99	2.48	286	168	0.02	0.00	0.062	0.2	0.013	12.70	160
CNC09-M06	3/19/99	0.00	285	182	0.01	0.00	0.011	0.0	ND	7.57	4,000

Notes:
mg/l - Milligrams per liter
ug/l - Micrograms per liter
E- Estimated Concentration
* Fixed base laboratory analysis

TABLE 4

SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (PPM)
CNC09-B01	09SSB0101	1	ND
	09SSB0102	2	ND
	09SSB0103	3	ND
CNC09-B02	09SSB0201	1	ND
	09SSB0202	2	1
	09SSB0203	3	1
CNC09-B03	09SSB0301	1	ND
	09SSB0302	2	ND
	09SSB0303	3	3
CNC09-B04	09SSB0401	1	ND
	09SSB0402	2	1
	09SSB0403	3	1
CNC09-B05	09SSB0501	1	4
	09SSB0502	2	ND
	09SSB0503	3	ND
CNC09-B06	09SSB0601	1	4
	09SSB0602	2	60
	09SSB0603	3	60
CNC09-B07	09SSB0701	1	15
	09SSB0702	2	50
	09SSB0703	3	40
CNC09-B08	09SSB0801	1	2
	09SSB0802	2	3
	09SSB0803	3	4
CNC09-B09	09SSB0901	1	3
	09SSB0902	2	3
	09SSB0903	3	600
CNC09-B10	09SSB1001	1	ND
	09SSB1002	2	ND
	09SSB1003	3	ND
	09SSB1004	4	ND
CNC09-B11	09SSB1101	1	ND
	09SSB1102	2	ND
	09SSB1103	3	ND
	09SSB1104	4	ND
CNC09-B12	09SSB1201	1	ND
	09SSB1202	2	ND
	09SSB1203	3	ND
	09SSB1204	4	ND
CNC09-B13	09SSB1301	1	2
	09SSB1302	2	3
	09SSB1303	3	1
	09SSB1304	4	2

TABLE 4 (CONTINUED)

SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (PPM)
CNC09-B14	09SSB1401	1	2
	09SSB1402	2	2
	09SSB1403	3	5
	09SSB1404	4	120
CNC09-B15	09SSB1501	1	2
	09SSB1502	2	700
	09SSB1503	3	1100
	09SSB1504	4	130
CNC09-B16	09SSB1601	1	18
	09SSB1602	2	3
	09SSB1603	3	2
	09SSB1604	4	80
CNC09-B17	09SSB1701	1	7
	09SSB1702	2	2
	09SSB1703	3	3
	09SSB1704	4	3

NOTES:
OVA - organic vapor analyzer equipped with a flame ionization detector
PPM - parts per million
ND- not detected

TABLE 5

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOIL
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Sample Depth (feet)	Laboratory Screening Data (PPB) [1]				
			Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel Range Organics
09SSB0103	09SFB0103	3	<0.5	<0.5	<0.5	<1.0	<100
09SSB0203	09SFB0203	3	<0.5	<0.5	<0.5	<1.0	<100
09SSB0303	09SFB0303	3	<0.5	<0.5	<0.5	<1.0	<100
09SSB0403	09SFB0403	3	<0.5	<0.5	<0.5	<1.0	<100
09SSB0501	09SFB0501	1	<0.5	<0.5	<0.5	<1.0	<100

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 SCREENING RESULTS FOR GROUNDWATER
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Laboratory Screening Data (PPB) [1]				
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel Range Organics
CNC09-P01	09GFP0101	<0.5	<0.5	64.53	<1.0	163,604.24
CNC09-P02	09GFP0201	<0.5	<0.5	<0.5	<1.0	248.31
CNC09-P03	09GFP0301	<0.5	<0.5	2.09	0.50	2,372.86
CNC09-B03	09GFB03	<0.5	0.84	0.70	<1.0	4,661.99
CNC09-B04	09GFB04	<0.5	<0.5	<0.5	<1.0	2,489.53
CNC09-B05	09GFB05	<0.5	<0.5	<0.5	<1.0	354.53
CNC09-B06	09GFB06	<0.5	<0.5	<0.5	<1.0	<100
CNC09-B08	09GFB08	<0.5	<0.5	<0.5	<1.0	<100
CNC09-B09	09GFB09	<0.5	<0.5	<0.5	<1.0	<100
CNC09-B11	09GFB11	<0.5	<0.5	<0.5	<1.0	1,343.22
CNC09-B12	09GFB12	<0.5	<0.5	<0.5	<1.0	584.54
CNC09-B13	09GFB13	<1.0	<1.0	<1.0	<1.0	<10
CNC09-B14	09GFB14	<1.0	<1.0	<1.0	<1.0	<10
CNC09-B15	09GFB15	<1.0	<1.0	<1.0	<1.0	<10
CNC09-B16	09GFB16	<1.0	<1.0	<1.0	<1.0	<10
CNC09-B17	09GFB17	<1.0	<1.0	1.8	2.6	<10
CNC09-B18	09GFB18	<1.0	<1.0	<1.0	<1.0	<10
CNC09-B19	09GFB19	<1.0	<1.0	<1.0	<1.0	<10

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 7

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Soil Boring / Sample No.	Sample Date	Benzene	Ethylbenzene	Toluene	Xylenes (total)	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Dibenzo(a,h) anthracene	Chrysene	Naphthalene
RBSL [1]		5	1260	1622	42471	73084	29097	231109	87866	12998	210
CNC09-B01 / 09SLB0103	13-Jan-99	4.32 [J]	5.12	4.27 [J]	ND	ND	ND	ND	ND	ND	.717 [J]
CNC09-B02 / 09SLB0203	13-Jan-99	**19.2**	1.65 [J]	10.50	3.37 [J]	ND	ND	ND	ND	ND	1.52 [J]
CNC09-B03 / 09SLB0303	13-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CNC09-B04 / 09SLB0403	13-Jan-99	33.5	2.56 [J]	17.4	5.16	ND	ND	ND	ND	ND	1.44 [J]
CNC09-B05 / 09SLB0501	13-Jan-99	**6.22**	7.90	7.32	1.31 [J]	5910	5820	4090	ND	6250	.832 [J]
CNC09-B09 / 09SLB0903	13-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZHTL00201 [2]	24-Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZHRL00601 [3]	22-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
All concentrations are in micrograms per kilograms (ug/kg).
NA - Not analyzed.
ND - Not detected
Bold Value - Concentration exceeded RBSLs.
Sample 09SLB0103 was also analyzed for total recoverable petroleum hydrocarbons ,but was not detected above instrument detection limits.
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for clayey sand soils; depth to groundwater less than 5 feet.
[2] Trip Blank
[3] Rinsate Blank
[J] Indicates the presence of an analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 8

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Monitoring Well/ Sample No.	Sample Date	Benzene	Ethyl-benzene	Toluene	Xylenes (total)	MTBE	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	dibenzo(a,h) anthracene	Naphthalene
RBSL[1]		5	700	1000	10000	40	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]
CNC09-M01 / 09GLM0101	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.28 [J]
CNC09-M02 / 09GLM-0201	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.66 [J]
CNC09-M03 / 09GLM-0301	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CNC09-M04 / 09GLM-0401	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CNC09-M05 / 09GLM0501	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CNC09-M06 / 09GLM-0601	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.74 [J]
CNC09-M07 / 09GLM-0701	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZHTL02001[3]	19-Mar-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZHRL00101[4]	14-Jan-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.37[J]

All concentrations are in ug/l.
ND - Not detected.
NA - Not analyzed
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels.
[2] The Risk based screening level for individual PAH CoC is 10 ug/l or 25 ug/l for total PAHs.
[3] Trip Blank
[4] Rinsate Blank

TABLE 9

COMPARISON OF MAXIMUM CONCENTRATIONS TO RBSLs
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Concern	Maximum Concentration (Soil) (ug/kg)	RBSLs (Soil) (ug/kg)[a]	Maximum Concentration (GW) (ug/L)	RBSLs (GW) (ug/L)[b]
Benzene	**33.5**	5	ND	5
Toluene	17.4	1622	ND	1000
Ethylbenzene	7.9	1260	ND	700
Xylenes	5.16	42471	ND	10000
MTBE	ND	NA	ND	40
Naphthalene	1.52	210	3.28	10
Benzo(a)anthracene	5910	73084	ND	10
Benzo(a)pyrene	NA	NA	ND	10
Benzo(b)fluoranthene	5820	29097	ND	10
Benzo(k)fluoranthene	4090	231109	ND	10
Benzo(g,h,I)perylene	NA	NA	ND	10
Chrysene	6250	12998	ND	10
Dibenzo(a,h)anthracene	ND	87866	ND	10

Notes:
(a) - From Risk-Based Corrective Action for Petroleum Releases, Table B3, Depth to GW - <5 ft, SCDHEC RBCA Guidelines, 1998.
(b) - From Risk-Based Corrective Action for Petroleum Releases, Table B1, SCDHEC RBCA Guidelines, 1998.
GW - Groundwater
RBSLs - Risk Based Screening Levels
Bolded value indicates the concentration exceeded the RBSL.
NA = Not Available
ND = Not Detected

TABLE 10

EXPOSURE PATHWAY ASSESSMENT - CURRENT USE
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Media	Exposure Route	Pathway Selected for Evaluation? (Yes or No)	Exposure point or Reason for Non-Selection	Data Requirements (If pathway selected)
Air	Inhalation	No	No volatilization to enclosed space. No explosion hazard.	
	Explosion Hazard	No		
Groundwater	Ingestion	No	No groundwater contamination above RBSLs.	
	Dermal contact	No		
	Inhalation	No		
Surface Water	Ingestion	No	No surface water within 1000 ft.	
	Dermal contact	No	No groundwater contamination above RBSLs.	
	Inhalation	No		
Surficial Soil	Ingestion	No	No impacted surface soil	No additional data required
	Dermal contact	No		
	Inhalation	No		
Subsurface Soil	Ingestion	No	No subsurface soil with BTEX above SSTLs	
	Dermal contact	No		
	Inhalation	No		

TABLE 11

EXPOSURE PATHWAY ASSESSMENT - FUTURE USE
SITE 9, BUILDING 654
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 Explosion Hazard	No No	No volatilization to enclosed space. No explosion hazard.	
Groundwater	Ingestion Dermal contact Inhalation	No No No	Vacant property zoned for commercial use	
Surface Water	Ingestion Dermal contact Inhalation	No No No	No surface water within 1000 ft. No groundwater contamination above RBSLs.	No additional data required
Surficial Soil	Ingestion Dermal contact Inhalation	No No No	No impacted surface soil	
Subsurface Soil	Ingestion Dermal contact Inhalation	No No No	No subsurface soil with BTEX above SSTLs	

TABLE 12

FATE AND TRANSPORT INPUT PARAMETERS
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

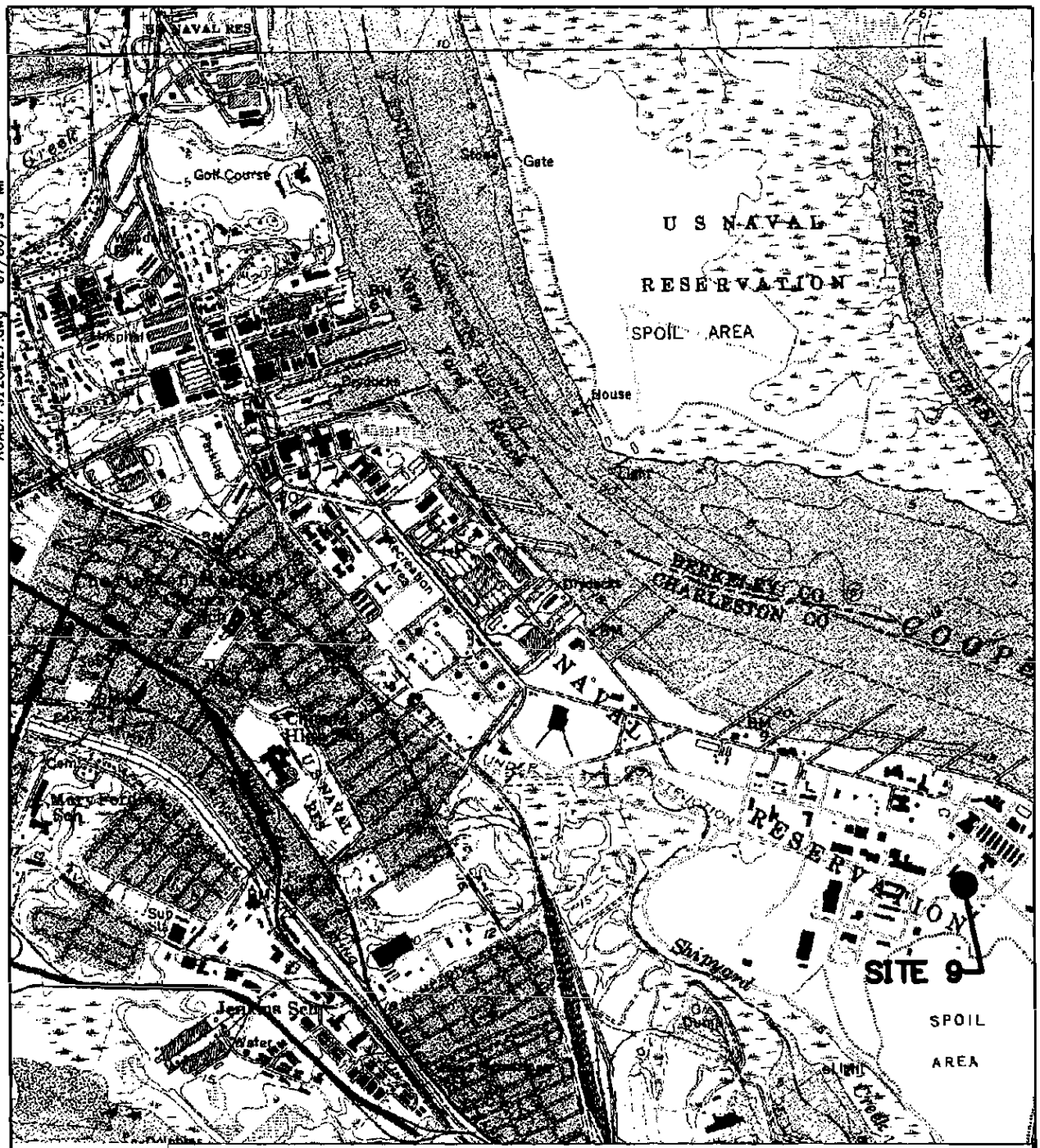
Parameter	Domenico Dilution/Attenuation Model[1]
Hydraulic Conductivity [m/sec]	1.986E-06
Hydraulic Gradient	0.0055
Porosity	0.475
Estimated Plume Length [ft]	NA
Soil Bulk Density [kg/L]	1.525
Partition Coefficient [L/kg]	chemical specific[b]
Fractional Organic Carbon	4.11E-02
First Order Decay Rate[a] [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]
Fraction Clay	30.5
Fraction Sand	44.7

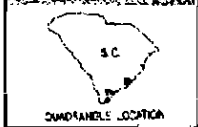
(1) - *South Carolina Risk-Based Corrective Action for Petroleum Releases,* South Carolina Department of Health and Environmental Control, 1998.

(a) - Stated values are default values.

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

(c) - Assumption of the Domenico Model.





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

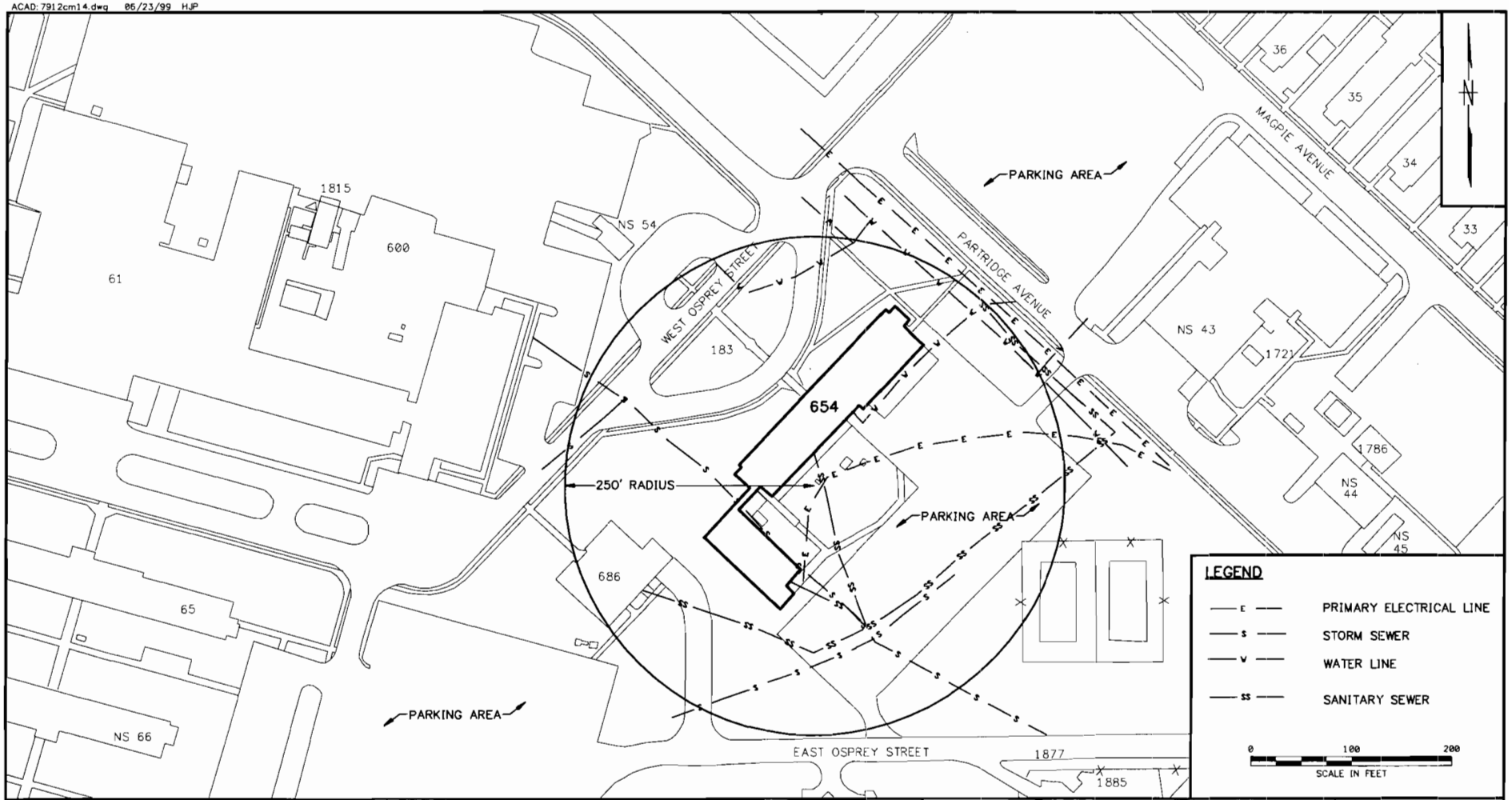
0 2000 4000
SCALE IN FEET

DRAWN BY MF DATE 7/6/99	DEPARTMENT OF THE NAVY · NAVAL FACILITIES ENGINEERING COMD	SITE LOCATION MAP SITE 9, BUILDING 654, ZONE H CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SC	CONTRACT NO. 7912
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 0

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

ACAD: 7912CM27.dwg 07/06/99 MF

ACAD: 7912cm14.dwg 06/23/99 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

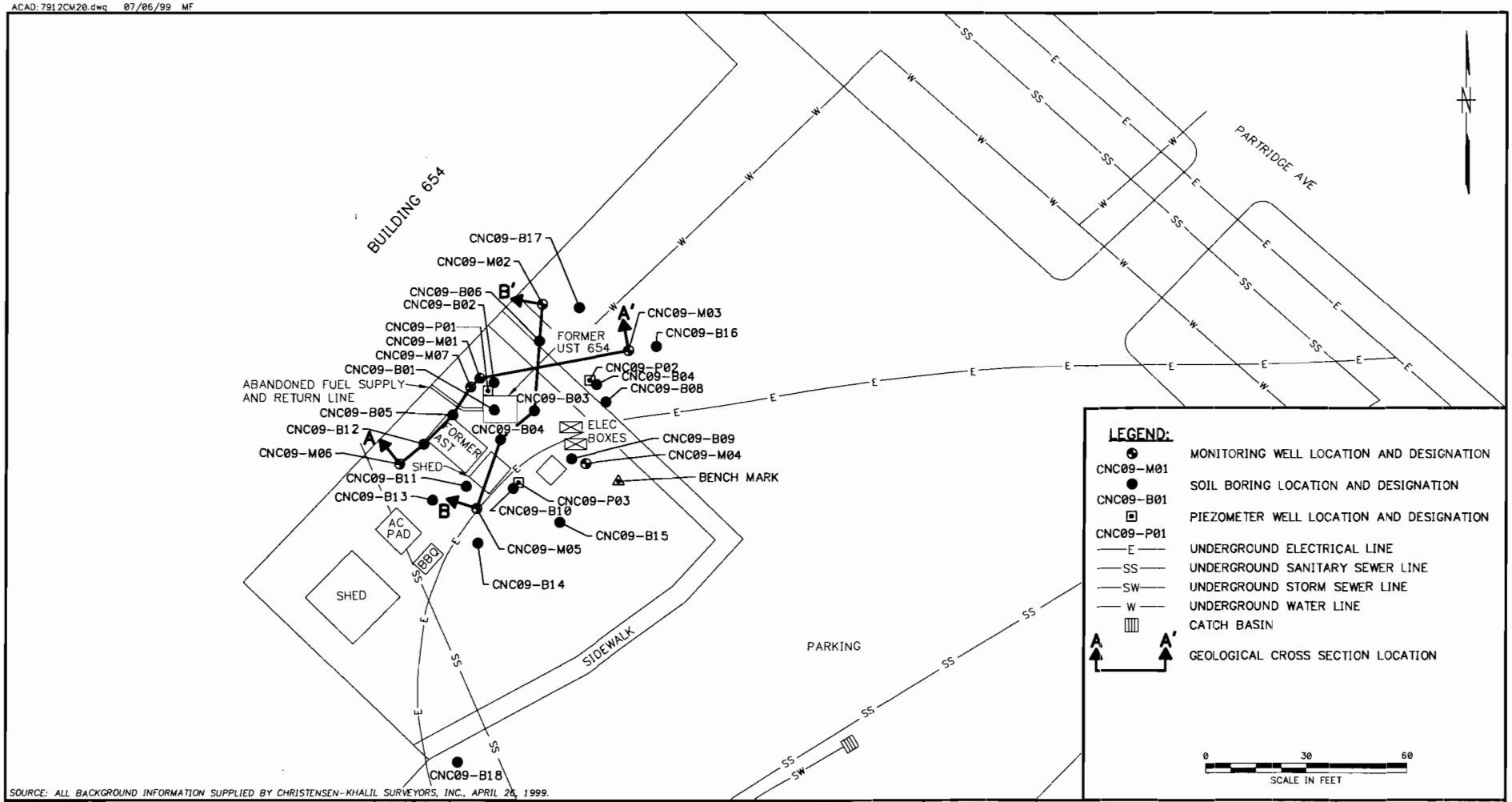
DRAWN BY KW DATE 5/24/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE VICINITY MAP
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2
REV. 0

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

ACAD: 7912CM20.dwg 07/06/99 MF



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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

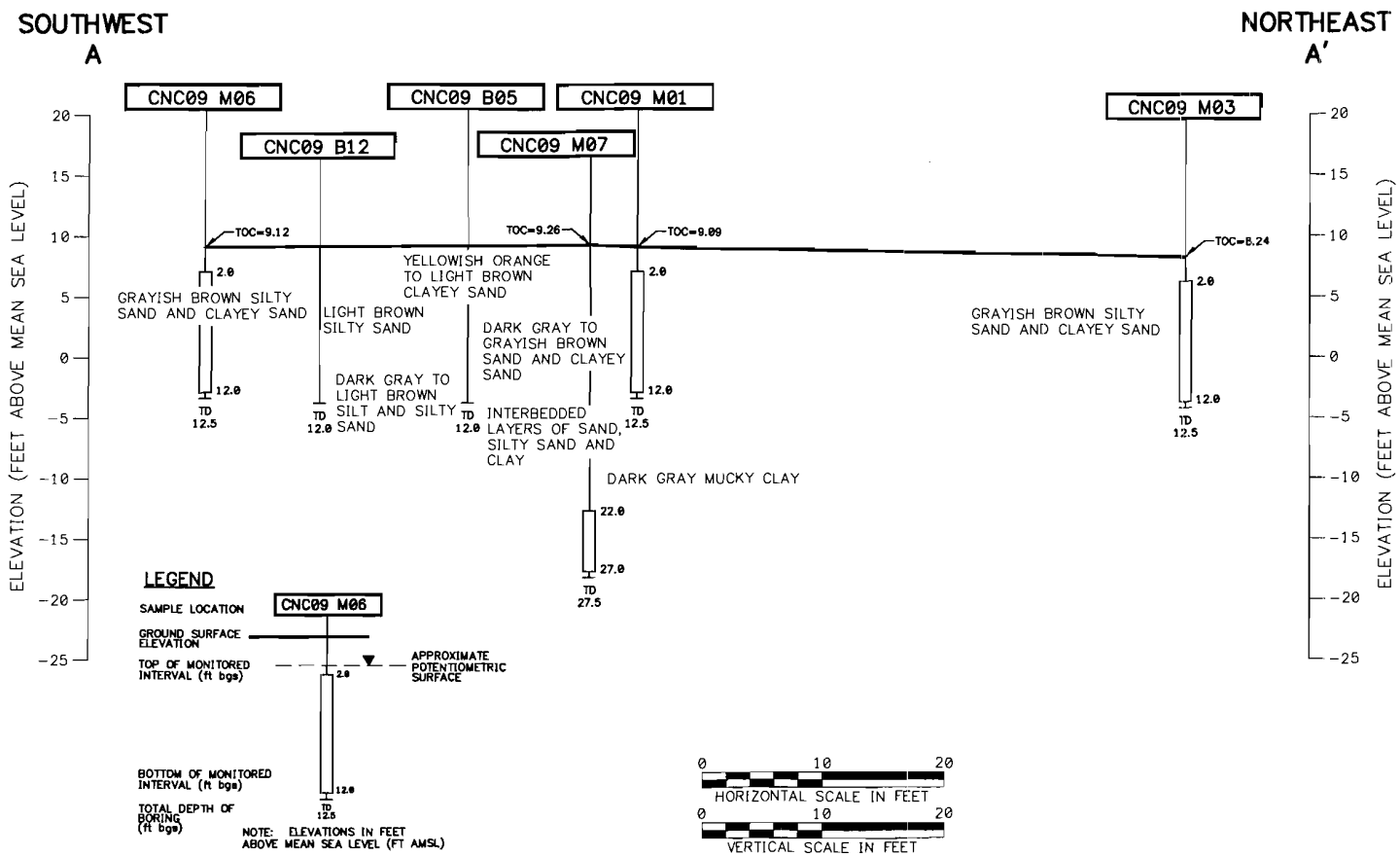
DRAWN BY MF DATE 6/9/99
CHECKED BY DATE
COST/SCHED--AREA
SCALE AS NOTED

SITE MAP AND SAMPLING LOCATIONS
SITE 9, BUILDING 654
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: 7912GX13.dwg 07/06/99 MF



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

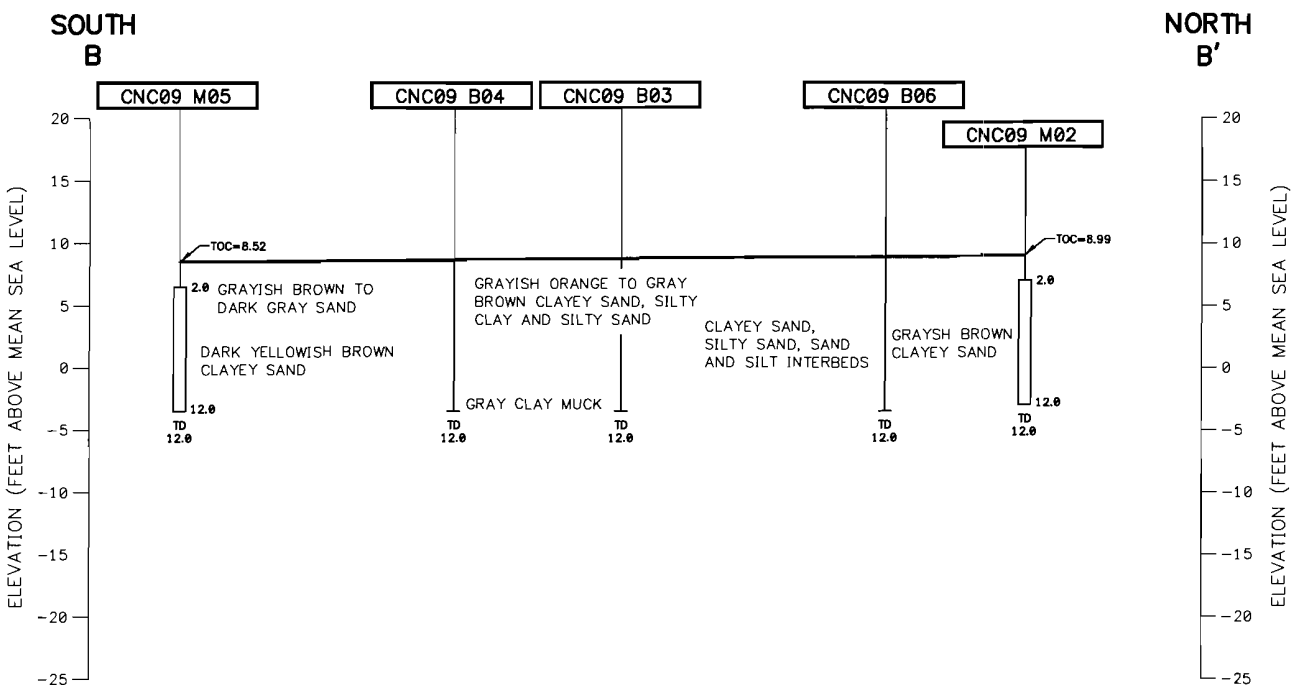
DRAWN BY MF DATE 7/6/99
CHECKED BY DATE
COST/SCHED--AREA
SCALE AS NOTED

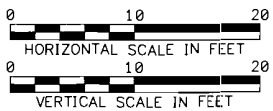
GEOLOGIC CROSS SECTION
A–A'
SITE 9, BUILDING 654
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

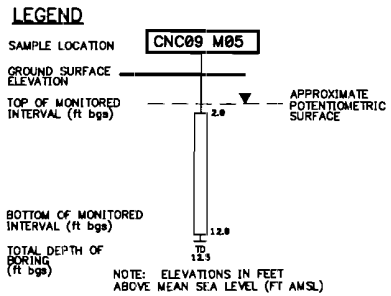
CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4
REV. 0

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

ACAD:7912GX14.dwg 07/06/99 MF







NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

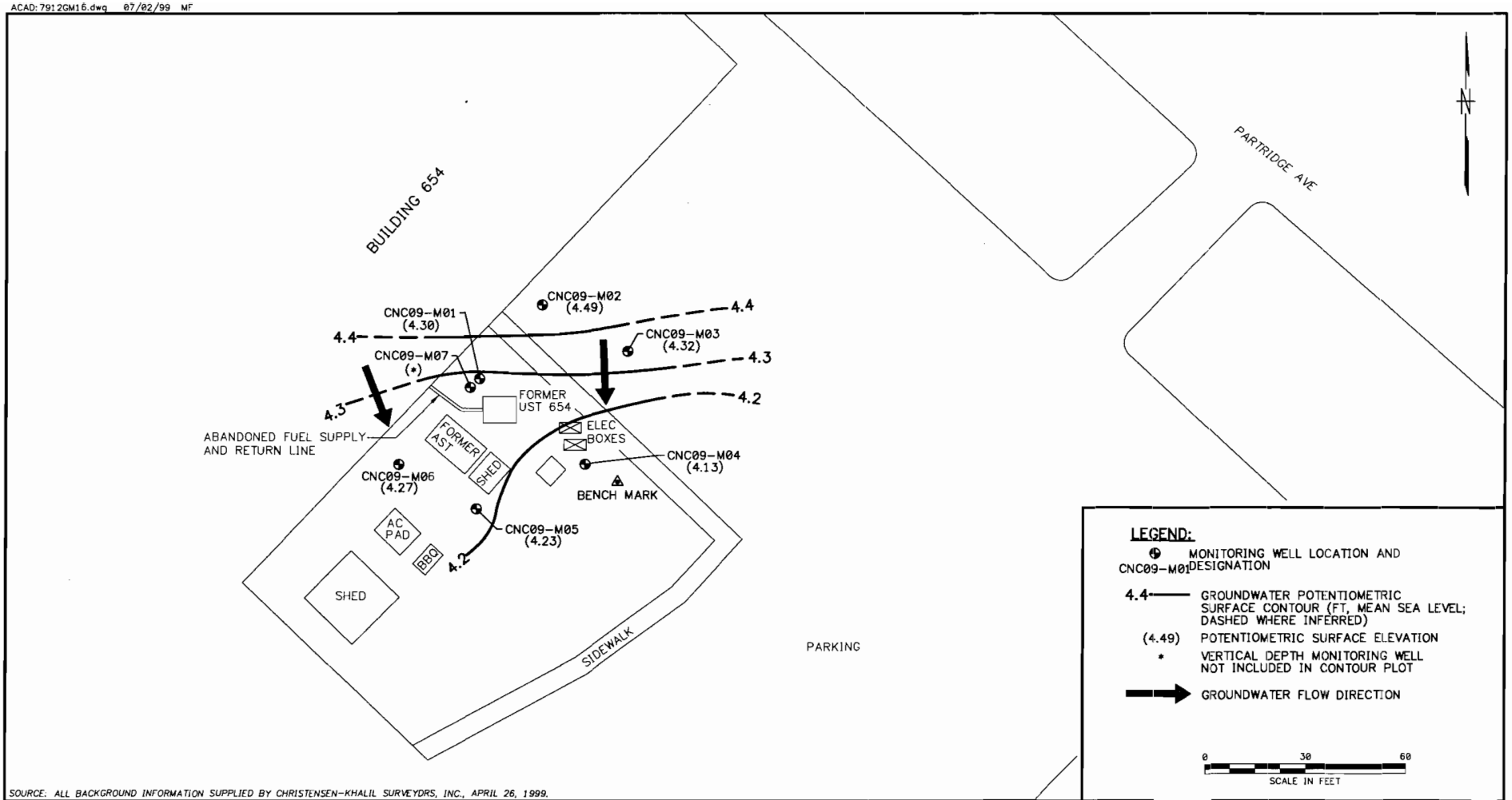
DRAWN BY MF DATE 7/6/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GEOLOGIC CROSS SECTION
B–B'
SITE 9, BUILDING 654
ZONE H CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

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

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

ACAD: 7912GM16.dwg 07/02/99 MF



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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

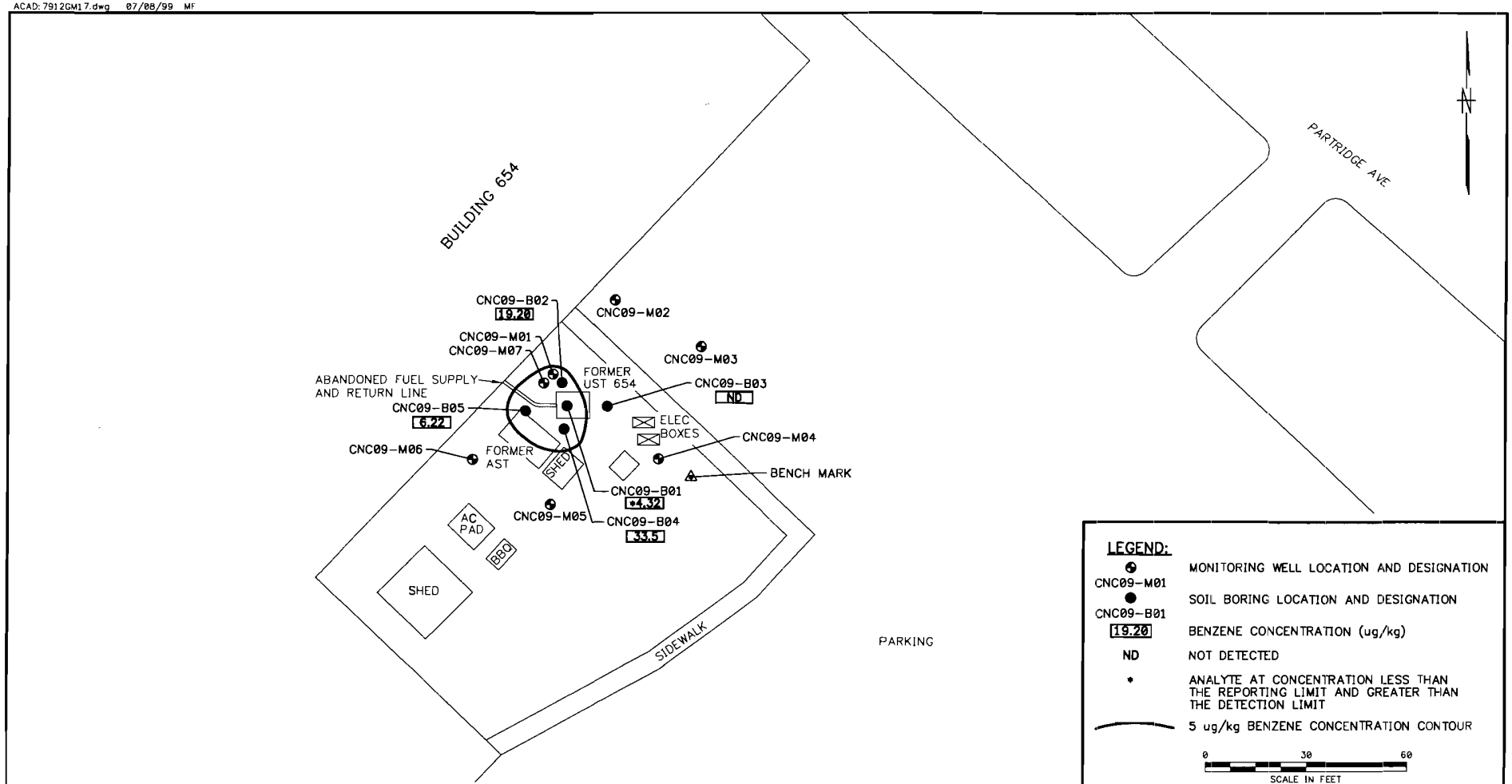
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER POTENTIOMETRIC MAP
(FEBRUARY 21, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

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

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

ACAD: 7912GM17.dwg 07/08/99 MF



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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

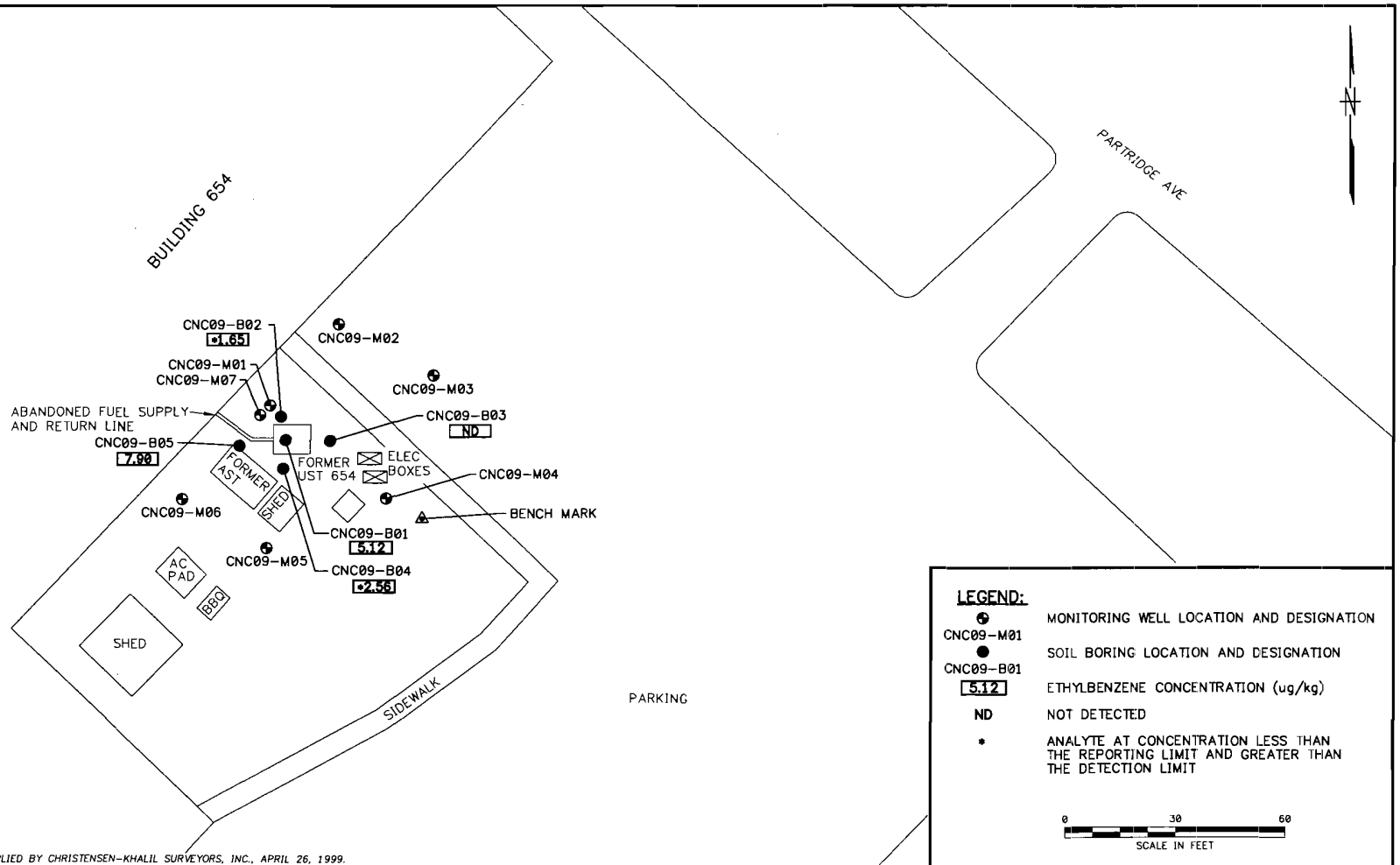
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL BENZENE CONCENTRATION MAP
(JANUARY 13, 1999)
SITE 9, BUILDING 654
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. SON_BH.DWG - REV D - 1/20/98

ACAD: 7912GM19.dwg 07/08/99 MF



LEGEND:

CNC09-M01	MONITORING WELL LOCATION AND DESIGNATION
CNC09-B01	SOIL BORING LOCATION AND DESIGNATION
5.12	ETHYLBENZENE CONCENTRATION (ug/kg)
ND	NOT DETECTED
*	ANALYTE AT CONCENTRATION LESS THAN THE REPORTING LIMIT AND GREATER THAN THE DETECTION LIMIT

0 30 60
SCALE IN FEET

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

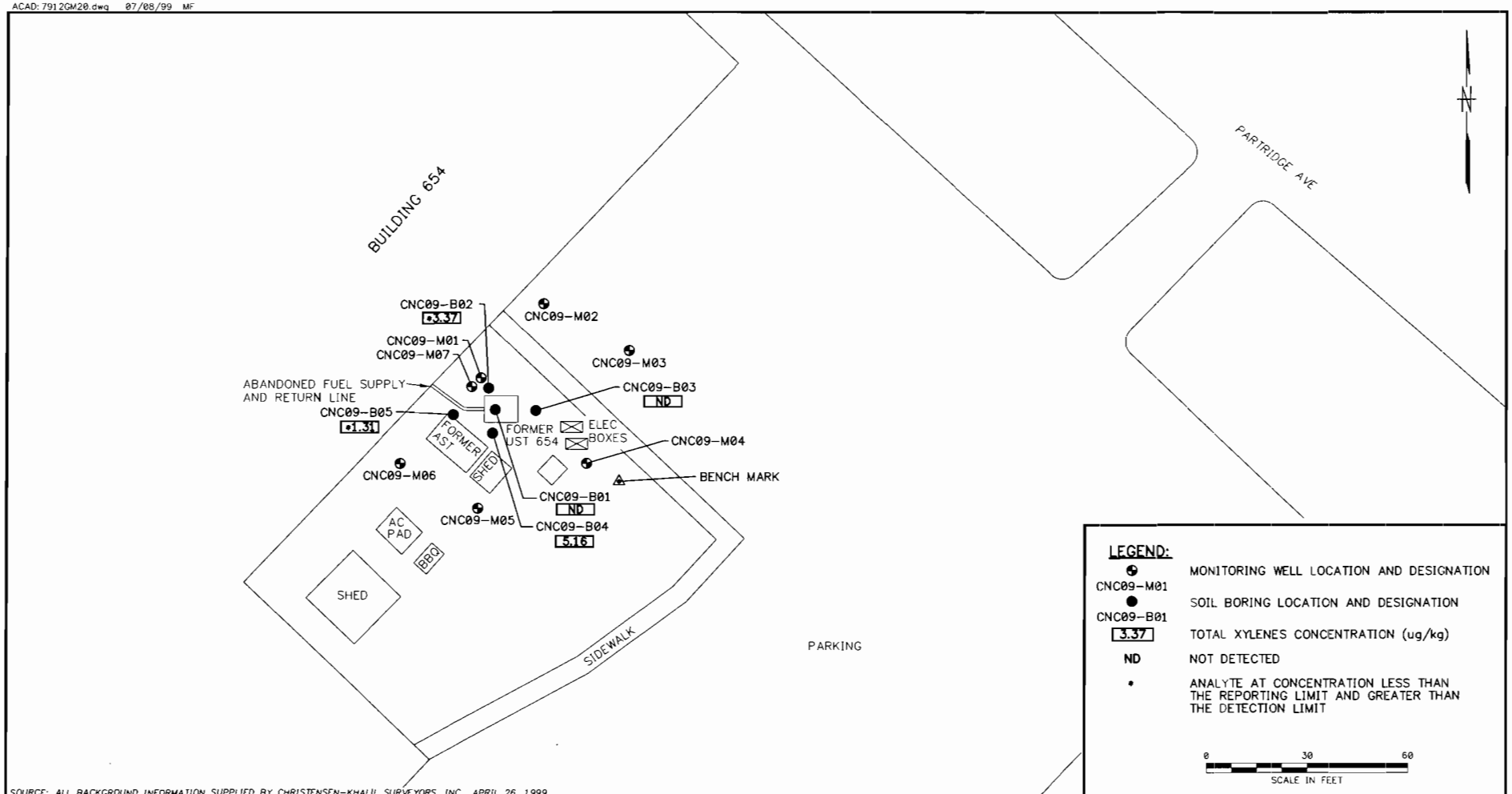
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL ETHYLBENZENE CONCENTRATION MAP
(JANUARY 13, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

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

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

ACAD: 7912GM20.dwg 07/08/99 MF



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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

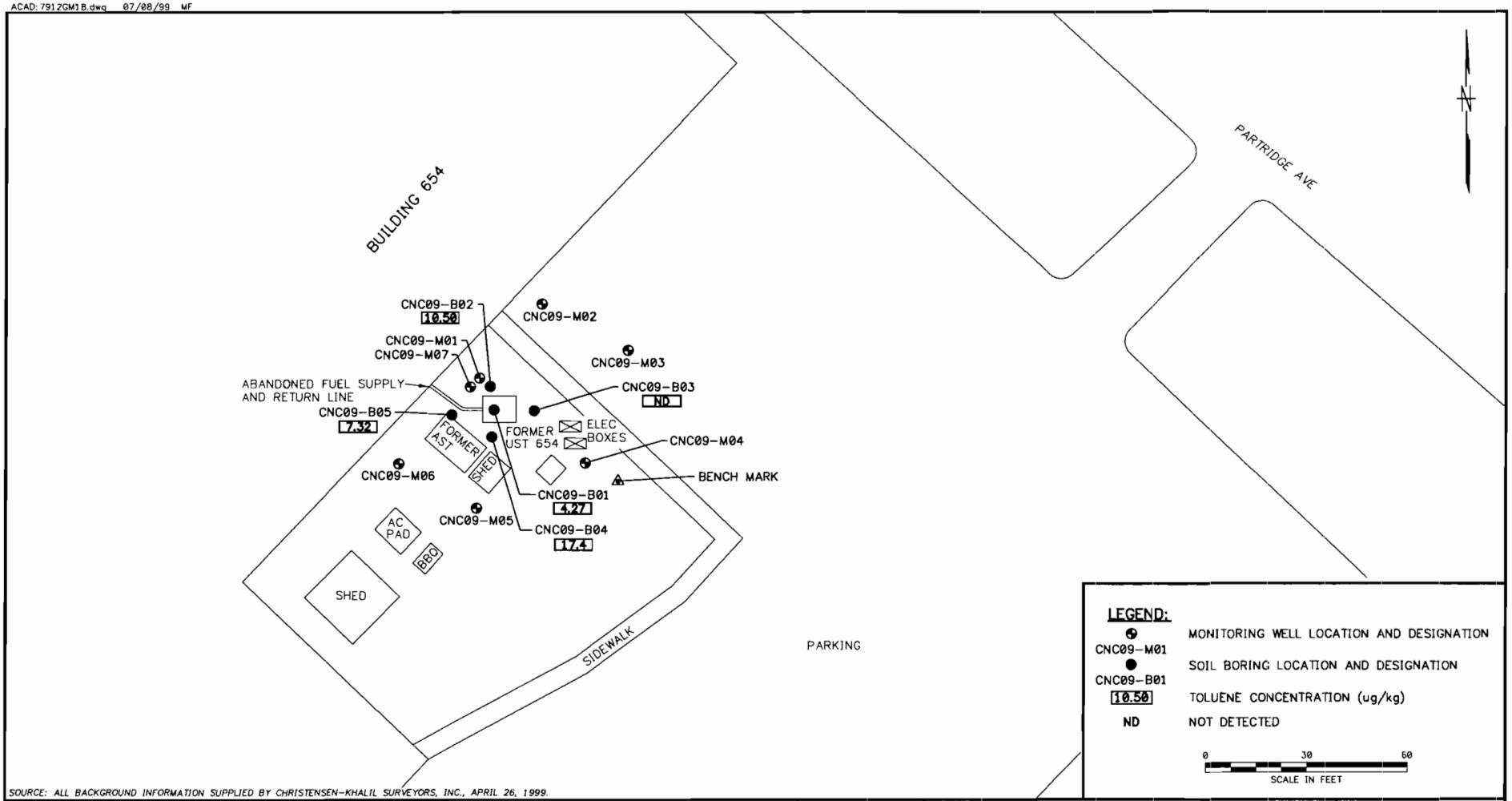
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL TOTAL XYLENES CONCENTRATION MAP
(JANUARY 13, 1999)
SITE 9, BUILDING 654
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 D - 1/20/98

ACAD: 7912GM1B.dwg 07/08/99 MF



LEGEND:

CNC09-M01	MONITORING WELL LOCATION AND DESIGNATION
CNC09-B01	SOIL BORING LOCATION AND DESIGNATION
10.50	TOLUENE CONCENTRATION (ug/kg)
ND	NOT DETECTED

0 30 60
SCALE IN FEET

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

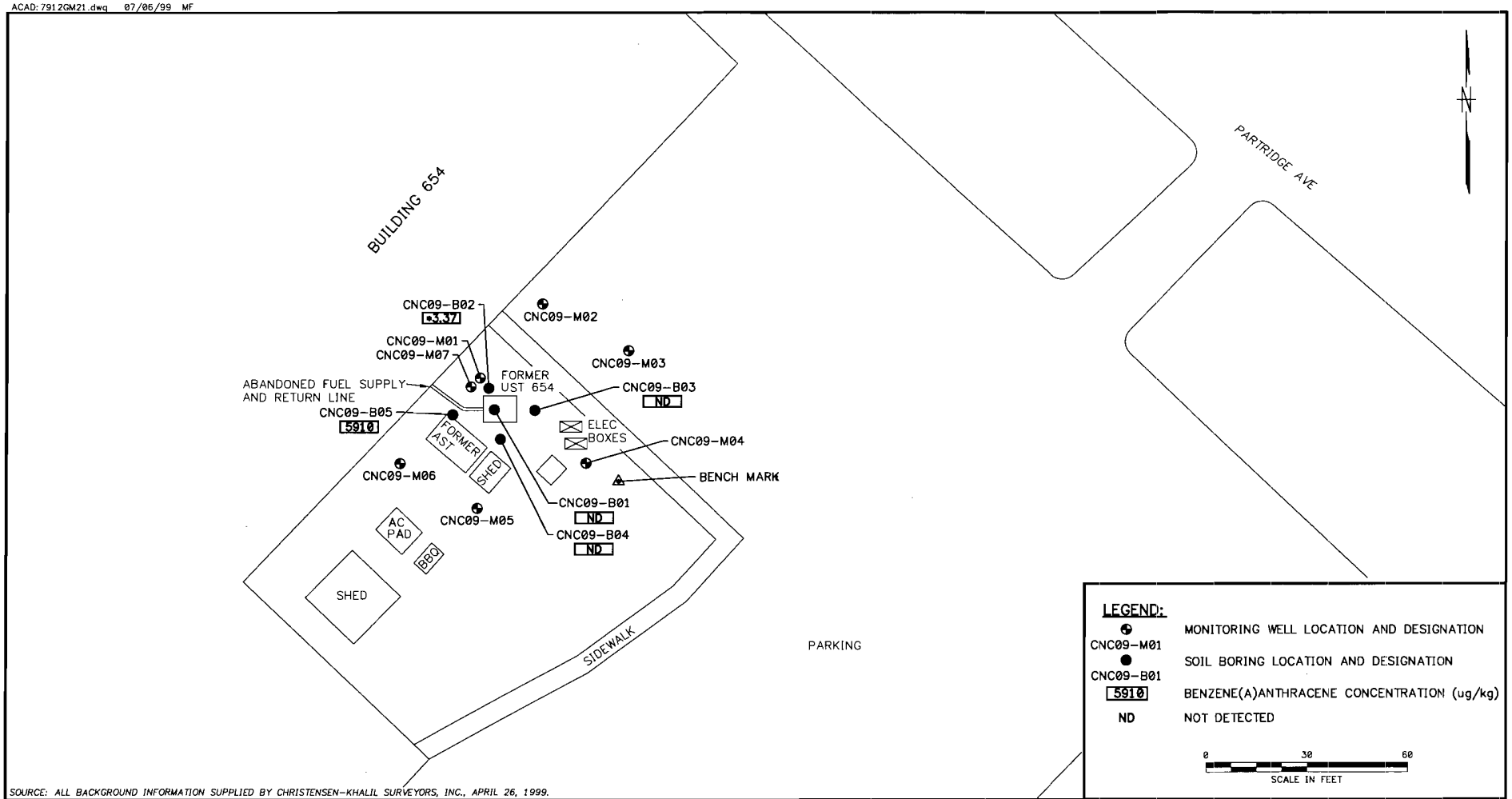
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL TOLUENE CONCENTRATION MAP
(JANUARY 13, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 10
REV. 0

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

ACAD: 7912GM21.dwg 07/06/99 MF



LEGEND:

CNC09-M01	MONITORING WELL LOCATION AND DESIGNATION
CNC09-B01	SOIL BORING LOCATION AND DESIGNATION
5910	BENZENE(A)ANTHRACENE CONCENTRATION (ug/kg)
ND	NOT DETECTED

0 30 60
SCALE IN FEET

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

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

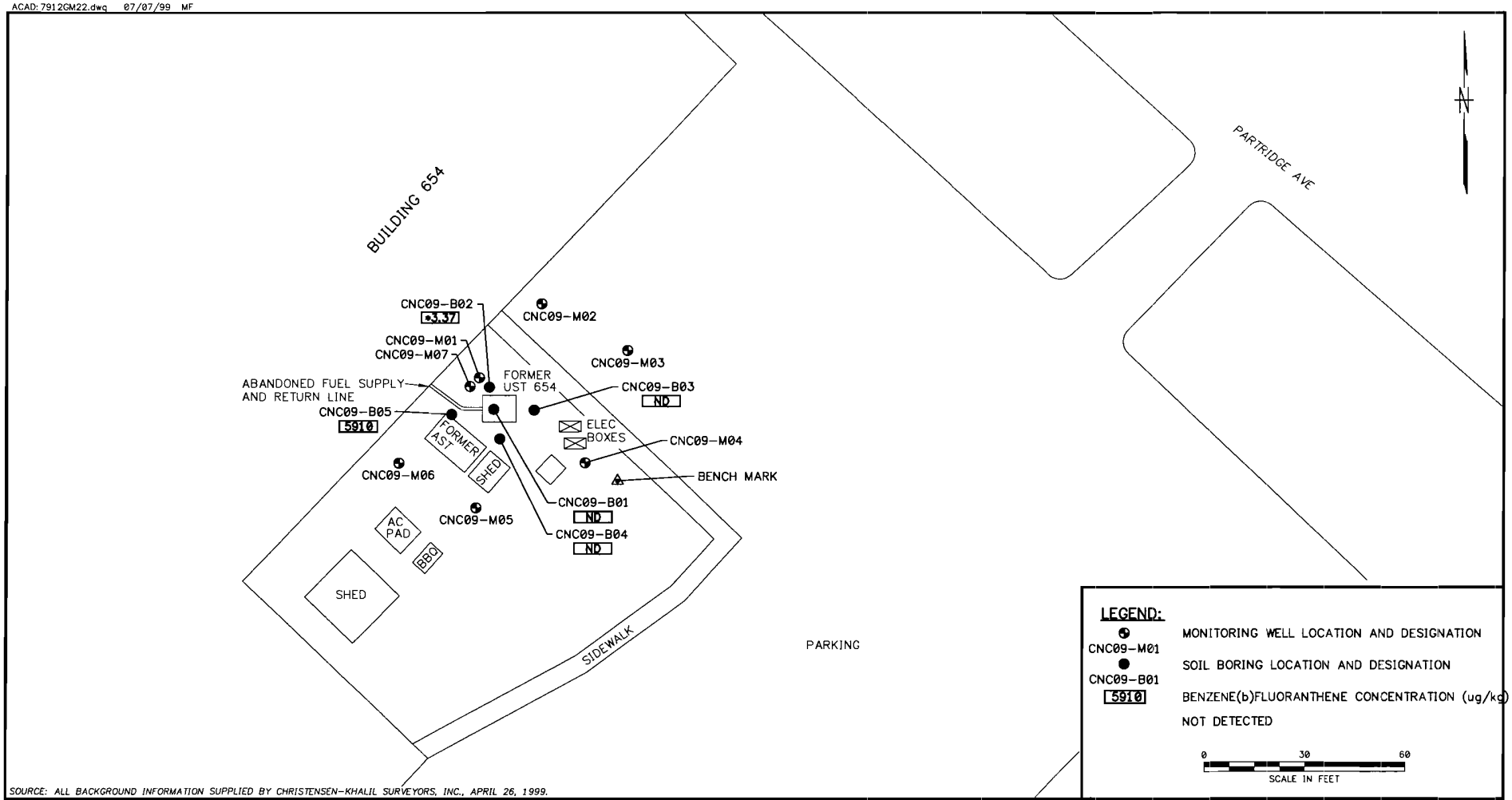
DEPARTMENT OF THE NAVY · SOUTHERN DIV. FACILITIES ENGINEERING COMD

SOIL BENZENE(A)ANTHRACENE CONCENTRATION MAP
(JANUARY 13 & 19, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 11
REV. 0

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

ACAD: 7912GM22.dwg 07/07/99 MF



LEGEND:

CNC09-M01 — MONITORING WELL LOCATION AND DESIGNATION

CNC09-B01 — SOIL BORING LOCATION AND DESIGNATION

5910 — BENZENE(b)FLUORANTHENE CONCENTRATION (ug/kg)

ND — NOT DETECTED

0 30 60
SCALE IN FEET

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

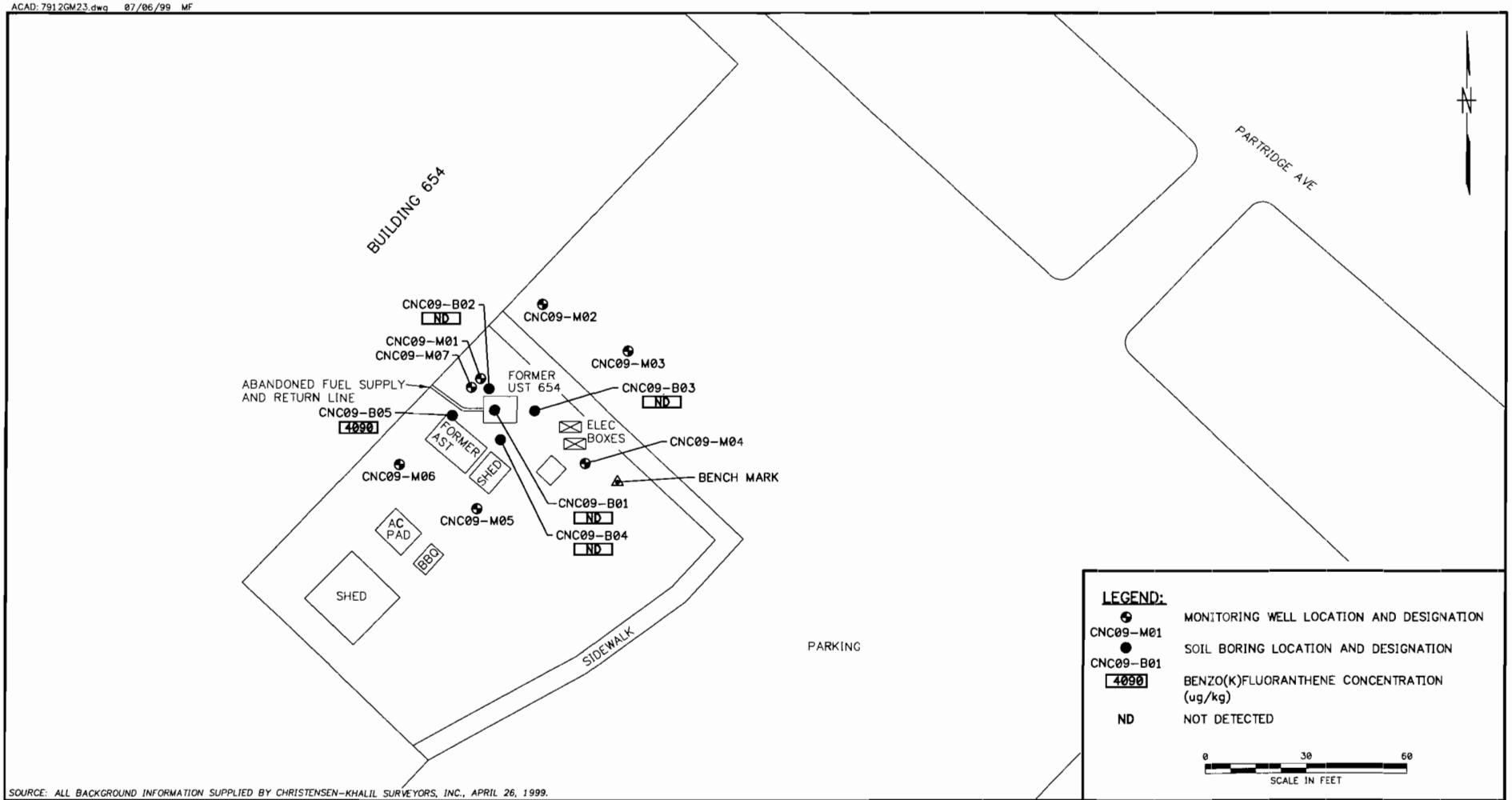
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL BENZENE(b)FLUORANTHENE CONCENTRATION MAP
(JANUARY 13 & 19, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 12
REV. 0

FORM CADD NO. SDIV_BH.DWG – REV D – 1/20/98

ACAD: 7912GM23.dwg 07/06/99 MF



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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

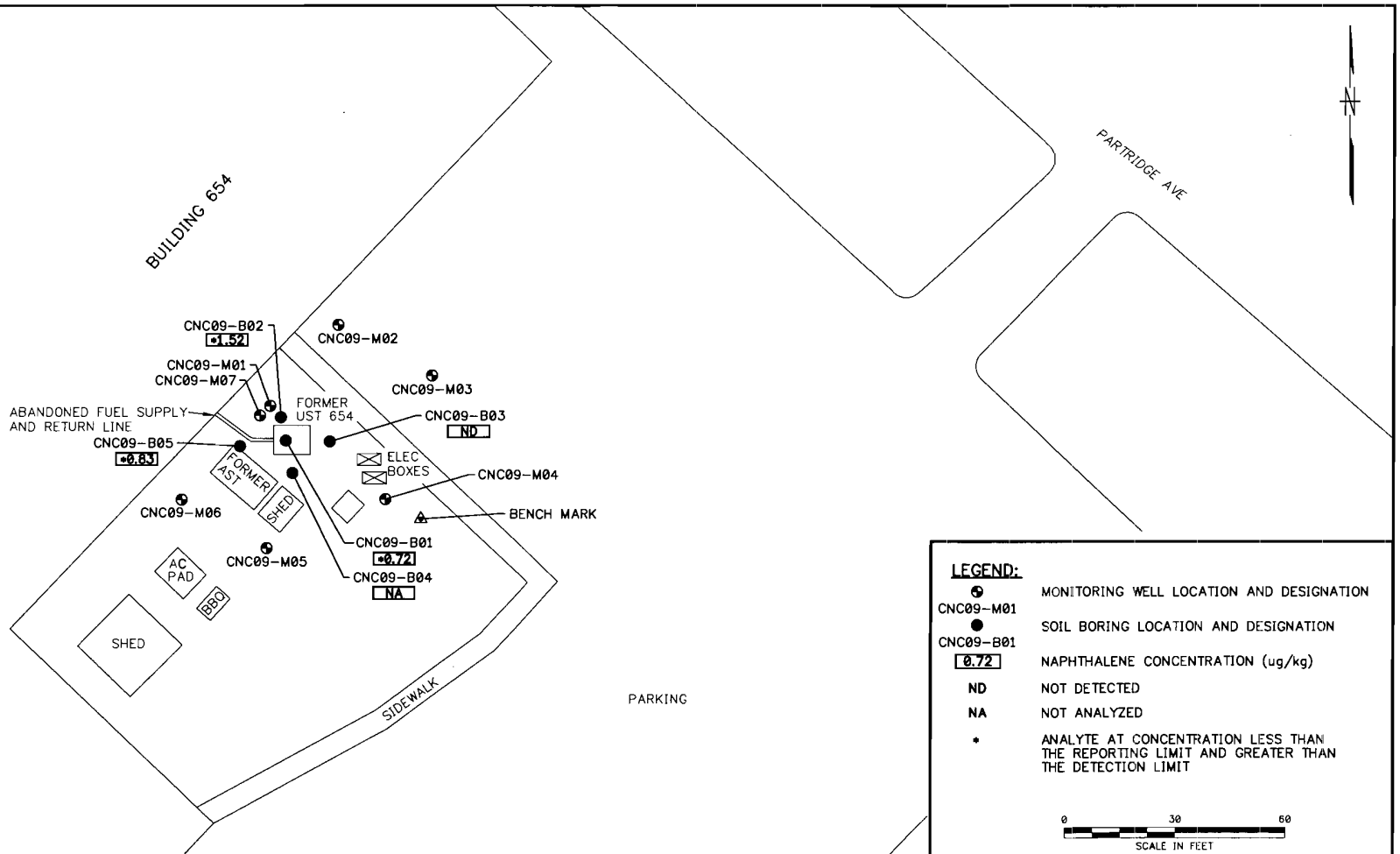
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL BENZO(K)FLUORANTHENE CONCENTRATION MAP
(JANUARY 13 & 19, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPRDVED BY DATE
APPRDVED BY DATE
DRAWING NO. FIGURE 13
REV. 0

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

ACAD: 7912GM25.dwg 07/06/99 MF



LEGEND:

CNC09-M01	MONITORING WELL LOCATION AND DESIGNATION
CNC09-B01	SOIL BORING LOCATION AND DESIGNATION
0.72	NAPHTHALENE CONCENTRATION (ug/kg)
ND	NOT DETECTED
NA	NOT ANALYZED
*	ANALYTE AT CONCENTRATION LESS THAN THE REPORTING LIMIT AND GREATER THAN THE DETECTION LIMIT

0 30 60
SCALE IN FEET

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

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

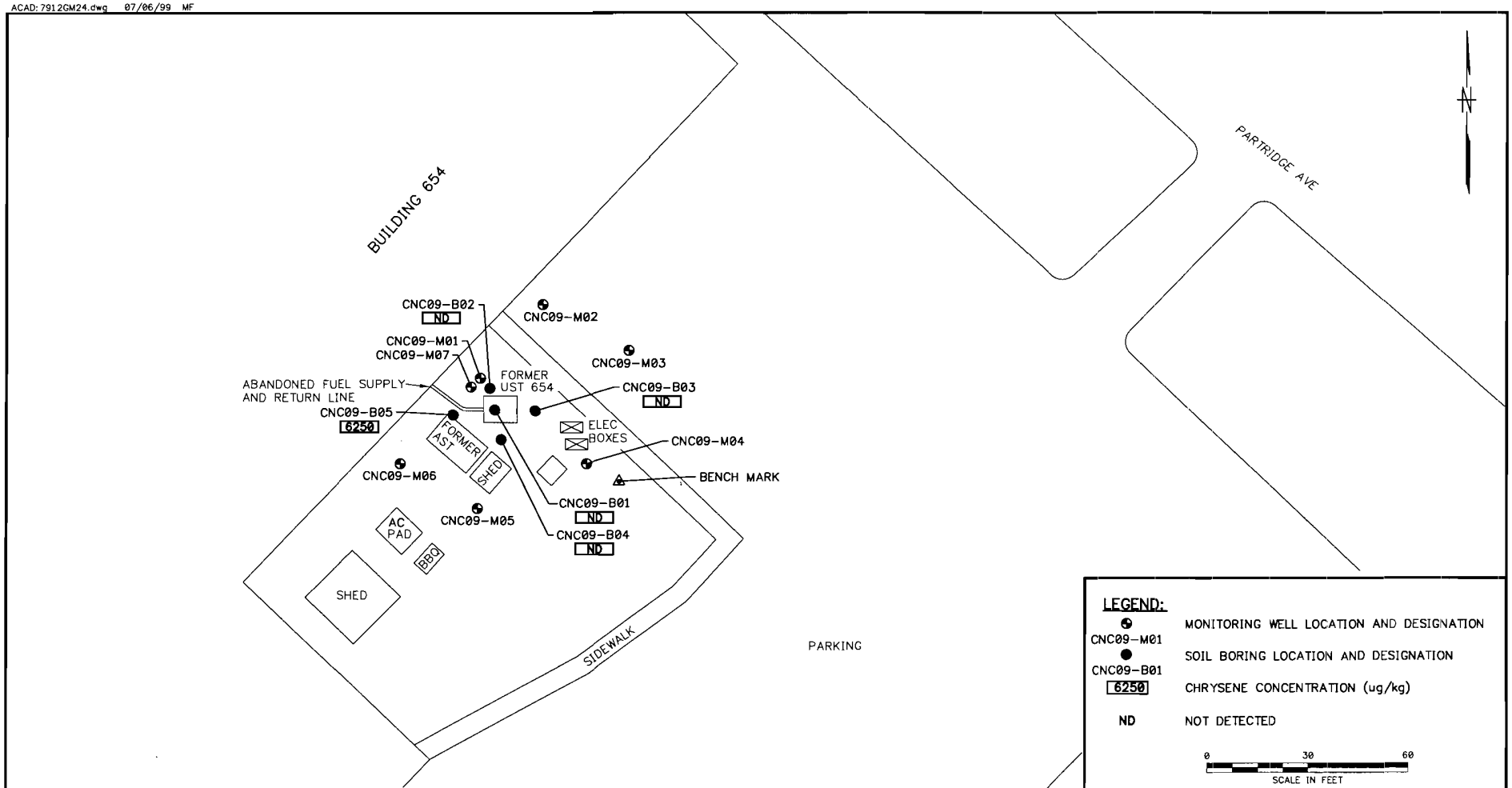
DEPARTMENT OF THE NAVY · NAVAL FACILITIES ENGINEERING COMMAND

SOIL NAPHTHALENE CONCENTRATION MAP
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 14
REV. 0

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

ACAD: 7912GM24.dwg 07/06/99 MF



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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

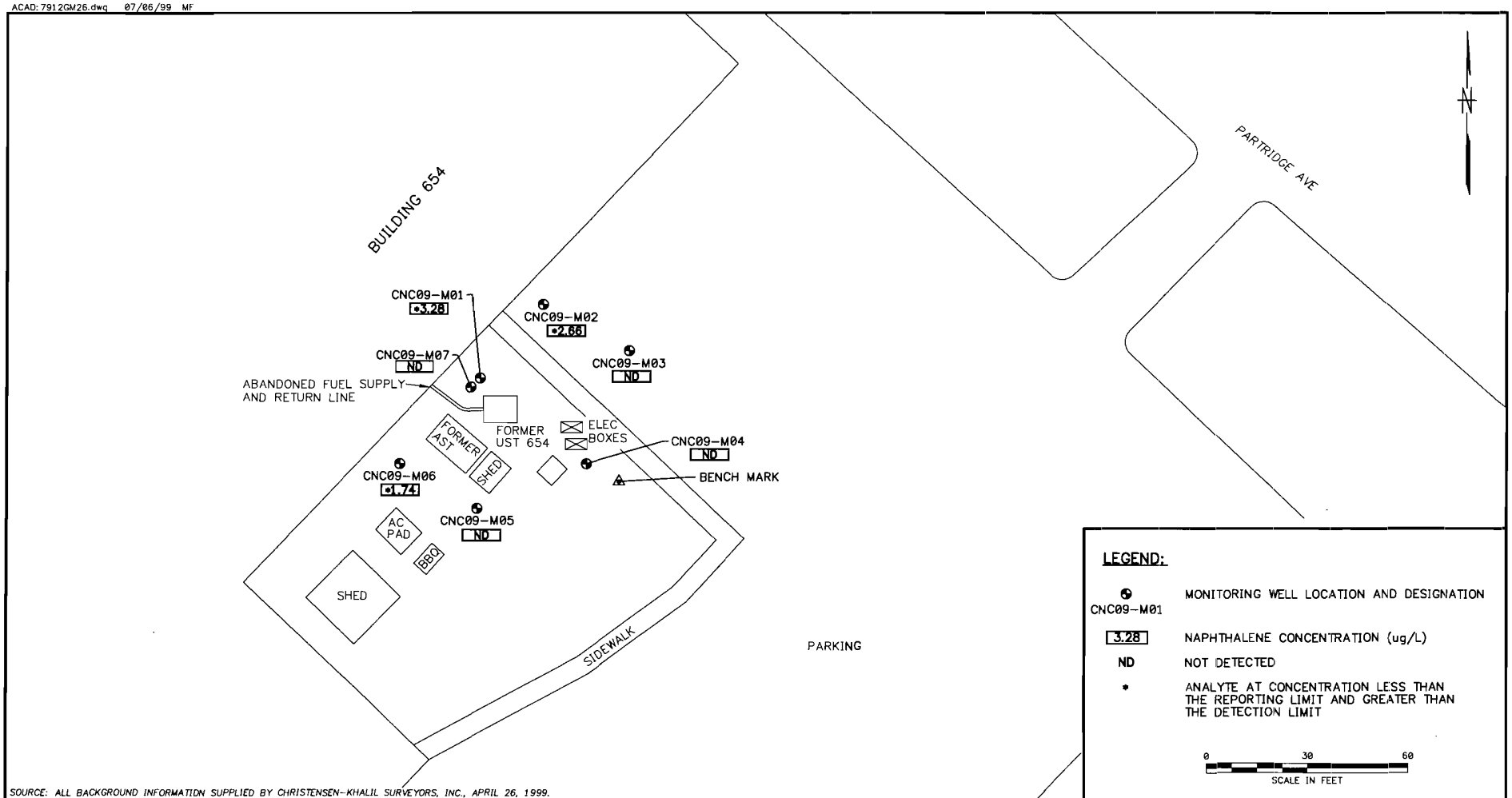
DRAWN BY MF DATE 6/10/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SOIL CHRYSENE CONCENTRATION MAP
(JANUARY 13 & 19, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 15
REV. 0

FORM CADO NO. SDIV_BH.DWG ~ REV 0 ~ 1/20/98

ACAD: 7912GM26.dwg 07/06/99 MF



LEGEND:

CNC09-M01	MONITORING WELL LOCATION AND DESIGNATION
3.28	NAPHTHALENE CONCENTRATION (ug/L)
ND	NOT DETECTED
*	ANALYTE AT CONCENTRATION LESS THAN THE REPORTING LIMIT AND GREATER THAN THE DETECTION LIMIT

0 30 60
SCALE IN FEET

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

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

DEPARTMENT OF THE NAVY · NAVAL FACILITIES ENGINEERING COMMAND

GROUNDWATER NAPHTHALENE CONCENTRATION MAP
(MARCH 19, 1999)
SITE 9, BUILDING 654
ZONE H, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 7912
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 16
REV. 0

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

APPENDIX A

UNDERGROUND STORAGE TANK ASSESSMENT REPORT - UST 654

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 654

Street Address: West Osprey Street

City: North Charleston, 29405-2413 County: Charleston

III. CLOSURE INFORMATION

Closure Started: 24 Jan 1997 Closure Completed: 25 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

V. UST INFORMATION

A. Product.....

B. Capacity.....

C. Age.....

D. Construction Material.....

E. Month/Year of Last Use.....

F. Depth (ft.) To Base of Tank.....

G. Spill Prevention Equipment Y/N.....

H. Overfill Prevention Equipment Y/N.....

I. Method of Closure Removed/Filled.....

J. Visible Corrosion or Pitting Y/N.....

K. Visible Holes Y/N.....

654	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Fuel oil					
2,000 gal.					
Unk.					
Steel					
Unk.					
7'					
N					
N					
R					
N					
N					

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

UST 654 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)

UST 654 was found empty. The rinse water used to clean the tank was recycled.

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

The tank was in very good condition. It had no corrosion, pitting, or holes.

VI. PIPING INFORMATION

	654	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A. Construction Material.....	Copper & PVC					
B. Distance from UST to Dispenser.....	14'					
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.....	N					
G. Visible Holes Y/N.....	N					
H. Age.....	Unk.					

Note 1: The tank provided fuel oil to Building 654.

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

The piping was in good condition, no corrosion, pitting, or holes were found.

VII. BRIEF SITE DESCRIPTION AND HISTORY

UST 654 provided heating fuel oil to building 654, a former Charleston Naval Base Administration building.

The only applicable records found on Building 654 indicate the tank and piping were installed in 1962. Based on the good condition of the piping and tank, and the obvious contamination of the site, it was thought that the tank and/or piping had been replaced. The Steel Tank Institute (STI ®) was called and it was verified that the "sti-P_3" marking on the tank end (see attachment I photos) were not in use prior to 1970 and most likely not found on a tank prior to 1975. Therefore, it is assumed that the tank was replaced in the last 20 years due to failure.

VIII. SITE CONDITIONS

		Yes	No	Unk
A.	Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells? If yes, indicate depth and location on the site map. **[UST excavation, 7']**	X		
B.	Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells? If yes, indicate location on site map and describe the odor (strong, mild, etc.) **[UST excavation, mild]**	X		
C.	Was water present in the UST excavation, soil borings, or trenches? If yes, how far below land surface (indicate location and depth)? _____		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.		N/A	

* 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 0323-1	Beneath pipe run	Soil	12"	1/27/97 1330	W. Nesbit	0 ppm
SPORT 0323-2	West end of tank	Soil	7'	1/27/97 1350	W. Nesbit	3014 ppm
SPORT 0323-3	East end of tank	Soil	7'	1/27/97 1412	W. Nesbit	1285 ppm
SPORT 0323-4	Dirt pile	Soil	-	1/27/97 1435	W. Nesbit	47.9 ppm
SPORT 0368-1	Dirt pile, composite	Soil	-	3/4/97 1120	B. Murray	120 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 samples were taken after the removal of UST 654. 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. UST piping soil samples were taken under the piping at the mechanical connections. A biased composite sample was taken from the excavation dirt pile 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

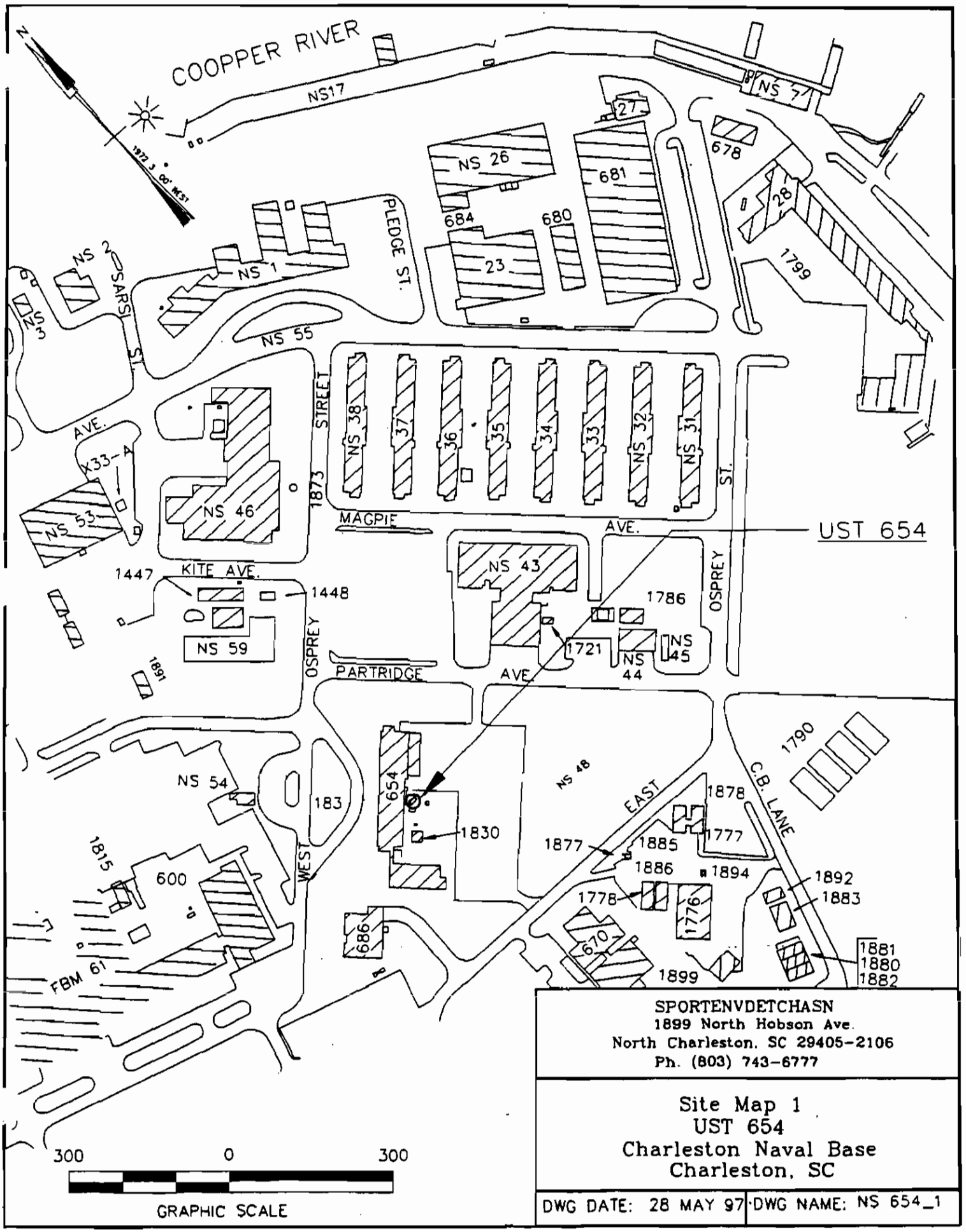
		Yes	No
A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system? If yes, indicate type of receptor, distance, and direction on site map.		X
B.	Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system? If yes, indicate type 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? **[electricity]** 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.

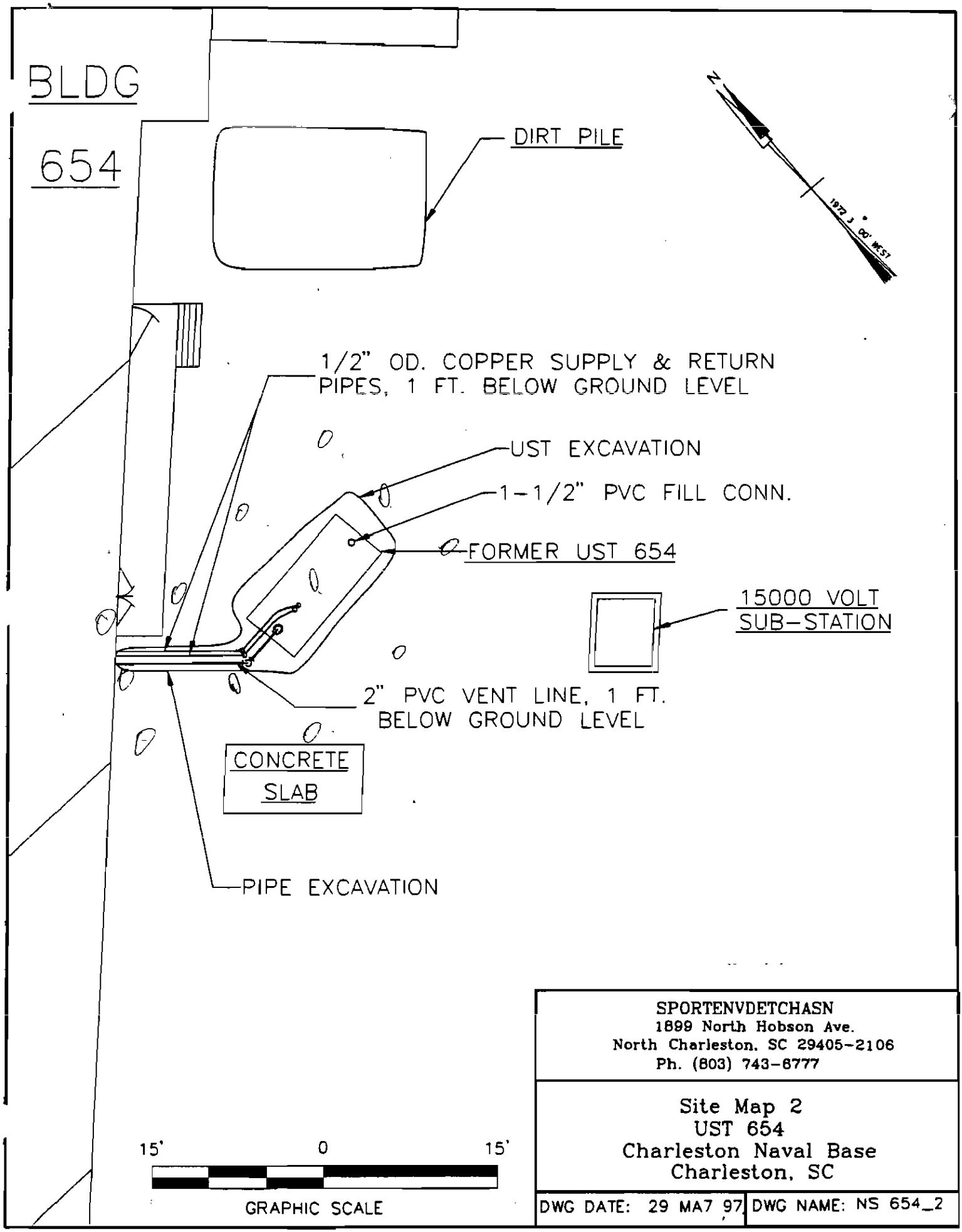
Site Maps 1, 2, and 3
Photographs 1, 2, and 3



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

Site Map 1
UST 654
Charleston Naval Base
Charleston, SC

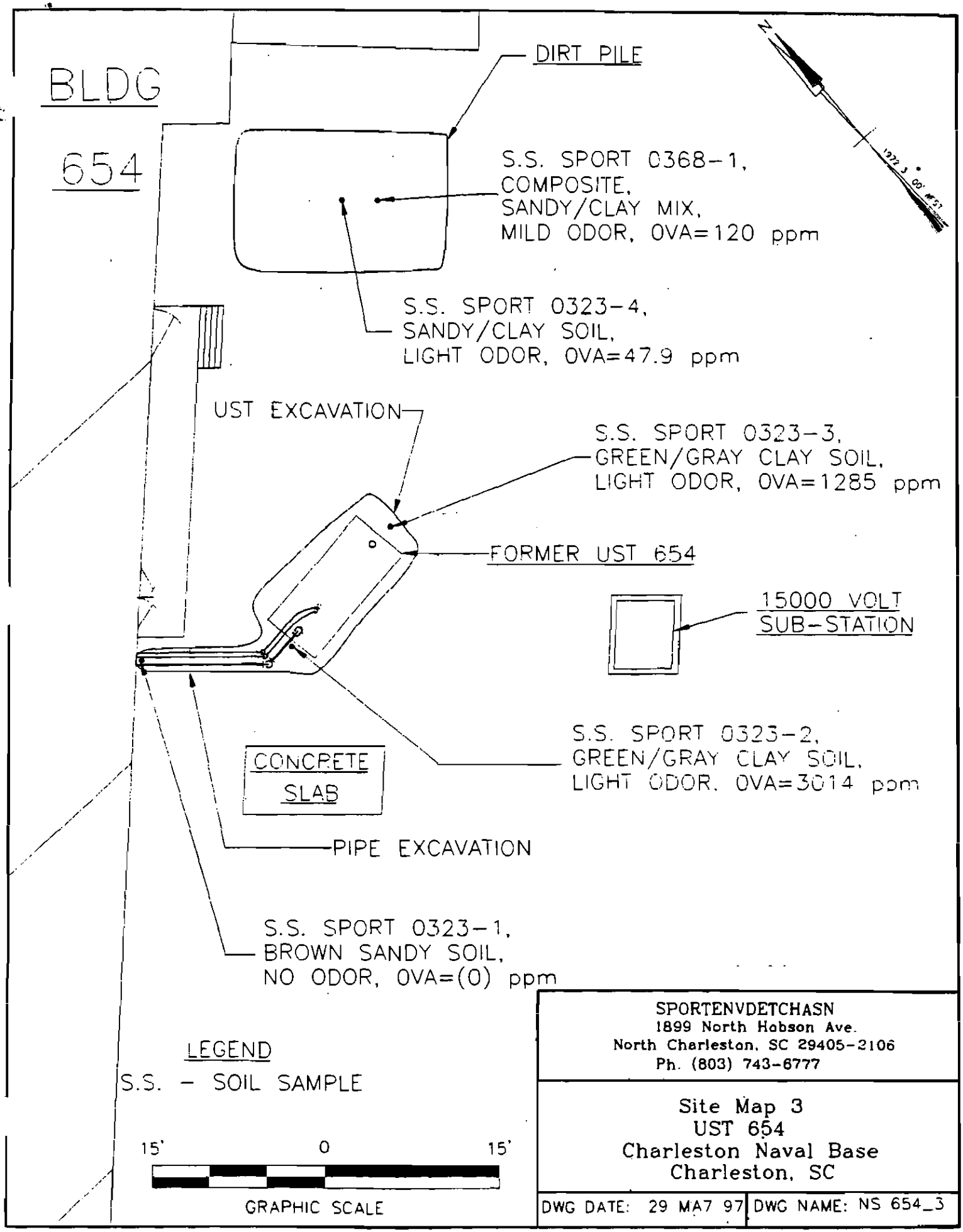
DWG DATE: 28 MAY 97 | DWG NAME: NS 654_1



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

Site Map 2
UST 654
Charleston Naval Base
Charleston, SC

DWG DATE: 29 MA7 97 | DWG NAME: NS 654_2


BLDG
654
DIRT PILE
S.S. SPORT 0368-1,
COMPOSITE,
SANDY/CLAY MIX,
MILD ODOR, OVA=120 ppm
S.S. SPORT 0323-4,
SANDY/CLAY SOIL,
LIGHT ODOR, OVA=47.9 ppm
UST EXCAVATION
S.S. SPORT 0323-3,
GREEN/GRAY CLAY SOIL,
LIGHT ODOR, OVA=1285 ppm
FORMER UST 654
15000 VOLT
SUB-STATION
S.S. SPORT 0323-2,
GREEN/GRAY CLAY SOIL,
LIGHT ODOR, OVA=3014 ppm
CONCRETE
SLAB
PIPE EXCAVATION
S.S. SPORT 0323-1,
BROWN SANDY SOIL,
NO ODOR, OVA=(0) ppm
LEGEND
S.S. - SOIL SAMPLE
15'
0
15'
GRAPHIC SCALE
SPORTENVDETCHASN
1899 North Hobson Ave.
North Charleston, SC 29405-2106
Ph. (803) 743-6777
Site Map 3
UST 654
Charleston Naval Base
Charleston, SC
DWG DATE: 29 MA7 97
DWG NAME: NS 654_3

UST 654

Photo 1: UST 654 during excavation.

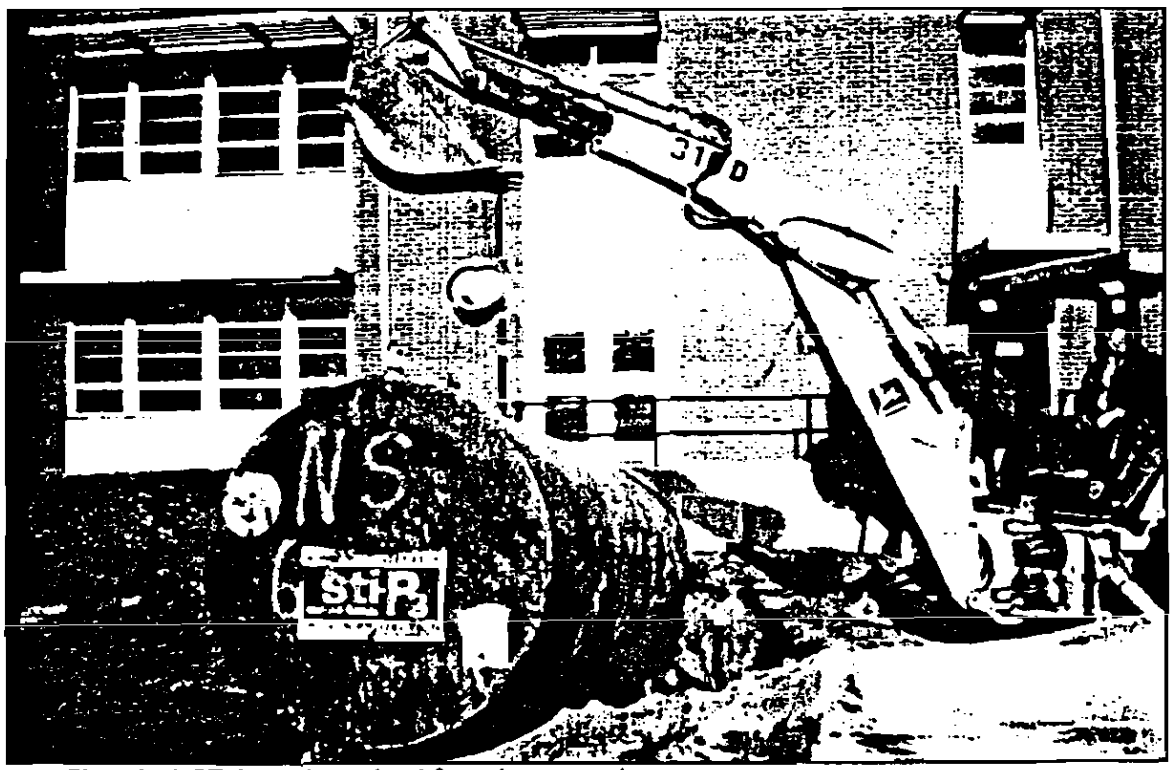


Photo 2: UST 654 being hoisted from the excavation.

UST 654

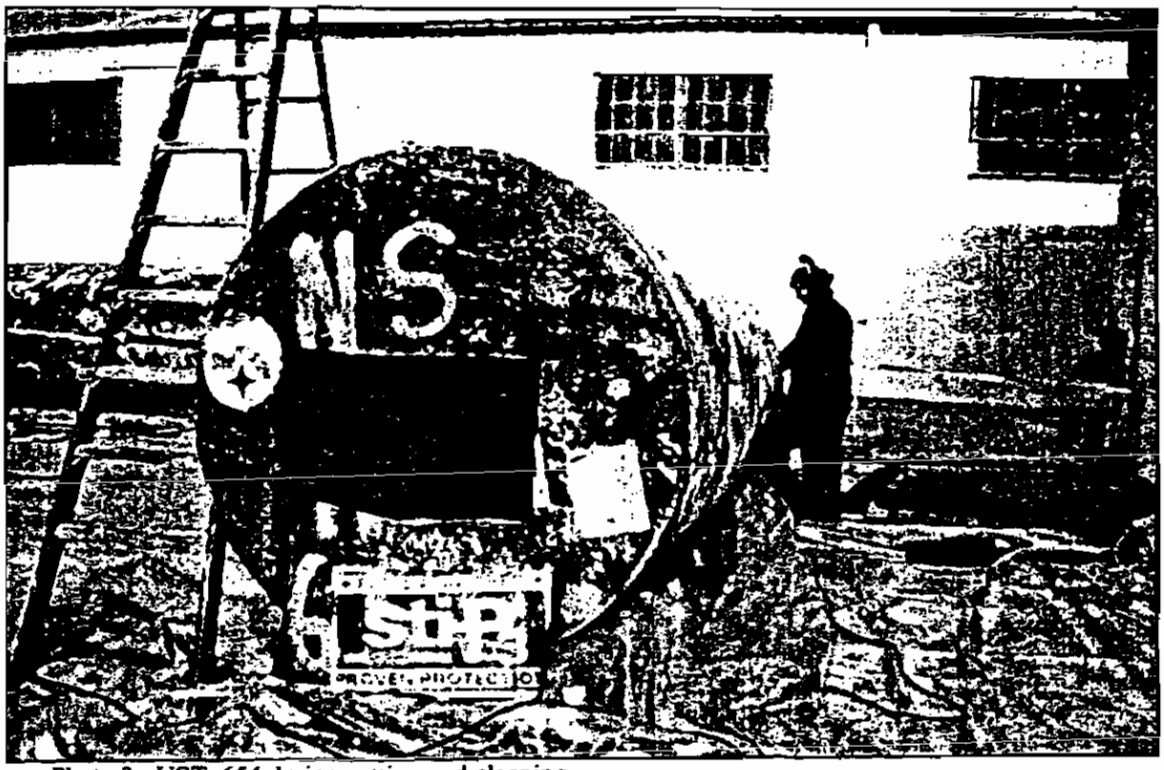


Photo 3: UST 654 during cutting and cleaning.

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 07, 1997

Sample ID	: SPORT0323-1
Lab ID	: 9701516-01
Matrix	: Soil
Date Collected	: 01/27/97
Date Received	: 01/28/97
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	01/31/97	2047	97209	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1620	3240	ug/kg	10.	WAM	02/03/97	2020	97163	2
Acenaphthylene	U	0.00	1620	3240	ug/kg	10.					
Anthracene	U	0.00	1620	3240	ug/kg	10.					
Benzo(a)anthracene		5220	1620	3240	ug/kg	10.					
Benzo(a)pyrene		4080	1620	3240	ug/kg	10.					
Benzo(b)fluoranthene		3950	1620	3240	ug/kg	10.					
Benzo(ghi)perylene	J	2330	1620	3240	ug/kg	10.					
Benzo(k)fluoranthene		4990	1620	3240	ug/kg	10.					
Chrysene		6420	1620	3240	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1620	3240	ug/kg	10.					
Fluoranthene		11000	1620	3240	ug/kg	10.					
Fluorene	U	0.00	1620	3240	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	J	2300	1620	3240	ug/kg	10.					
Naphthalene	U	0.00	1620	3240	ug/kg	10.					
Phenanthrene		8390	1620	3240	ug/kg	10.					
Pyrene		8550	1620	3240	ug/kg	10.					

he following prep procedures were performed:
GC/MS Base/Neutral Compounds MS 01/31/97 1100 97163

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

(803) 556-8171 • Fax (803) 766-1178

9701516-01

Printed on recycled paper.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472A
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 07, 1997

Sample ID : SPORT0323-1

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
2-Fluorobiphenyl	M610	0.00*	(30.0 - 115.)
Nitrobenzene-d5	M610	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610	108.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	130.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	90.0	(63.4 - 136.)
Toluene-d8	BTEX-8260	95.2	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	130.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	90.0	(63.4 - 136.)
Toluene-d8	NAP-8260	95.2	(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.

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

(803) 556-8171 • Fax (803) 766-1178

9701516-01

Printed on recycled paper.

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 07, 1997

Sample ID : SPORT0323-1

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

viewed By

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

(803) 556-8171 • Fax (803) 766-1178

9701516-01

Printed on recycled paper.

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 07, 1997

Sample ID	: SPORT0323-2
Lab ID	: 9701516-02
Matrix	: Soil
Date Collected	: 01/27/97
Date Received	: 01/28/97
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	01/31/97	2115	97209	
Ethylbenzene	U	0.00	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	U	0.00	10.0	20.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1660	3320	ug/kg	10.	WAM	02/03/97	2053	97163	2
Acenaphthylene	U	0.00	1660	3320	ug/kg	10.					
Anthracene	U	0.00	1660	3320	ug/kg	10.					
Benzo(a)anthracene	U	0.00	1660	3320	ug/kg	10.					
Benzo(a)pyrene	U	0.00	1660	3320	ug/kg	10.					
Benzo(b)fluoranthene	U	0.00	1660	3320	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	1660	3320	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	1660	3320	ug/kg	10.					
Chrysene	U	0.00	1660	3320	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1660	3320	ug/kg	10.					
Fluoranthene	U	0.00	1660	3320	ug/kg	10.					
Fluorene	U	0.00	1660	3320	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	1660	3320	ug/kg	10.					
Naphthalene	U	0.00	1660	3320	ug/kg	10.					
Phenanthrene	U	0.00	1660	3320	ug/kg	10.					
Pyrene	U	0.00	1660	3320	ug/kg	10.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds MS 01/31/97 1100 97163

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

(803) 556-8171 • Fax (803) 766-1178

9701516-02

Printed on recycled paper.

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 07, 1997

Sample ID : SPORT0323-2

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

Comments:
A dilution was required for Volatile Organics due to a high concentration of hydrocarbons. 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	110.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	94.4	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	92.0	(63.4 - 136.)
Toluene-d8	BTEX-8260	101.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	94.4	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	92.0	(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).
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.

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

(803) 556-8171 • Fax (803) 766-1178

9701516-02

Printed on recycled paper.

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 07, 1997

Sample ID : SPORT0323-2

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
eviewed By

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

(803) 556-8171 • Fax (803) 766-1178

9701516-02

Printed on recycled paper.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

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 07, 1997

Sample ID	: SPORT0323-3
Lab ID	: 9701516-03
Matrix	: Soil
Date Collected	: 01/27/97
Date Received	: 01/28/97
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	01/31/97	2143	97209	1
Ethylbenzene	U	0.00	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	U	0.00	10.0	20.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1650	3290	ug/kg	10.	WAM	02/03/97	2126	97163	2
Acenaphthylene	U	0.00	1650	3290	ug/kg	10.					
Anthracene	U	0.00	1650	3290	ug/kg	10.					
Benzo(a)anthracene	U	0.00	1650	3290	ug/kg	10.					
Benzo(a)pyrene	U	0.00	1650	3290	ug/kg	10.					
Benzo(b)fluoranthene	U	0.00	1650	3290	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	1650	3290	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	1650	3290	ug/kg	10.					
Chrysene	U	0.00	1650	3290	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1650	3290	ug/kg	10.					
Fluoranthene	U	0.00	1650	3290	ug/kg	10.					
Fluorene	U	0.00	1650	3290	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	1650	3290	ug/kg	10.					
Naphthalene	U	0.00	1650	3290	ug/kg	10.					
Phenanthrene	U	0.00	1650	3290	ug/kg	10.					
Pyrene	U	0.00	1650	3290	ug/kg	10.					

he following prep procedures were performed:
GC/MS Base/Neutral Compounds MS 01/31/97 1100 97163

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 07, 1997

Sample ID : SPORT0323-3

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

Comments:
A dilution was required for Volatile Organics due to a high concentration of hydrocarbons. 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	96.0	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	94.0	(63.4 - 136.)
Toluene-d8	BTEX-8260	105.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	96.0	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	94.0	(63.4 - 136.)
Toluene-d8	NAP-8260	105.	(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.

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

(803) 556-8171 • Fax (803) 766-1178

9701516-03

Printed on recycled paper

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 07, 1997

Sample ID : SPORT0323-3

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

9701516-03

Printed on recycled paper.

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 07, 1997 |

Sample ID	: SPORT0323-4
Lab ID	: 9701516-04
Matrix	: Soil
Date Collected	: 01/27/97
Date Received	: 01/28/97
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	01/31/97	2211	97209	1
Ethylbenzene	U	0.00	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	U	0.00	10.0	20.0	ug/kg	10.					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1650	3290	ug/kg	10.	WAM	02/05/97	1104	97163	2
Acenaphthylene	U	0.00	1650	3290	ug/kg	10.					
Anthracene	U	0.00	1650	3290	ug/kg	10.					
Benzo(a)anthracene	U	0.00	1650	3290	ug/kg	10.					
Benzo(a)pyrene	U	0.00	1650	3290	ug/kg	10.					
Benzo(b)fluoranthene	U	0.00	1650	3290	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	1650	3290	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	1650	3290	ug/kg	10.					
Chrysene	U	0.00	1650	3290	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1650	3290	ug/kg	10.					
Fluoranthene	J	1710	1650	3290	ug/kg	10.					
Fluorene	U	0.00	1650	3290	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	1650	3290	ug/kg	10.					
Naphthalene	U	0.00	1650	3290	ug/kg	10.					
Phenanthrene	U	0.00	1650	3290	ug/kg	10.					
Pyrene	U	0.00	1650	3290	ug/kg	10.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds — MS 01/31/97 1100 97163

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

(803) 556-8171 • Fax (803) 766-1178

9701516-04

Printed on recycled paper.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E37472/87
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 07, 1997

Sample ID : SPORT0323-4

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

Comments:
A dilution was required for Volatile Organics due to a high concentration of hydrocarbons. 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	102.	(30.0 - 115.)
Nitrobenzene-d5	M610	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610	112.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	102.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	87.2	(63.4 - 136.)
Toluene-d8	BTEX-8260	105.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	102.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	87.2	(63.4 - 136.)
Toluene-d8	NAP-8260	105.	(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.

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

(803) 556-8171 • Fax (803) 766-1178

9701516-04

Printed on recycled paper.

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 07, 1997

Sample ID : SPORT0323-4

M = Method	Method-Description

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

Karen Blakeney
Reviewed By

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

(803) 556-8171 • Fax (803) 766-1178

9701516-04

Printed on recycled paper.

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 07, 1997

Sample ID	: SPORT0323-5
Lab ID	: 9701516-05
Matrix	: Soil
Date Collected	: 01/27/97
Date Received	: 01/28/97
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	1831	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		2.83	1.00	2.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	96.3	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	83.2	(63.4 - 136.)
Toluene-d8	BTEX-8260	93.8	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	96.3	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	83.2	(63.4 - 136.)
Toluene-d8	NAP-8260	93.8	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260

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 07, 1997

Sample ID : SPORT0323-5

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

9701516-05

Printed on recycled paper.

N° C00196

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29414
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9701576 KBB

Page 1 of 1

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: SPORTENVDETCHASN

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

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

CCL 25346

	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 PIUS NAPTHALENE	PAH	Remarks	
01	SPORTØ323-1	1/27/97	133Ø		X		X	2																X	X	UST NS 654-1 Soil	.1
02	SPORTØ323-2	1/27/97	135Ø		X		X	2																X	X	UST NS 654-2 Soil	.1
03	SPORTØ323-3	1/27/97	1412		X		X	2																X	X	UST NS 654-3 Soil	.1
04	SPORTØ323-4	1/27/97	1435		X	X		2																X	X	UST NS654-4 Soil DIRT Pile	.1
05	SPORTØ323-5	1/27/97	~~1350~~ 1320 VOA		X		X	1																X		UST NS654 Soil VOA TRIP BLANK	.2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	1/28/97	Ø823	[signature]	[signature]	1/28/97	1450	Crystal Henderson

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
Crystal Henderson	1-28-97	15:15	[signature]	1/28/97	15:15	

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	E87472/874
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 13, 1997

Sample ID	: SPORT0368-1
Lab ID	: 9703076-01
Matrix	: Soil
Date Collected	: 03/04/97
Date Received	: 03/04/97
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	6580	13200	ug/kg	40.	JCB	03/07/97	1850	98604	1
Acenaphthylene	U	0.00	6580	13200	ug/kg	40.					
Anthracene	U	0.00	6580	13200	ug/kg	40.					
Benzo(a)anthracene	U	0.00	6580	13200	ug/kg	40.					
Benzo(a)pyrene	U	0.00	6580	13200	ug/kg	40.					
Benzo(b)fluoranthene	U	0.00	6580	13200	ug/kg	40.					
Benzo(ghi)perylene	U	0.00	6580	13200	ug/kg	40.					
Benzo(k)fluoranthene	U	0.00	6580	13200	ug/kg	40.					
Chrysene	U	0.00	6580	13200	ug/kg	40.					
Dibenzo(a,h)anthracene	U	0.00	6580	13200	ug/kg	40.					
Fluoranthene	U	0.00	6580	13200	ug/kg	40.					
Fluorene	U	0.00	6580	13200	ug/kg	40.					
Indeno(1,2,3-c,d)pyrene	U	0.00	6580	13200	ug/kg	40.					
Naphthalene	U	0.00	6580	13200	ug/kg	40.					
Phenanthrene	U	0.00	6580	13200	ug/kg	40.					
Pyrene	U	0.00	6580	13200	ug/kg	40.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds TSD 03/05/97 1500 98604 2

Comments:

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

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

(803) 556-8171 • Fax (803) 766-1178

9703076-01

Printed on recycled paper

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: March 13, 1997

Sample ID : SPORT0368-1

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.)

M = Method	Method-Description
M 1	EPA 8270
M 2	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

9703076-01

Printed on recycled paper

NDOC00196

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29414
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9703076

Page 1 of 1

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: J. AMEY SPORTENVDETCHASN

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

CCL 25997

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

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrate/Nitrite	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	PAH		Remarks
01 SPORTΦ368-1	3/4/97	1120		X	X		1																X		DIRT PRE - UST NS654
																									NOTE: SEE ATTACHED SHEET FOR Limits.

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Bu [illegible]	3/4/97	1200	Fred S. McGregor Jr.	Fred S. McGregor Jr.	3/4/97	1500	Catherine [illegible]
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
Catherine [illegible]	3-4-97	1540	Leonie Francis	3/4/97	1540		

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

UST 654; Building 654, Partridge 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)

APPENDIX B

GEOLOGIC BORING LOGS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B01	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catlin	**COMPLETION DATE:** 12/17/98	**LOGGED BY:** Bryan Moeller
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 7.5ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	CLAYEY SAND: ~40% clay, fine-grained, some large gravel, dry, cohesive, soft, dark brown.		SC		
				0					
	09SFB0103			0			CL		
5					CLAY: sandy, some gravel, non-plastic, very soft, dark gray, wet.				
					Met Refusal - End of Boring.				
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B02	**WELL ID:**	**PIEZOMETER ID:** CNC09-P01
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/17/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SAND: very fine-grained, trace silt, dry, loose, well sorted, reddish gray.		SP		
				1	SILTY SAND: 25% silt, some clay, very fine- to medium-grained, some small gravel, dry, loose, brown.		SM		
	09SFB0203			1	SILTY SAND: very organic (like potting soil), loose, very fine- grained, damp, black.				
					CLAYEY SAND: ~20% clay, very fine-grained, cohesive, soft, wet, grayish orange.		SC		
5					SILTY SAND: ~20-30% silt, some clay, very fine-grained sand and gravel, shells (oyster), strong petroleum odor, wet, greenish gray.		SM		
					SAND: fine-grained, trace silt, dense, saturated, light gray.		SP		
10	09GFP0101				SILT: some very fine-grained sand, very soft, saturated, greenish brown.		ML		
					End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B03	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/18/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SILTY SAND: ~10% silt, trace clay, very fine-grained, loose, dry, grayish orange.		SM		
				0	SAND: very fine- to coarse-grained, gravel, black, resembles ground asphalt.		SW		
	09SFB0303			3	CLAYEY SAND: ~20% clay, some silt, very fine-grained, soft, cohesive, wet, grayish orange.		SC		
5					SILTY CLAY: ~20% silt, 2 2" layers of gravel (one phosphate, one granite) at 5' and 7.5' bls, one 2' silty sand layer, non-plastic, very stiff, wet, grayish brown.		CL		
					SILTY SAND: ~20% silt, very fine-grained, cohesive, dense, wet, grayish brown.		SM		
10					CLAY AND SAND: layers of clay muck and well sorted fine sand, gray to dark gray.		SP OL		
	09GFB04				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B04	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/18/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SILTY SAND: ~15% silt, very fine-grained, loose, dry, grayish orange and brown.		SM		
				1	SAND: very fine- to coarse-grained, gravel, black, resembles ground asphalt.		SW		
	09SFB0403			1			SC		
5					CLAYEY SAND: ~10% clay, very fine-grained, cohesive, soft, wet, pale gray.				
					SILTY SAND: ~30% silt, very fine-grained, wet, dense, light brown.		SM		
10					INTERBEDDED CLAY AND SAND: 4" to 6" layers of black organic clay muck and very fine- to fine-grained sand.		SP CL		
	09GFB04				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B05	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/18/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					SAND: very fine-grained, trace silt, dry, loose, well sorted.		SP		
	09SFB0501			4			SW		
				0	SILTY SAND: very fine- to coarse-grained, gravel, black, resembles ground asphalt.				
				0			SC		
					CLAYEY SAND: ~10% clay, fine-grained, moderately sorted, cohesive, loose, wet, yellowish orange.				
5							SM		
					SILTY SAND: ~40% silt, very fine-grained, trace medium, 2 distinct layers of gravel and oyster shells, dense, cohesive, wet, light brown.				
							SP		
							SM		
10					INTERBEDDED SAND, SILTY SAND, AND CLAY: sands are fine-grained, well sorted, silty sands as above, clays are organic, very soft, mucky, gray, saturated.		OL		
	09GFB05				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B06	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/20/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					ASPHALT		GC		
				4	SAND-CLAY-GRAVEL: ~20% clay, ~10% gravel, ~70% fine- to medium- grained sand, very poor sort, loose, dry, grayish brown.		SW		
				60	SAND: very fine- to medium-grained, trace coarse, trace gravel, resembles ground asphalt, dry, black.		SC		
				60	CLAYEY SAND: ~10-15% clay, very fine- to fine-grained, cohesive, soft, damp to wet, grayish brown.		SM		
5					SILTY SAND: ~20-30% silt, very fine-grained, medium dense, one 1" layer of fine sand at 6.5 bls, wet, light brown.				
					SAND: very fine- to coarse grained, shells, dense, saturated, light gray.		SW		
					SAND: fine-grained, trace clay, trace wood, saturated, dense, light gray.		SP		
10					SILT: very soft, trace very fine-grained sand, saturated, light brown.		ML		
					SILTY SAND: ~40-45% silt, very fine-grained, saturated, soft, light brown.		SM		
	09GFB06				End of Boring				
15									

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B07	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/20/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					ASPHALT				
				4	SAND-CLAY-GRAVEL: ~30% clay, ~10% gravel, ~60% fine- to coarse- grained sand, loose, dry, brown.		GC		
				60	SAND: very fine- to coarse-grained, gravel, dry, resembles ground asphalt, black.		SW		
				60	CLAYEY SAND: very fine- to fine-grained, numerous clay pellets, damp to wet, damp to wet, soft, loose.		SC		
5					SILTY SAND: ~20-30% silt, very fine-grained, medium dense, one 1" layer of fine sand at 6.5 bls, wet, light brown.		SM		
							SW		
					SAND: fine-to medium-grained, moderately sorted, grass and grass roots, saturated, medium dense, light gray.		SP		
10							ML		
					SILTY CLAY: ~30% silt, some fine-grained sand, very soft, dark gray.		SM		
	09GFB08				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B08	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/20/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 4ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					ASPHALT				
				3	SAND-CLAY-GRAVEL: ~20% clay, ~10% gravel, ~70% fine- to medium- grained sand, very poor sort, loose, dry, grayish brown.		GC		
				3	SAND: very fine- to medium-grained, trace coarse, trace gravel, resembles ground asphalt, dry, black.		SW		
	09GFB08			600	SILTY SAND: ~30% silt, very fine-grained, medium dense, some clay, cohesive, wet, light brown.		SM		
					End of Boring				
5									
10									
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B09	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/20/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHOLOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				3	SAND: very fine- to coarse-grained, gravel, dry, resembles ground asphalt, black.		SP		
				3					
				600	CLAYEY SAND: ~10% clay, very fine- to fine-grained, saturated, soft, light brown.		SM		
							SM		
5									
					SILTY SAND: ~30% silt, very fine-grained, medium dense, 20% phosphate pebbles, some oyster shells, soft, saturated, grayish brown.				
10					No recovery 8-12'				
	09GFB09				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B10	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/21/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SILTY SAND: ~10% silt, very fine-grained, loose, dry, brown to dark brown.		SM		
				0	SAND: very fine- to coarse-grained, gravel, dry, resembles ground asphalt, black.		SW		
				0	CLAYEY SAND: very fine- to fine-grained, numerous clay pellets, damp to wet, damp to wet, soft, loose.		SC		
5					SILTY SAND: ~30% silt, very fine-grained, medium dense, 10-15% phosphate pebbles, some oyster shells, soft, saturated, light brown.		SM		
10					CLAYEY SAND: ~20% clay, very fine- to fine-grained, cohesive, soft, saturated, light gray.		SC		
	09GFP0301				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B11	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/21/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				0	SILTY SAND: ~10% silt, 10-15% clay, increasing with depth, very fine- grained, loose, dry, brown.		SM		
				0	SAND: very fine- to coarse-grained, dry, resembles ground asphalt, black.		SW		
				0			SC		
5					CLAYEY SAND: 20-40% clay, increasing with depth, very fine- to fine- grained, cohesive, soft, damp, light gray to pale yellowish orange.				
							SM		
					SILTY SAND: ~30% silt, very fine-grained, medium dense, 10-15% phosphate pebbles, some oyster shells, soft, saturated, light brown.				
10									
	09GFB11				SILT-SAND-GRAVEL		GM		
					End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B12	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 12/21/98	**LOGGED BY:** P.J. Jackson
METHOD: Powerprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					SAND: very fine-grained, loose, well sorted, dry, brown.		SP		
					CLAYEY SAND: ~20-25% clay, very fine- to medium-grained, dry, loose, brown.		SC		
				0	SAND: very fine- to coarse-grained, loose, dry, black, resembles ground asphalt.		SP		
				0	SAND: very fine-grained, lots of mica, trace clay, soft, wet, light gray.				
				0			SM		
5									
					SILTY SAND: ~45% silt, very fine-grained, layers of fine-grained, phosphate pebbles, some oyster shells, soft, saturated, light brown.				
					SILT: some very fine-grained sand, lots of bark and wood, very soft, saturated, gray.		OL		
					SAND: fine, well sorted, light gray.		SP		
10					SILT: soft, wet, some clay organic, very dark gray.		OL		
					SILTY SAND: 40-45% silt, very fine-grained, traces of wood, soft, light brown.		SM		
	09GFB12				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B13	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 1/12/99	**LOGGED BY:** Bryan Moeller
METHOD: Geoprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					SILTY SAND: trace clay, moist, loose, brown.		SP		
				2					
				2.5					
				1	CLAYEY SAND: some clay, very fine- to medium-grained sand, loose, wet, brown to black mottled.		SC		
				2					
5					CLAYEY SAND: some clay, very fine- to medium-grained, loose, wet, brown to black mottled.				
					No recovery 8-12'				
10									
	09GFB13				End of Boring				
16									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B14	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 1/12/99	**LOGGED BY:** Bryan Moeller
METHOD: Geoprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					SILTY SAND: ~10-15% silt, silty fine-grained sand, loose, dry, dark brown.		SM		
				2	SAND: very fine- to medium-grained, some gravel, loose, dry, resembles ground asphalt, dark brown.		SP		
				2			SC		
				5	CLAYEY SAND: very fine- to fine-grained sand, cohesive, soft, orange yellow.				
				120			SM		
5					SILTY SAND: ~30% silt, very fine-grained, some pebbles and shells, light gray.				
10					No recovery 8-12'				
	09CNC B14				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B15	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 1/12/99	**LOGGED BY:** Bryan Moeller
METHOD: Geoprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
				2	SILTY SAND: ~10-15% silt, silty fine-grained sand, loose, dry, dark brown.		SM		
				700	SAND: fine- to very fine-grained, some gravel, loose, dry, resembles ground asphalt, dark brown.		SP		
				1100			SC		
				130	CLAYEY SAND: very fine- to fine-grained sand, cohesive, soft, damp, orange yellow.				
5							SM		
					SILTY SAND: ~25% silt, very fine-grained, some shell fragments, light gray to yellow.				
10					No recovery 8-12'				
	[illegible]				End of Boring				

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B16	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 1/12/99	**LOGGED BY:** Bryan Moeller
METHOD: Geoprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ▽** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					ASPHALT/CRUSH				
				18	CLAYEY SAND: 15% clay, loose, dry, brown.		SC		
				3	SAND: fine- to very fine-grained, some gravel, loose, dry to moist, resembles ground asphalt, dark brown.		SP		
				2			SC		
				80	CLAYEY SAND: very fine- to fine-grained sand, cohesive, soft, damp to wet with depth, orangish yellow.				
5							CL		
					SANDY CLAY: fine- to very fine-grained sand, increasing clay with depth, shell fragments, dense, wet, orangish brown.				
10					No recovery 8-12'				
	09DFB16				End of Boring				
15									

Tetra Tech NUS

BASE: Charleston Naval Complex, Zone H	**SITE ID:** 09	**PROJECT NO.** 7921
BORING ID: CNC09-B17	**WELL ID:**	**PIEZOMETER ID:**
CONTRACTOR: Catelin	**COMPLETION DATE:** 1/12/99	**LOGGED BY:** Bryan Moeller
METHOD: Geoprobe	**DIAMETER:** 3" OD	**TOTAL DEPTH:** 12ft bls
TOC ELEVATION: ft MSL	**SCREEN INTERVAL:** ft bls	**DEPTH TO ∇** ft bls

DEPTH FT.	LAB SAMPLE ID.	SAMPLE	RECOVERY	CORRECTED HEADSPACE (ppm)	LITHILOGIC DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOW COUNTS	WELL DATA
					ASPHALT/CRUSH				
				6.5	SAND: fine- to very fine-grained, some gravel, loose, dry, brown.		SC		
				2	SAND: very fine- to medium grained, loose, dry, resembles asphalt, black.		SP		
				2.5	CLAYEY SAND: very fine- to fine-grained sand, cohesive, soft, damp to wet with depth, orangish yellow.		SC		
				3			CL		
5									
					SANDY CLAY: fine-grained sand, soft, wet, olive green.				
					SAND: fine- to coarse-grained, shell fragments, wet, loose.		SW		
					SANDY CLAY: fine-grained sand, shell fragments, density decreasing with depth, orange brown.		CL		
10					No recovery 8-12'				
	09GFB17				End of Boring				
15									

Tetra Tech NUS

SOUTHNAVFAC

LOG OF BORING CNC09-B18

PROJECT NO: CTO 0068/7192	PROJECT NAME: Site 9, Building 654
PROJECT LOCATION: Charleston Naval Complex, Zone H	DATE DRILLED: 1-24-99
DRILLING COMPANY: U.S. Probe	SURFACE ELEVATION: Feet —
DRILLING METHOD: (Hand Auger) / Direct Push	BORING DIAMETER: 3 Inches
DRILLING RIG: 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
5		Hand Auger							Boring hand augered to 9' bls for purpose of collecting groundwater field screening sample 09GFB18	
			E.O.B							
10										
15										
20										
25										
30										
35										
40										

ICE NUMBER

SOUTHNAVFAC

LOG OF BORING

CNC09-B19

PROJECT NO: CTO 0068 / 7192	PROJECT NAME: Site 9, Building 654
PROJECT LOCATION: Charleston Naval Complex, Zone H	DATE DRILLED: 1-24-99
DRILLING COMPANY: U.S. Probe	SURFACE ELEVATION: Feet —
DRILLING METHOD: Hand Auger / Direct Push	BORING DIAMETER: 3 Inches
DRILLING RIG: Geoprobe	GEOLOGIST: Ron 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
		Hand Auger							Brown and Gray Sand 0-4' b/s. Brown & Gray Clayey Sand from 4-9' b/s (Marine Sands w/ Shell material	
5										
				E.O.B						
10									Field Screening Data 09GFB19	
20										
25										
30										
35										
40										

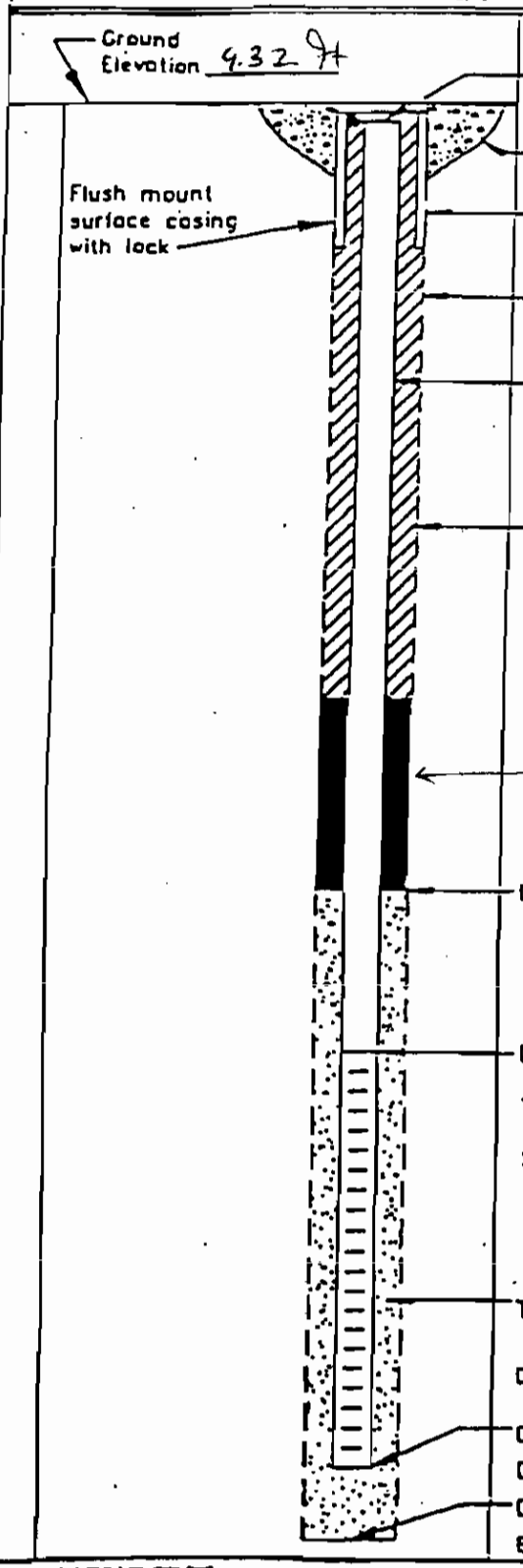
JOB NUMBER

MONITORING WELL SHEET

PROJECT CNC ZONE H
PROJECT NO. CTO 0068/7912
ELEVATION —
FIELD GEOLOGIST Ken Jackson

LOCATION SITE 9 BUILDING 654
BORING CNC09-M01
DATE 2/17/99

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



ELEVATION TOP OF RISER: 9.09 ft

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 TYPE I CEMENT

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 FT / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12 FT / BLS

BACKFILL MATERIAL BELOW SAND: 12 FT BLS

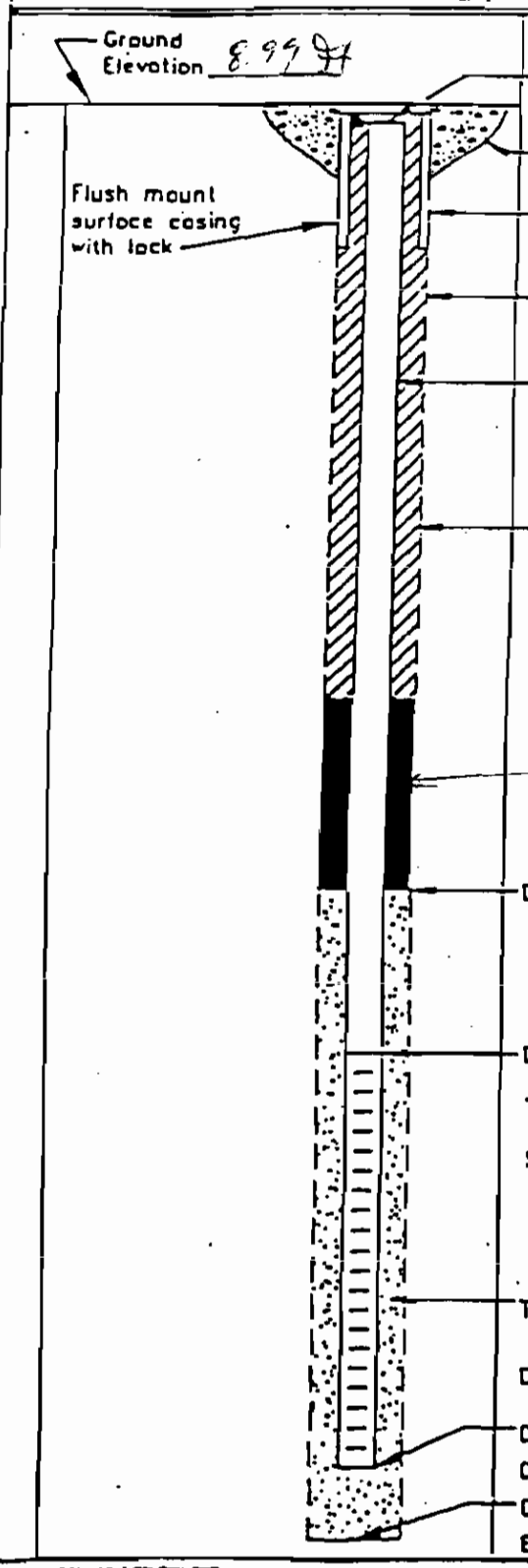
NOTE: L:\79\GEO\CBURD1.DWG

MONITORING WELL SHEET

PROJECT CNC ZONE H
PROJECT NO. CTO 0068/7912
ELEVATION —
FIELD GEOLOGIST Pam Jackson

LOCATION SITE 9, BUILDING 654
BORING CNC09-MW2-
DATE 2/17/99

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



ELEVATION TOP OF RISER: 9.27 ft

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 TYPE I CEMENT

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 FT / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12 FT / BLS

BACKFILL MATERIAL BELOW SAND: 12 FT BLS

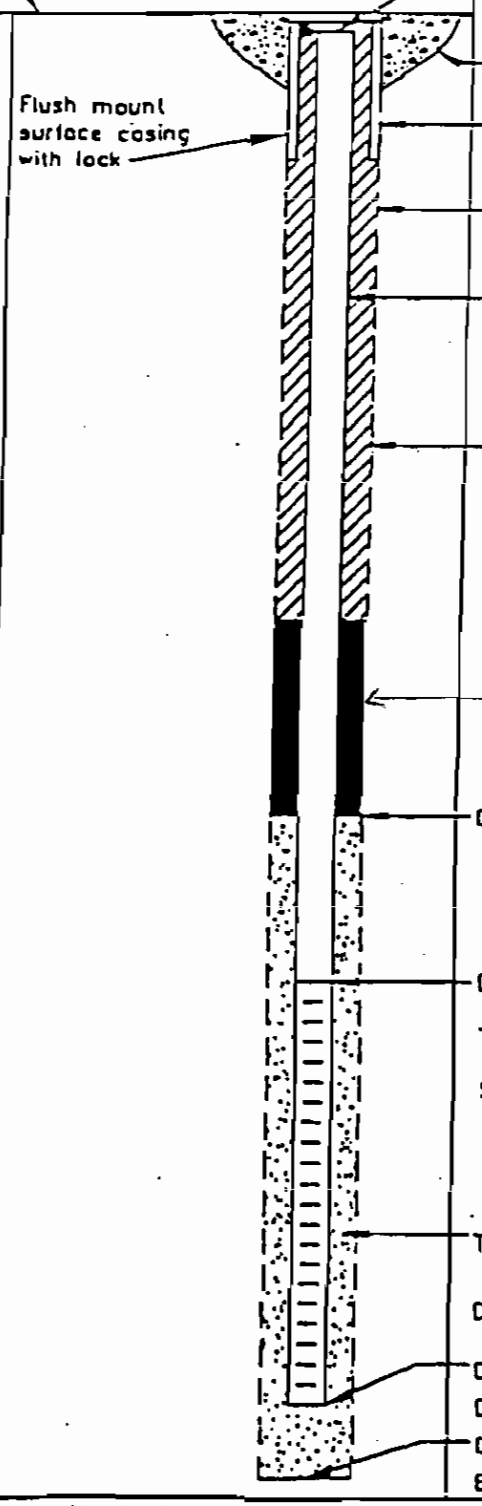
MONITORING WELL SHEET

PROJECT CNC Zone H
PROJECT NO. CTO 0068/7912
ELEVATION —
FIELD GEOLOGIST Ron Jackson

LOCATION Site 9, Building 654
BORING CNC09-MO3
DATE 2/17/99

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

Ground Elevation 8.51 ft



ELEVATION TOP OF RISER: 8.24 ft

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 Type I Cement

30/65 Standard Silica Sand Seal 0.5 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 ft / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12 ft / BLS

BACKFILL MATERIAL BELOW SAND: 12 ft BLS

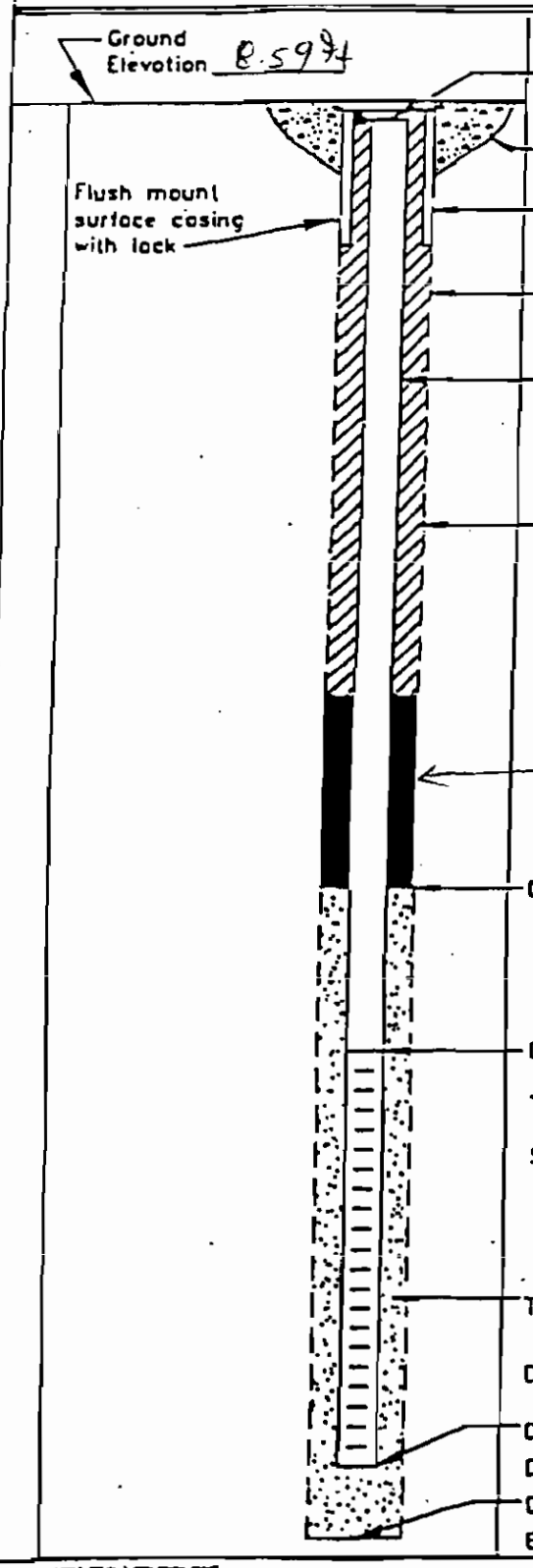
NOTE: [illegible]

MONITORING WELL SHEET

PROJECT ENC Zone 14
PROJECT NO. CTO 0068/7912
ELEVATION —
FIELD GEOLOGIST Pam Jackson

LOCATION Site 9, Building 654
BORING ENC09-MW4
DATE 2/12/99

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



ELEVATION TOP OF RISER: 8.28 ft

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 Type I Cement

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 ft / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12 ft / BLS

BACKFILL MATERIAL BELOW SAND: 12 ft BLS

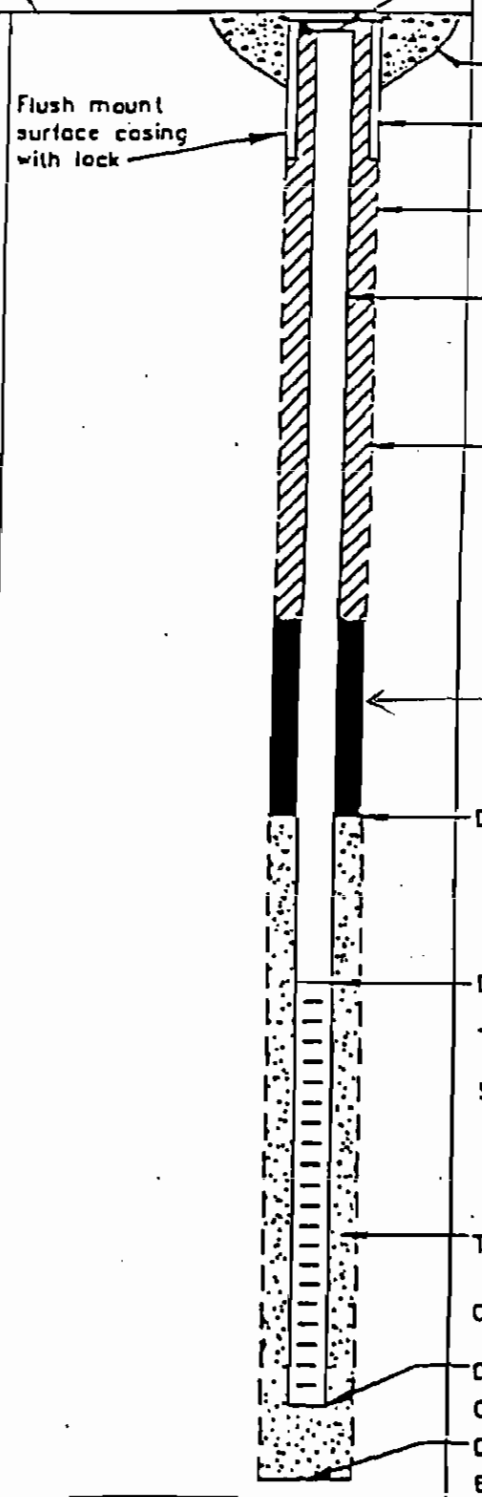
MONITORING WELL SHEET

PROJECT CNC ZONE H
PROJECT NO. CTO 0068/7912
ELEVATION —
FIELD GEOLOGIST Pam Jackson

LOCATION SITE 9, BUILDING 654
BORING CNC09-MOS
DATE 7/17/99

DRILLER CUSTOM DRILLING
DRILLING METHOD HOLLOW STEM AUGER
DEVELOPMENT METHOD OVER PUMPING

Ground Elevation 8.47 ft



ELEVATION TOP OF RISER: 8.53 ft

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 TYPE I CEMENT

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 FT / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12 FT / BLS

BACKFILL MATERIAL BELOW SAND: 12 FT BLS

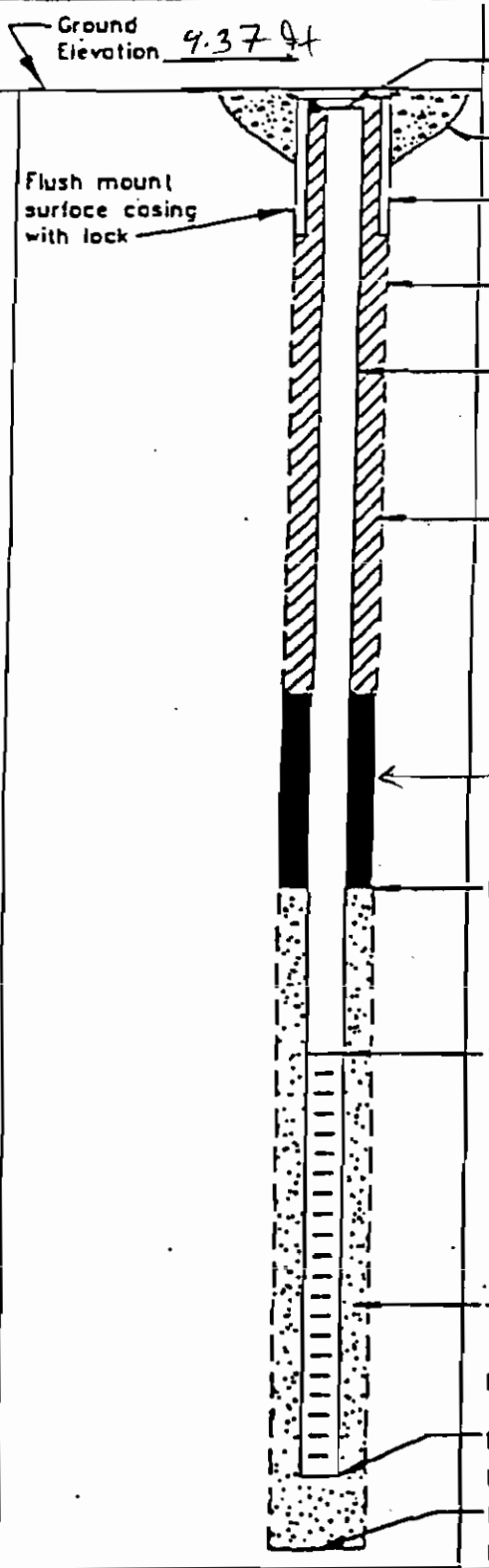
FILE: U:\70\ECO\GRAPHIC

MONITORING WELL SHEET

PROJECT CNC ZONE H
PROJECT NO. CTO 0068/7912
ELEVATION
FIELD GEOLOGIST Pam Jackson

LOCATION SITE 9, BUILDING 654
BORING CNC09-M06
DATE 2/17/99

DRILLER CUSTOM DRILLING
DRILLING METHOD HOLLOW STEM AUGER
DEVELOPMENT METHOD OVER PUMPING



ELEVATION TOP OF RISER: 9.12 ft

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 TYPE I CEMENT

30/65 STANDARD SILICA SAND SEAL 1.5 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 FT / BLS

DEPTH/ELEVATION BOTTOM OF HOLE: 12 FT / BLS

BACKFILL MATERIAL BELOW SAND: 12 FT BLS

BORING NO.: _____

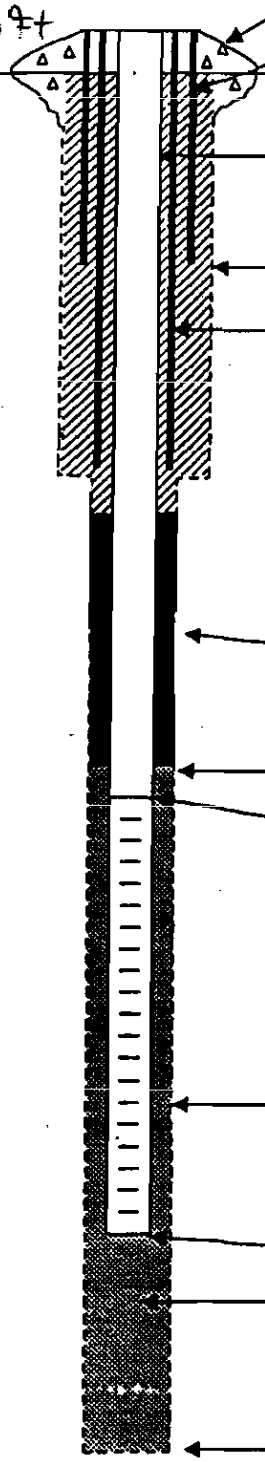
MONITORING WELL SHEET

PROJECT CNC ZONE H
PROJECT NO. CT00068/7912
ELEVATION T.O.C. 9.26 FT
FIELD GEOLOGIST Pam Jackson

LOCATION SITE 9 BUILDING 654
BORING CNC09-MC7
DATE 2/19/99

DRILLER CUSTOM DRILLING
DRILLING METHOD Hollow Stem Auger 5 7/8-INCH TRI CONE
DEVELOPMENT METHOD OVER PUMPING

GROUND ELEVATION 9.61 FT



TYPE OF SURFACE SEAL: CONCRETE MIX

I.D. OF SURFACE CASING: 8-INCH WELL
TYPE OF SURFACE CASING: VAULT WITH STEEL MANHOLE COVER

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

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: 20 FT / BLS

ELEVATION / DEPTH TOP OF SEAL: 19 FT / BLS
TYPE OF SEAL: 1-FOOT BENTONITE PELLET SEAL SET 19 TO 20 BLS

DEPTH TOP OF SAND PACK: 20 FT / BLS

ELEVATION/DEPTH TOP OF SCREEN: 22 FT / BLS
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 / BLS

ELEVATION / DEPTH BOTTOM OF SAND PACK: 27.5 / BLS
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 STANDARD SILICA SAND

ELEVATION / DEPTH OF HOLE: 27.5 FT / BLS

APPENDIX C

FIELD SAMPLING DATA SHEETS

Site 9 2-21-99

0 Breaking for lunch while well recharges.

15 CNC09-M07 developed as it will get. Removed ~10 gallon. Water is silty, black, opaque. Left site.

1302 Onsite to measure water levels @ MWs.

Time	Location	Depth to H_2O (BTOC)
1300	CNC09M01	4.79'
1311	CNC09M02	4.78'
1308	CNC09M03	3.92'
1313	CNC09M04	4.15'
1316	CNC09M05	4.30'
1318	CNC09M06	4.85'
1319	CNC09M07	25.12'

1326 Leave site.

By Hoyle 2/21/99

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 9
Project No.: 7912

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

Sample ID No.: 09GLM0101
Sample Location: ENC09-M01
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Date: 3/19/99								
Time: 1310								
Method:								

PURGE DATA

Date: 3/19/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.93	1.68	19.9	31	.92	.07	450 ml/min
Monitor Reading (ppm):	1	7.02	1.30	19.5	4	.94	.05	2G
Well Casing Diameter: 2"	2	6.40	1.43	19.5	28	1.84	.06	4G
Well Casing Material: PVC	3	7.12	1.32	19.9	8	1.14	.06	5G
Total Well Depth (TD): 12.09'								
Static Water Level (WL): 5.05'								
One Casing Volume(gal/L): 1.16								
Start Purge (hrs): 1000								
End Purge (hrs): 1140								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L): 5G								

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 9
Project No.: 7912

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

Sample ID No.: 09GLM02-01
Sample Location: CNC09-M02
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/19/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1325								
Method:								

PURGE DATA

Date: 3/19/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.31	.345	21.1	5	1.35	0.01	
Monitor Reading (ppm):	1	7.36	.287	21.0	2	.46	0.01	2G
Well Casing Diameter: 2"	2	7.11	.405	21.0	8	0.41	0.01	4G
Well Casing Material: PVC	3	7.58	.372	20.5	14	0.56	0.01	5G
Total Well Depth (TD): 11.81'								
Static Water Level (WL): 4.96'								
One Casing Volume(gal/L): 1.1G								
Start Purge (hrs): 1100								
End Purge (hrs): 1205								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L): 5G								

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

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

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 9
Project No.: 7912

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

Sample ID No.: 09GLM0301
Sample Location: GNC09-M03
Sampled By: SA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/19/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1345								
Method:								

PURGE DATA

Date: 3/19/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.68	.626	20.5	73	1.51	.02	40 ONE MIN
Monitor Reading (ppm):	1	7.11	.567	19.4	0	1.20	.02	2 G
Well Casing Diameter: 2"	2	7.08	.566	20.1	0	.46	.02	3.5 G
Well Casing Material: PVC	3	6.76	.630	19.8	20	1.40	.02	5 G
Total Well Depth (TD): 11.83'								
Static Water Level (WL): 4.20'								
One Casing Volume(gal/L): 1.26								
Start Purge (hrs): 0930								
End Purge (hrs): 1035								
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		(2) 1000 ml	✓
Nitrate, sulfate		(1) 250 ml	
Methane		(3) 40 ml	

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Gwamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 9
Project No.: 792

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

Sample ID No.: 09GLM0401
Sample Location: CNC09-M04
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Date: 3/19/99								
Time: 1405								
Method:								

PURGE DATA

Date: 3/19/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	6.93	3.38	18.7	9	1.40	0.16	
Monitor Reading (ppm):	1	9.89	2.08	13.6	4	0.67	.09	
Well Casing Diameter: 2"	2	7.08	2.27	18.4	25	1.21	.10	
Well Casing Material: PVC	3	7.09	2.26	18.7	0	0.91	.10	
Total Well Depth (TD): 11.92'								
Static Water Level (WL): 4.37'								
One Casing Volume(gal/L): 1.26								
Start Purge (hrs): 0930								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 5G								

450 ml/min
2 gpm
3.5 gal
5 G

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

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

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 9
Project No.: 7912

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

Sample ID No.: 09GLM0501
Sample Location: CNC09-M05
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/19/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1425								
Method:								

PURGE DATA

Date: 3/19/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method:	Initial	7.10	1.31	18.5	17	0.86	0.06	500 ml
Monitor Reading (ppm):	1	7.15	1.49	19.3	3	0.72	0.06	2G
Well Casing Diameter: 2"	~~#~~	~~7.24~~	~~1.545~~	~~21.7~~	~~35~~	~~1.20~~	~~0.01~~	
Well Casing Material: PVC	~~#2~~	7.50	2.38	18.7	3	0.65	.06	3.5
Total Well Depth (TD): 11.94	3	7.54	2.34	19.3	0	0.40	.12	5G
Static Water Level (WL): 4.55								
One Casing Volume(gal/L): 1.26								
Start Purge (hrs): 1030								
End Purge (hrs): 1145								
Total Purge Time (min): 105								
Total Vol. Purged (gal/L): 5G								

SAMPLE COLLECTION INFORMATION

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

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: site 9
Project No.: 7912

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

Sample ID No.: 09GLM0601
Sample Location: ZNC09-M06
Sampled By: JA / BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Date: 3/19/99								
Time: 1440								
Method:								

PURGE DATA

Date: 3/19/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	7.05	.859	18.4	4	.91	.03	400 ml/min
Monitor Reading (ppm):	1	7.05	.841	18.2	3	2.08	.03	2G
Well Casing Diameter: 2"	2	7.00	.841	18.6	5	.92	.03	3.5G
Well Casing Material: PVC	3	6.27	.766	18.4	4	.72	.03	5G
Total Well Depth (TD): 11.97'								
Static Water Level (WL): 5.11'								
One Casing Volume(gal/L): 1.16								
Start Purge (hrs): 0930								
End Purge (hrs): 1040								
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	—	(2) 1000 ml	✓
Nitrate, Sulfate	—	(1) 250 ml	✓
Methane		(3) 40 ml	✓

OBSERVATIONS / NOTES

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

Gwsamp

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 9
Project No.: 7912

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

Sample ID No.: 09GLM0701
Sample Location: CNC09-M07
Sampled By: JA/BDH
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 3/19/99	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Time: 1555								
Method:								

PURGE DATA

Date: 3/19/99	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method: Peristaltic	Initial	8.71	25.5	21.9	104	0.00	1.56	
Monitor Reading (ppm):	1	8.76	19.4	21.5	65	0.31	1.16	
Well Casing Diameter: 2"	2	9.41	14.9	21.4	34	1.21	0.86	
Well Casing Material: PVC	3							
Total Well Depth (TD): 27.29'								
Static Water Level (WL): 7.10'								
One Casing Volume(gal/L): 3.36								
Start Purge (hrs): 1110								
End Purge (hrs): 1150	well purged dry							
Total Purge Time (min):								
Total Vol. Purged (gal/L): 3.5								

40 ml

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
VOC, MTBE	HCl	(3) 40ml	✓
PAH	—	(2) 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 9
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 09GLM0101
Sample Location: CNC09-M01
Duplicate: ☐

SAMPLING DATA:

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

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT

Analysis Time: _____

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

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

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☑	100-400 mg/L	100 ml	1.600 N	1.0	& 385	x 1.0	= 385
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

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

Notes:

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT

Analysis Time: _____

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

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
247	x 1.0	= 247
	x 2.0	=

Notes:

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

B

GROUNDWATER SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 9
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 09GLM010
Sample Location: CNC09-M01
Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter HS-C Color Chart Analysis Time: 1720
Program No.:
Concentration: 0.04 mg/L Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter IR-18C Color Wheel Analysis Time: 1640
Program No.:
Concentration: 0.16 mg/L Filtered: ☐
Notes:

Nitrite:

Equipment: HACH DR-890 Colorimeter Analysis Time: 1730
Program No.:
Concentration: 0.046 mg/L Reagent Blank Correction: ☐
Standard Solution: ☐ Results:
Notes:

~~Nitrate:~~ Na

Equipment: HACH DR-890 Colorimeter Analysis Time: 1655
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:

B

SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 9
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 09GLM0301
Sample Location: CNC09-M03
Duplicate: ☐

SAMPLING DATA:

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

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT

Analysis Time: _____

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

Titration Count	Multiplier	Concentration
248	x 0.01	= 2.48
	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☑	100-400 mg/L	100 ml	1.600 N	1.0	& 286	x 1.0	= 286
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

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

Notes:

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT

Analysis Time: _____

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

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
168	x 1.0	= 168
	x 2.0	=

Notes:

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

(A)

GROUNDWATER SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 9
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 09GWM0301
Sample Location: CNC09-M03
Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter HS-C Color Chart
Analysis Time: 1720
Program No.:
Concentration: 0.02 mg/L
Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter IR-18C Color Wheel
Analysis Time: 1640
Program No.:
Concentration: 0.00 mg/L
Filtered: ☐
Notes:

Nitrite: 60

Equipment: HACH DR-890 Colorimeter
Analysis Time: 1730
Program No.:
Concentration: 0.062 mg/L
Reagent Blank Correction: ☐
Standard Solution: ☐ Results:
Notes:

Nitrate: Mn

Equipment: HACH DR-890 Colorimeter
Analysis Time: 1655
Program No.:
Concentration: 0.2 mg/L
Nitrite Interference Treatment: ☐
Standard Solution: ☐ Results:
Reagent Blank Correction: ☐
Standard Additions: ☐ Digits Required: 0.1ml:____ 0.2ml:____ 0.3ml:____
Notes:

Ⓐ

SAMPLE LOG SHEET
NATURAL ATTENUTAION PARAMETERS

Tetra Tech NUS, Inc.

Project Site Name: Site 9
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 09GLM0601
Sample Location: CNC09-M06
Duplicate: ☐

SAMPLING DATA:

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

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT

Analysis Time: _____

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

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

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☑	100-400 mg/L	100 ml	1.600 N	1.0	& 285	x 1.0	= 285
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

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

Notes:

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT

Analysis Time: _____

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

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
182	x 1.0	= 182
	x 2.0	=

Notes:

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 9
Project No.: 7912
Sampled By: JA / BDH

Sample ID No.: 09GL M0601
Sample Location: CNC09-M06
Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-890 Colorimeter HS-C Color Chart Analysis Time: 1720
Program No.:
Concentration: 0.01 mg/L Filtered: ☐
Notes:

Ferrous Iron:

Equipment: HACH DR-890 Colorimeter IR-18C Color Wheel Analysis Time: 1640
Program No.:
Concentration: 0.00 mg/L Filtered: ☐
Notes:

Nitrite:

Equipment: HACH DR-890 Colorimeter Analysis Time: 1730
Program No.:
Concentration: 0.011 mg/L Reagent Blank Correction: ☐
Standard Solution: ☐ Results:
Notes:

~~Nitrate:~~ Mn

Equipment: HACH DR-890 Colorimeter Analysis Time: 1655
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:

①

APPENDIX D

SOIL AND GROUNDWATER LABORATORY ANALYTICAL DATA

CERTIFICATE OF ANALYSIS

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 06, 1999

Sample ID : 09GLM0101
Lab ID : 9903742-09
Matrix : Water
Date Collected : 03/19/99
Date Received : 03/19/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/26/99	1417	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	J	3.28	0.600	5.00	ug/l	1.0	RMB	03/26/99	1417	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/26/99	1417	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 06, 1999

Sample ID : 09GLM0101

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	03/26/99	1417	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
xtractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	J	8.36	2.18	10.0	ug/l	1.0	TSD	03/29/99	2005	145135	3
ACENAPHTHYLENE	U	ND	1.29	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.28	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.77	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	1.98	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.65	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.48	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.57	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.18	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.18	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.07	10.0	ug/l	1.0					
FLUORENE	J	7.76	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	J	3.58	1.78	10.0	ug/l	1.0					
PYRENE	U	ND	2.48	10.0	ug/l	1.0					
General Chemistry											
NITROGEN, NITRATE	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/22/99	1404	145013	4
SULFATE (AS SO4)		18.0	0.0380	0.200	mg/l	1.0					

The following prep procedures were performed:

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

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 06, 1999

Sample ID : 09GLM0101

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	71.9	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	67.9	(35.3 - 108.)
p-Terphenyl-d14	M610-TETR	55.0	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	88.2	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	97.4	(66.0 - 117.)
Toluene-d8	EDB-8260B	81.3	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	88.2	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	97.4	(66.0 - 117.)
Toluene-d8	MTBE-8260B	81.3	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	88.2	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	97.4	(66.0 - 117.)
Toluene-d8	NAP-8260B	81.3	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	88.2	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	97.4	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	81.3	(73.0 - 122.)

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

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903742-09

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 06, 1999

Sample ID : 09GLM0101

M = Method	Method-Description

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

Reviewed By

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

(843) 556-8171 • Fax (843) 766-1178

9903742-09

Printed on recycled paper.

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 06, 1999

Sample ID : 09GLM0201
Lab ID : 9903742-10
Matrix : Water
Date Collected : 03/19/99
Date Received : 03/19/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/26/99	1452	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	J	2.66	0.600	5.00	ug/l	1.0	RMB	03/26/99	1452	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/26/99	1452	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 06, 1999

Sample ID : 09GLM0201

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	03/26/99	1452	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
:traetable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.29	10.4	ug/l	1.0	TSD	03/29/99	2035	145135	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 03/23/99 1445 145135 4

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	78.8	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	74.8	(35.3 - 108.)

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

(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903742-10

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 06, 1999

Sample ID : 09GLM0201

Surrogate Recovery	Test	Percent %	Acceptable Limits
p-Terphenyl-d14	M610-TETR	52.8	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	82.3	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	92.5	(66.0 - 117.)
Toluene-d8	EDB-8260B	78.3	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	82.3	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	92.5	(66.0 - 117.)
Toluene-d8	MTBE-8260B	78.3	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	82.3	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	92.5	(66.0 - 117.)
Toluene-d8	NAP-8260B	78.3	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	82.3	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	92.5	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	78.3	(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.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903742-10

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 06, 1999

Sample ID : 09GLM0201

M = Method **Method-Description**

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

Reviewed By

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

(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903742-10

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 06, 1999

Sample ID : 09GLM0301
Lab ID : 9903742-11
Matrix : Water
Date Collected : 03/19/99
Date Received : 03/19/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/26/99	1527	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/26/99	1527	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/26/99	1527	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 06, 1999

Sample ID : 09GLM0301

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	03/26/99	1527	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
xtractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.22	10.1	ug/l	1.0	TSD	03/29/99	2205	145135	3
ACENAPHTHYLENE	U	ND	1.31	10.1	ug/l	1.0					
ANTHRACENE	U	ND	2.32	10.1	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.83	10.1	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.02	10.1	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.75	10.1	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.53	10.1	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.63	10.1	ug/l	1.0					
CHRYSENE	U	ND	2.22	10.1	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.22	10.1	ug/l	1.0					
FLUORANTHENE	U	ND	3.13	10.1	ug/l	1.0					
FLUORENE	U	ND	2.12	10.1	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.43	10.1	ug/l	1.0					
PHENANTHRENE	U	ND	1.82	10.1	ug/l	1.0					
PYRENE	U	ND	2.53	10.1	ug/l	1.0					
General Chemistry											
NITROGEN, NITRATE	J	0.0130	0.0127	0.0500	mg/l	1.0	RWS	03/22/99	1445	145013	4
SULFATE (AS SO4)		12.7	0.0380	0.200	mg/l	1.0					

The following prep procedures were performed:

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

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomarrow.

Laboratory Certifications

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

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

cc: TETR00498 Report Date: April 06, 1999

Sample ID : 09GLM0301

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	71.7	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	61.7	(35.3 - 108.)
p-Terphenyl-d14	M610-TETR	79.0	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	86.0	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	93.7	(66.0 - 117.)
Toluene-d8	EDB-8260B	81.0	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	86.0	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	93.7	(66.0 - 117.)
Toluene-d8	MTBE-8260B	81.0	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	86.0	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	93.7	(66.0 - 117.)
Toluene-d8	NAP-8260B	81.0	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	86.0	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	93.7	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	81.0	(73.0 - 122.)

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

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903742-11

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 06, 1999

Sample ID : 09GLM0301

M = Method **Method-Description**

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

Reviewed By

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

(843) 556-8171 • Fax (843) 766-1178

9903742-11

Printed on recycled paper.

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 06, 1999

Sample ID	: 09GLM0401
Lab ID	: 9903742-12
Matrix	: Water
Date Collected	: 03/19/99
Date Received	: 03/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/26/99	1602	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/26/99	1602	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/26/99	1602	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 06, 1999

Sample ID : 09GLM0401

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	03/26/99	1602	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
tractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.20	10.0	ug/l	1.0	TSD	03/29/99	2236	145135	3
ACENAPHTHYLENE	U	ND	1.30	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.30	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.80	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.00	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.70	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.50	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.60	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.20	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.20	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.10	10.0	ug/l	1.0					
FLUORENE	U	ND	2.10	10.0	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.40	10.0	ug/l	1.0					
PHENANTHRENE	U	ND	1.80	10.0	ug/l	1.0					
PYRENE	U	ND	2.50	10.0	ug/l	1.0					

The following prep procedures were performed:

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

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	70.8	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	57.9	(35.3 - 108.)

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

(843) 556-8171 • Fax (843) 766-1178

9903742-12

Printed on recycled paper.

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 06, 1999

Sample ID : 09GLM0401

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	71.5	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	88.7	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	96.7	(66.0 - 117.)
Toluene-d8	EDB-8260B	81.2	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	88.7	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	96.7	(66.0 - 117.)
Toluene-d8	MTBE-8260B	81.2	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	88.7	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	96.7	(66.0 - 117.)
Toluene-d8	NAP-8260B	81.2	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	88.7	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	96.7	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	81.2	(73.0 - 122.)

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

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 06, 1999

Sample ID : 09GLM0401

M = Method **Method-Description**

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

Reviewed By

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

(843) 556-8171 • Fax (843) 766-1178

9903742-12

Printed on recycled paper.

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 06, 1999

Sample ID : 09GLM0501
Lab ID : 9903742-13
Matrix : Water
Date Collected : 03/19/99
Date Received : 03/19/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/26/99	1638	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/26/99	1638	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/26/99	1638	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 06, 1999

Sample ID : 09GLM0501

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	03/26/99	1638	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
tractable Organics											
olyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.20	10.0	ug/l	1.0	TSD	03/29/99	2307	145135	3
ACENAPHTHYLENE	U	ND	1.30	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.30	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.80	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.00	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.70	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.50	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.60	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.20	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.20	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.10	10.0	ug/l	1.0					
FLUORENE	U	ND	2.10	10.0	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.40	10.0	ug/l	1.0					
PHENANTHRENE	U	ND	1.80	10.0	ug/l	1.0					
PYRENE	U	ND	2.50	10.0	ug/l	1.0					

The following prep procedures were performed:

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

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	83.4	(41.2 - 107.)
itrobenzene-d5	M610-TETR	78.7	(35.3 - 108.)

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

(843) 556-8171 • Fax (843) 766-1178

9903742-13

Printed on recycled paper.

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 06, 1999

Sample ID : 09GLM0501

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	79.5	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	85.6	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	95.0	(66.0 - 117.)
Toluene-d8	EDB-8260B	79.4	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	85.6	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	95.0	(66.0 - 117.)
Toluene-d8	MTBE-8260B	79.4	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	85.6	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	95.0	(66.0 - 117.)
Toluene-d8	NAP-8260B	79.4	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	85.6	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	95.0	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	79.4	(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.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

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 06, 1999

Sample ID : 09GLM0501

M = Method	Method-Description

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

Reviewed By

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

(843) 556-8171 • Fax (843) 766-1178

9903742-13

Printed on recycled paper.

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 06, 1999

Sample ID	: 09GLM0601
Lab ID	: 9903742-14
Matrix	: Water
Date Collected	: 03/19/99
Date Received	: 03/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/26/99	1713	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	J	1.74	0.600	5.00	ug/l	1.0	RMB	03/26/99	1713	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/26/99	1713	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

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 06, 1999

Sample ID : 09GLM0601

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	03/26/99	1713	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
xtractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	J	2.29	2.18	10.0	ug/l	1.0	TSD	03/30/99	1228	145135	3
ACENAPHTHYLENE	U	ND	1.29	10.0	ug/l	1.0					
ANTHRACENE	U	ND	2.28	10.0	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.77	10.0	ug/l	1.0					
BENZO(A)PYRENE	U	ND	1.98	10.0	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.65	10.0	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.48	10.0	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.57	10.0	ug/l	1.0					
CHRYSENE	U	ND	2.18	10.0	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.18	10.0	ug/l	1.0					
FLUORANTHENE	U	ND	3.07	10.0	ug/l	1.0					
FLUORENE	U	ND	2.08	10.0	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.37	10.0	ug/l	1.0					
PHENANTHRENE	U	ND	1.78	10.0	ug/l	1.0					
PYRENE	U	ND	2.48	10.0	ug/l	1.0					
General Chemistry											
NITROGEN, NITRATE	U	ND	0.0127	0.0500	mg/l	1.0	RWS	03/22/99	1459	145013	4
SULFATE (AS SO4)		7.57	0.0380	0.200	mg/l	1.0					

The following prep procedures were performed:

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

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

(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903742-14

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 06, 1999

Sample ID : 09GLM0601

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	80.2	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	77.2	(35.3 - 108.)
p-Terphenyl-d14	M610-TETR	62.1	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	87.4	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	99.2	(66.0 - 117.)
Toluene-d8	EDB-8260B	81.7	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	87.4	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	99.2	(66.0 - 117.)
Toluene-d8	MTBE-8260B	81.7	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	87.4	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	99.2	(66.0 - 117.)
Toluene-d8	NAP-8260B	81.7	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	87.4	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	99.2	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	81.7	(73.0 - 122.)

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

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

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 06, 1999

Sample ID : 09GLM0601

M = Method **Method-Description**

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

Reviewed By

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

(843) 556-8171 • Fax (843) 766-1178

9903742-14

Printed on recycled paper.

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 06, 1999

Sample ID	: 09GLM0701
Lab ID	: 9903742-15
Matrix	: Water
Date Collected	: 03/19/99
Date Received	: 03/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/26/99	1748	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/26/99	1748	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/26/99	1748	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM		1.74	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

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 06, 1999

Sample ID : 09GLM0701

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	03/26/99	1748	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					
xtractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2.31	10.5	ug/l	1.0	TSD	03/30/99	1258	145135	3
ACENAPHTHYLENE	U	ND	1.37	10.5	ug/l	1.0					
ANTHRACENE	U	ND	2.42	10.5	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.94	10.5	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.10	10.5	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.94	10.5	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.63	10.5	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.73	10.5	ug/l	1.0					
CHRYSENE	U	ND	2.31	10.5	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.31	10.5	ug/l	1.0					
FLUORANTHENE	U	ND	3.26	10.5	ug/l	1.0					
FLUORENE	U	ND	2.21	10.5	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.57	10.5	ug/l	1.0					
PHENANTHRENE	U	ND	1.89	10.5	ug/l	1.0					
PYRENE	U	ND	2.63	10.5	ug/l	1.0					

The following prep procedures were performed:

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

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	66.2	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	60.6	(35.3 - 108.)

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

(843) 556-8171 • Fax (843) 766-1178

9903742-15

Printed on recycled paper.

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 06, 1999

Sample ID : 09GLM0701

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	69.7	(36.6 - 110.)
Bromofluorobenzene	EDB-8260B	85.9	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	96.2	(66.0 - 117.)
Toluene-d8	EDB-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	85.9	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	96.2	(66.0 - 117.)
Toluene-d8	MTBE-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	85.9	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	96.2	(66.0 - 117.)
Toluene-d8	NAP-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	85.9	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	96.2	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	80.4	(73.0 - 122.)

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903742-15

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 06, 1999

Sample ID : 09GLM0701

M = Method	Method-Description

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

Reviewed By

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

(843) 556-8171 • Fax (843) 766-1178

9903742-15

Printed on recycled paper.

QC SUMMARY REPORT

QC Summary Report

Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Lab. Sample ID: 9903742% Report Date: April 06, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Volatile Organics													
QC597037	BLANK	145387											
1,1-Dichloroethylene						0.00	ug/l				RMB	03/25/99	1107
Benzene						0.00	ug/l						
Chlorobenzene						0.00	ug/l						
Toluene						0.00	ug/l						
Trichloroethylene						0.00	ug/l						
*Bromofluorobenzene							ug/l		86.0	(73.0 - 129.)			
*Dibromofluoromethane							ug/l		93.0	(66.0 - 117.)			
*Toluene-d8							ug/l		79.5	(73.0 - 122.)			
1,1,1-Trichloroethane						0.00	ug/l						
1,1,2,2-Tetrachloroethane						0.00	ug/l						
1,2-Trichloroethane						0.00	ug/l						
1,1-Dichloroethane						0.00	ug/l						
1,2-Dichlorobenzene						0.00	ug/l						
1,2-Dichloroethane						0.00	ug/l						
1,2-Dichloropropane						0.00	ug/l						
1,2-trans-Dichloroethylene						0.00	ug/l						
1,3-Dichlorobenzene						0.00	ug/l						
1,4-Dichlorobenzene						0.00	ug/l						
Bromoform						0.00	ug/l						
Carbon Tetrachloride						0.00	ug/l						
Chlorodibromomethane						0.00	ug/l						
Chloroethane						0.00	ug/l						
Chloroform						0.00	ug/l						
Dichlorobromomethane						0.00	ug/l						
Dichlorodifluoromethane						0.00	ug/l						
Ethylbenzene						0.00	ug/l						
Ethylene Dibromide						0.00	ug/l						
Methyl Bromide						0.00	ug/l						
Methyl Chloride						0.00	ug/l						
Methyl Tert Butyl Ether						0.00	ug/l						
Methylene Chloride						2.56	ug/l						
Naphthalene						0.849	ug/l						
Tetrachloroethylene						0.00	ug/l						
Trichlorofluoromethane						0.00	ug/l						
Vinyl chloride						0.00	ug/l						
Xylenes (TOTAL)						0.00	ug/l						
cis-1,3-Dichloropropylene						0.00	ug/l						
trans-1,3-Dichloropropylene						0.00	ug/l						

QC Summary Report

Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Lab. Sample ID: 9903742% Report Date: April 06, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
QC597232	BLANK	145387											
1,1-Dichloroethylene						0.00	ug/l				RMB	03/26/99	1128
Benzene						0.00	ug/l						
Chlorobenzene						0.00	ug/l						
Toluene						0.00	ug/l						
Trichloroethylene						0.00	ug/l						
*Bromofluorobenzene							ug/l		85.7	(73.0 - 129.)			
*Dibromofluoromethane							ug/l		92.2	(66.0 - 117.)			
*Toluene-d8							ug/l		78.8	(73.0 - 122.)			
1,1,1-Trichloroethane						0.00	ug/l						
1,1,2,2-Tetrachloroethane						0.00	ug/l						
1,1,2-Trichloroethane						0.00	ug/l						
1,1-Dichloroethane						0.00	ug/l						
1,2-Dichlorobenzene						0.00	ug/l						
1,2-Dichloroethane						0.00	ug/l						
1,2-Dichloropropane						0.00	ug/l						
1,2-trans-Dichloroethylene						0.00	ug/l						
1,3-Dichlorobenzene						0.00	ug/l						
1,4-Dichlorobenzene						0.00	ug/l						
Bromoform						0.00	ug/l						
Carbon Tetrachloride						0.00	ug/l						
Chlorodibromomethane						0.00	ug/l						
Chloroethane						0.00	ug/l						
Chloroform						0.00	ug/l						
Dichlorobromomethane						0.00	ug/l						
Dichlorodifluoromethane						0.00	ug/l						
Ethylbenzene						0.00	ug/l						
Ethylene Dibromide						0.00	ug/l						
Methyl Bromide						0.00	ug/l						
Methyl Chloride						0.00	ug/l						
Methyl Tert Butyl Ether						0.00	ug/l						
Methylene Chloride						0.00	ug/l						
Naphthalene						0.655	ug/l						
Tetrachloroethylene						0.00	ug/l						
Trichlorofluoromethane						0.00	ug/l						
Vinyl chloride						0.00	ug/l						
Xylenes (TOTAL)						0.00	ug/l						
cis-1,3-Dichloropropylene						0.00	ug/l						
trans-1,3-Dichloropropylene						0.00	ug/l						
QC597038	LCS	145387											

QC Summary Report

Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Lab. Sample ID: 9903742% Report Date: April 06, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
1,1-Dichloroethylene			50			54.9	ug/l		110	(70.0 - 144.)	RMB	03/25/99	1018
Benzene			50			50.5	ug/l		101	(74.0 - 133.)	RMB	03/25/99	1018
Chlorobenzene			50			47.1	ug/l		94.2	(78.0 - 118.)			
Toluene			50			46.2	ug/l		92.5	(79.0 - 129.)			
Trichloroethylene			50			50.7	ug/l		101	(69.0 - 127.)			
*Bromofluorobenzene			50			44.4	ug/l		88.8	(73.0 - 129.)			
*Dibromofluoromethane			50			46.9	ug/l		93.8	(66.0 - 117.)			
*Toluene-d8			50			41.1	ug/l		82.2	(73.0 - 122.)			
QC597233	LCS	145387											
1,1-Dichloroethylene			50			54.0	ug/l		108	(70.0 - 144.)	RMB	03/26/99	1038
Benzene			50			50.8	ug/l		102	(74.0 - 133.)			
Chlorobenzene			50			45.9	ug/l		91.9	(78.0 - 118.)			
Toluene			50			44.6	ug/l		89.2	(79.0 - 129.)			
Trichloroethylene			50			49.2	ug/l		98.5	(69.0 - 127.)			
*Bromofluorobenzene			50			43.6	ug/l		87.2	(73.0 - 129.)			
*Dibromofluoromethane			50			46.3	ug/l		92.6	(66.0 - 117.)			
*Toluene-d8			50			40.5	ug/l		81.1	(73.0 - 122.)			
QC597039	9903742-02PS	145387											
1,1-Dichloroethylene			50	0.00		54.5	ug/l		109	(59.2 - 141.)	RMB	03/26/99	1216
Benzene			50	0.00		51.2	ug/l		102	(63.3 - 134.)			
Chlorobenzene			50	0.00		45.4	ug/l		90.8	(77.8 - 125.)			
Toluene			50	0.00		44.5	ug/l		89.1	(71.6 - 125.)			
Trichloroethylene			50	0.00		48.7	ug/l		97.3	(65.5 - 130.)			
*Bromofluorobenzene			50			45.6	ug/l		91.2	(73.0 - 129.)			
*Dibromofluoromethane			50			47.7	ug/l		95.4	(66.0 - 117.)			
*Toluene-d8			50			41.0	ug/l		81.9	(73.0 - 122.)			
QC597040	9903742-02PSD	145387											
1,1-Dichloroethylene			50	0.00		55.4	ug/l	1.62	111	(0.00 - 25.1)	RMB	03/26/99	1251
Benzene			50	0.00		52.6	ug/l	2.73	105	(0.00 - 31.1)			
Chlorobenzene			50	0.00		45.9	ug/l	1.13	91.8	(0.00 - 22.7)			
Toluene			50	0.00		44.8	ug/l	0.618	89.6	(0.00 - 22.8)			
Trichloroethylene			50	0.00		50.7	ug/l	4.06	101	(0.00 - 36.9)			
*Bromofluorobenzene			50			44.2	ug/l		88.3	(73.0 - 129.)			
*Dibromofluoromethane			50			47.2	ug/l		94.4	(66.0 - 117.)			
*Toluene-d8			50			40.3	ug/l		80.6	(73.0 - 122.)			

* represent a surrogate.

QC Summary Report

Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Lab. Sample ID: 9903742% Report Date: April 06, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Extractable Organics													
QC596007	BLANK	145135											
Acenaphthene						0.00	ug/l				TSD	03/29/99	1437
Pyrene						0.00	ug/l						
*2-Fluorobiphenyl							ug/l		87.1	(41.2 - 107.)			
*Nitrobenzene-d5							ug/l		72.2	(35.3 - 108.)			
*p-Terphenyl-d14							ug/l		107	(36.6 - 110.)			
Acenaphthylene						0.00	ug/l						
Anthracene						0.00	ug/l						
Benzo(a)anthracene						0.00	ug/l						
Benzo(a)pyrene						0.00	ug/l						
Benzo(b)fluoranthene						0.00	ug/l						
Benzo(ghi)perylene						0.00	ug/l						
Benzo(k)fluoranthene						0.00	ug/l						
Chrysene						0.00	ug/l						
Dibenzo(a,h)anthracene						0.00	ug/l						
Fluoranthene						0.00	ug/l						
Fluorene						0.00	ug/l						
Indeno(1,2,3-c,d)pyrene						0.00	ug/l						
Phenanthrene						0.00	ug/l						
QC596008	LCS	145135											
Acenaphthene			50			45.9	ug/l		91.8	(53.0 - 100.)	TSD	03/29/99	1507
Pyrene			50			51.4	ug/l		103	(45.4 - 109.)			
*2-Fluorobiphenyl			50			47.6	ug/l		95.2	(41.2 - 107.)			
*Nitrobenzene-d5			50			42.4	ug/l		84.8	(35.3 - 108.)			
*p-Terphenyl-d14			50			50.3	ug/l		101	(36.6 - 110.)			
QC596009	LCS DUP	145135											
Acenaphthene			50			42.8	ug/l	7.11	85.5	(0.00 - 30.0)	TSD	03/29/99	1537
Pyrene			50			53.3	ug/l	3.64	107	(0.00 - 30.0)			
*2-Fluorobiphenyl			50			44.3	ug/l		88.6	(41.2 - 107.)			
*Nitrobenzene-d5			50			41.8	ug/l		83.6	(35.3 - 108.)			
*p-Terphenyl-d14			50			51.0	ug/l		102	(36.6 - 110.)			
QC596010	9903742-02MS	145135											
Acenaphthene			50	0.00		37.1	ug/l		74.3	(56.4 - 106.)	TSD	03/29/99	1606
Pyrene			50	0.00		50.0	ug/l		100	(52.6 - 125.)			
*2-Fluorobiphenyl			50			38.3	ug/l		76.6	(41.2 - 107.)			
*Nitrobenzene-d5			50			35.6	ug/l		71.2	(35.3 - 108.)			
*p-Terphenyl-d14			50			45.3	ug/l		90.5	(36.6 - 110.)			
QC596016	9903742-02MSD	145135											
Acenaphthene			50	0.00		38.2	ug/l	2.83	76.4	(0.00 - 19.2)	TSD	03/29/99	1636

QC Summary Report

Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Lab. Sample ID: 9903742% Report Date: April 06, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
Pyrene			50	0.00		56.9	ug/l	12.9	114	(0.00 - 21.9)	TSD	03/29/99	1636
*2-Fluorobiphenyl			50			38.6	ug/l		77.1	(41.2 - 107.)			
*Nitrobenzene-d5			50			33.0	ug/l		66.0	(35.3 - 108.)			
*p-Terphenyl-d14			50			51.4	ug/l		103	(36.6 - 110.)			

* represent a surrogate.

QC Summary Report

Project Description: CNC- Zone H UST (CTO68)

cc: TETR00498 Lab. Sample ID: 9903742% Report Date: April 06, 1999

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
General Chemistry													
QC595524	BLANK	145013											
Nitrogen, Nitrate						0.0270	mg/l				RWS	03/22/99	1649
Sulfate as SO4						0.0760	mg/l						
QC595523	LCS	145013											
Nitrogen, Nitrate			5			4.71	mg/l		94.2	(90.0 - 110.)	RWS	03/22/99	1636
Sulfate as SO4			20			18.9	mg/l		94.3	(90.0 - 110.)			
QC595521	9903742-04PS	145013											
Nitrogen, Nitrate			5	0.00		4.48	mg/l		89.5	(80.0 - 120.)	RWS	03/22/99	1512
Sulfate as SO4			20	0.451		18.1	mg/l		88.2	(80.0 - 120.)			
QC595522	9903742-04PSD	145013											
Nitrogen, Nitrate			5	0.00		4.58	mg/l	2.36	91.6	(0.00 - 20.0)	RWS	03/22/99	1526
Sulfate as SO4			20	0.451		18.5	mg/l	1.99	90.0	(0.00 - 20.0)			

Notes:
The qualifiers in this report are defined as follows:
J indicates presence of analyte < RL (Report Limit)
U indicates presence of analyte < DL (Detect Limit)

n/a indicates that spike recovery limits do not apply when
sample concentration exceeds spike conc by a factor of 4 or more

CHAIN OF CUSTODY

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

CHAIN OF CUSTODY RECORD

Page 1 of 1

99037427

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

Collected by/Company: TT NUS

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

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

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	PAH	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Methane	Anions	Remarks	39165
01	ZHTL01901	3/18/99	0900					3						3												Trip Blank	.1
02	01GLM0101	3/18/99	1700	✓			✓	5			2			3													.2
03	01GLM0201	3/18/99	1720	✓			✓	5			2			3													.2
04	NBCH656001	3/18/99	1545/0715	✓			✓	9			2			3										3	1		.3
05	NBCH656002	3/18/99	1640	✓			✓	5			2			3													.2
06	NBCH656003	3/18/99	1610/0900	✓			✓	9			2			3										3	1		.3
07	10GLP0401	3/18/99	1620	✓			✓	5			2			3													.2

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

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

White - Sample collector Yellow = file Pink = with report

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolin ,07
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1

9903742%

Client Name/Facility Name

Collected by/Company

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

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

Q# 39165

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

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

White = sample collector Yellow = file Pink = with report

COOLER RECEIPT CHECKLIST

FEDERAL SAMPLE RECEIPT REVIEW

Client TEIRA Received by [illegible] Date 3/19/99

GEL COOLER ✓ GEL POLY COOLER ___ CLIENT COOLER ___ OTHER ___

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? Call project Manager if No	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? Call Project Manager if No	✓		
Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?		✓	
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed properly ? (Ink, signed, match containers)	✓		
5. Did all samples container arrive intact? (sealed , unbroken)? Call Project Manager if No	✓		
6. Were all sample containers properly labeled?	✓		
7. Were proper sample containers received?	✓		
8. Preserved samples checked for proper pH?	—	—	
9. Were samples preserved properly? If no, list samples & tests	—	—	
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (4+2C) If no, Call Project Manager	✓		1°C
12. Were samples received within holding time? if No, Call Project Manager	✓		
13. Were VOA vials free of headspace?	✓		
14. ARCOC# IF REQUIRED	—	—	
15. SDG# IF REQUIRED	✓		CT068WHH

REVIEW [illegible] DATE 3/19/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

FEDERAL SAMPLE RECEIPT REVIEW

Client TETRA Received by [illegible] Date 3/19/99

GEL COOLER___ GEL POLY COOLER___ CLIENT COOLER___ OTHER___

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? Call project Manager if No	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? Call Project Manager if No	✓		
Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?		✓	
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed properly ? (Ink, signed, match containers)	✓		
5. Did all samples container arrive intact? (sealed , unbroken)? Call Project Manager if No	✓		
6. Were all sample containers properly labeled?	✓		
7. Were proper sample containers received?	✓		
8. Preserved samples checked for proper pH?	—	—	
9. Were samples preserved properly? If no, list samples & tests	—	—	
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (4+2C) If no, Call Project Manager	✓		4°C
12. Were samples received within holding time? if No, Call Project Manager	✓		
13. Were VOA vials free of headspace?	✓		
14. ARCOC# IF REQUIRED	—	—	
15. SDG# IF REQUIRED	✓		CT068WHH

REVIEW [illegible] DATE 3/19/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

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 06, 1999

Sample ID	: ZHTL02001
Lab ID	: 9903742-08
Matrix	: Water
Date Collected	: 03/19/99
Date Received	: 03/19/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Ethylene Dibromide	U	ND	1.00	1.00	ug/l	1.0	RMB	03/25/99	1737	145387	1
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0	RMB	03/25/99	1737	145387	2
Priority Pollutant Volatiles - 32 items											
1,1,1-TRICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0	RMB	03/25/99	1737	145387	1
1,1,2,2-TETRACHLOROETHANE		ND	0.500	1.00	ug/l	1.0					
1,1,2-TRICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHANE	U	ND	0.400	1.00	ug/l	1.0					
1,1-DICHLOROETHENE	U	ND	0.700	1.00	ug/l	1.0					
1,2-DICHLOROBENZENE	U	ND	0.400	1.00	ug/l	1.0					
1,2-DICHLOROETHANE	U	ND	0.200	1.00	ug/l	1.0					
1,2-DICHLOROPROPANE	U	ND	0.200	1.00	ug/l	1.0					
TRANS-1,2-DICHLOROETHENE		ND	0.700	1.00	ug/l	1.0					
1,3-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
1,4-DICHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
BENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOFORM	U	ND	0.400	1.00	ug/l	1.0					
CARBON TETRACHLORIDE	U	ND	0.200	1.00	ug/l	1.0					
CHLOROBENZENE	U	ND	0.300	1.00	ug/l	1.0					
CHLORODIBROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROFORM	U	ND	0.700	1.00	ug/l	1.0					
BROMODICHLOROMETHANE	U	ND	0.400	1.00	ug/l	1.0					
DICHLORODIFLUOROMETHANE		ND	1.20	5.00	ug/l	1.0					
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
BROMOMETHANE	U	ND	0.300	1.00	ug/l	1.0					
CHLOROMETHANE	U	ND	0.200	1.00	ug/l	1.0					
METHYLENE CHLORIDE	U	ND	1.20	5.00	ug/l	1.0					

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision far 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 06, 1999

Sample ID : ZHTL02001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
TETRACHLOROETHYLENE	U	ND	0.700	1.00	ug/l	1.0					
TOLUENE	U	ND	0.500	5.00	ug/l	1.0	RMB	03/25/99	1737	145387	1
TRICHLOROETHYLENE (TCE)	U	ND	0.600	1.00	ug/l	1.0					
TRICHLOROFLUOROMETHANE		ND	1.70	5.00	ug/l	1.0					
VINYL CHLORIDE	U	ND	0.400	1.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					
CIS-1,3-DICHLOROPROPENE	U	ND	0.300	1.00	ug/l	1.0					
TRANS-1,3-DICHLOROPROPENE		ND	0.300	1.00	ug/l	1.0					

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	EDB-8260B	86.6	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	96.0	(66.0 - 117.)
Toluene-d8	EDB-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	86.6	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	96.0	(66.0 - 117.)
Toluene-d8	MTBE-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	86.6	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	96.0	(66.0 - 117.)
Toluene-d8	NAP-8260B	80.4	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	86.6	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	96.0	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	80.4	(73.0 - 122.)

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

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 06, 1999

Sample ID : ZHTL02001

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.

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

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9903742-08

Printed on recycled paper.

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

CHAIN OF CUSTODY RECORD

99037427

Client Name/Facility Name

Collected by/Company

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

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

Q# 39165

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

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Bm Horge	3/19/99	1720					

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

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 09, 1999

Sample ID : ZHTL02201 (TRIP BLANK)
Lab ID : 9903846-01
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	1546	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	1546	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	1546	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					

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 : ZHTL02201 (TRIP 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	1546	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					

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	EDB-8260B	84.3	(73.0 - 129.)
Dibromofluoromethane	EDB-8260B	85.9	(66.0 - 117.)
Toluene-d8	EDB-8260B	76.2	(73.0 - 122.)
Bromofluorobenzene	MTBE-8260B	84.3	(73.0 - 129.)
Dibromofluoromethane	MTBE-8260B	85.9	(66.0 - 117.)
Toluene-d8	MTBE-8260B	76.2	(73.0 - 122.)
Bromofluorobenzene	NAP-8260B	84.3	(73.0 - 129.)
Dibromofluoromethane	NAP-8260B	85.9	(66.0 - 117.)
Toluene-d8	NAP-8260B	76.2	(73.0 - 122.)
Bromofluorobenzene	PP VOA-TETR	84.3	(73.0 - 129.)
Dibromofluoromethane	PP VOA-TETR	85.9	(66.0 - 117.)
Toluene-d8	PP VOA-TETR	76.2	(73.0 - 122.)

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9903846-01

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 : ZHTL02201 (TRIP BLANK)

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

9903846-01

Printed on recycled paper.

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

CHAIN OF CUSTODY RECORD

9903846 7.

Page 1 of 1

Client Name/Facility Name: ZONE H Charleston Naval Complex

Collected by/Company: TETRUS

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

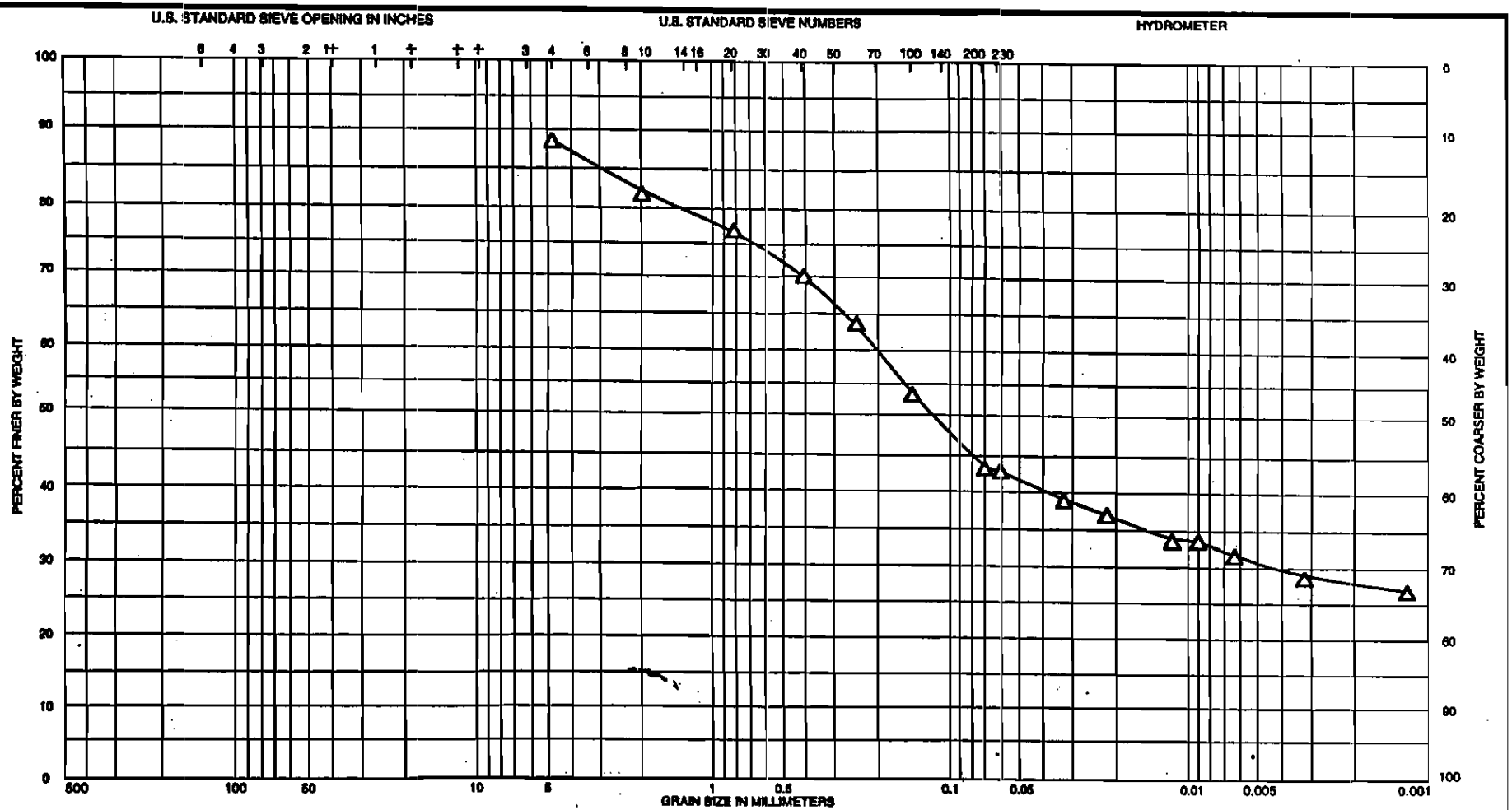
39229.

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	~~TOX~~ 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	ZHTL02201	3/22/99	1030					3						3												Trip Blank	.1
02	ZHRL0060	3/22/99	1430	✓			✓	5			2			3	~~1~~ Pb											RINSATE Blank	.2
03	11GLM0101	3/23/99	1405	✓			✓	1							1												.3
04	11GLM0301	3/23/99	1540	✓			✓	1							1												
05	11GLM0401	3/23/99	1545	✓			✓	1							1												
06	11GLM0601	3/23/99	1530	✓			✓	1							1												
07	11GLM0701	3/23/99	1600	✓			✓	1							1												
08	NBCH663-001	3/23/99	1535	✓			✓	1							1												
09	NBCH663-003	3/23/99	1525	✓			✓	1							1												.3

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
	7:25	3/24/99	[illegible]				
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
[illegible]	3/24/99	7:25	P. Power	3/24/99	09:00	VOC = 8260 w/MTBE + Naph. (see PAH = ~~8270~~ METALS = LEAD	

White = sample collector Yellow = file Pink = with report

GEOTECHNICAL ANALYSIS



Sample No.	Specific Gravity	Classification	Nat w %	LL	PL	PI
9901346-08	---	SC	---			
		% GRAVEL = 11.6				
		% SAND = 44.7				
		% SILT = 13.2				
		% CLAY = 30.5				

GRADATION CURVES

GENERAL ENGINEERING
A Division of General Engineering Laboratories, Inc.

Project: tstr00498
Area: Tetra Tech NUS, Inc.
Boring No.
Date: January 30, 1999

GEOTECHNICAL SPREADSHEET

Project Number:	tetr00498	Depth:	UNKNOWN
Sample Number:	9901346-08	Tested By:	M. Yates
Boring Number:	NA	Date:	1/30/99
Location:	NA		

GRAIN-SIZE ANALYSIS

HYGROSCOPIC MOISTURE CONTENT DETERMINATION

weight of total air dried sample=	88.4
weight of container + air-dried soil=	32.2
weight of container + oven-dried soil=	26.16
weight of container=	7.2
weight of water=	6.04
weight of oven-dried soil=	18.96
weight of air-dried soil=	25
hygroscopic moisture correction factor=	0.76
weight of oven-dried sample for hydro. anal.=	67.18

SIEVE ANALYSIS

weight of oven-dried sample= 67.18

Sieve #	Weight Ret.	Weight Passed	% Passing
4	7.81	59.37	88.4
10	4.41	54.96	81.8
20	3.37	51.59	76.8
40	4.43	47.16	70.2
60	4.21	42.95	63.9
100	7.18	35.77	53.2
200	6.42	29.35	43.7
230	0.63	28.72	42.8
pan	0.1	28.62	42.6

HYDROMETER ANALYSIS

weight	67.18
SG	2.45

TIME	ACTUAL READING	TEMP.	COMPOSITE CORRECTION	R	LENGTH	K	DIAMETER	P
2	1.019	21	0.00350	1.01550	11.3	0.01438	.03413	39.0
5	1.018	21	0.00350	1.01450	11.5	0.01438	.02184	36.5
15	1.017	21	0.00350	1.01350	11.8	0.01438	.01276	34.0
30	1.017	21	0.00350	1.01350	11.8	0.01438	.00902	34.0
60	1.016	21	0.00350	1.01250	12.1	0.01438	.00645	31.4
250	1.015	20	0.00375	1.01125	12.3	0.01456	.00323	28.3
1440	1.014	21	0.00350	1.01050	12.6	0.01438	.00134	26.4

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 01, 1999

Sample ID	: 09SLB0103
Lab ID	: 9901346-08
Matrix	: Soil
Date Collected	: 01/13/99
Date Received	: 01/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	J	4.32	0.513	5.00	ug/kg	1.0	RMB	01/15/99	1738	139880	1
ETHYLBENZENE		5.12	0.308	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.182	5.70	ug/kg	1.0					
NAPHTHALENE	J	0.717	0.695	5.00	ug/kg	1.0					
TOLUENE	J	4.27	1.07	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.285	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		20.0	1.00	1.00	wt%	1.0	GJ	01/15/99	1605	139911	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	2000	4170	ug/kg	10.	TSD	01/21/99	1813	139859	3
ACENAPHTHYLENE	U	ND	1840	4170	ug/kg	10.					
ANTHRACENE	U	ND	1100	4170	ug/kg	10.					
BENZO(A)ANTHRACENE	U	ND	855	4170	ug/kg	10.					
BENZO(A)PYRENE	U	ND	897	4170	ug/kg	10.					
BENZO(B)FLUORANTHENE	U	ND	1780	4170	ug/kg	10.					
BENZO(G,H,I)PERYLENE	U	ND	1020	4170	ug/kg	10.					
BENZO(K)FLUORANTHENE	U	ND	1650	4170	ug/kg	10.					
CHRYSENE	U	ND	684	4170	ug/kg	10.					
DIBENZ(A,H) ANTHRACENE	U	ND	1040	4170	ug/kg	10.					
FLUORANTHENE	U	ND	817	4170	ug/kg	10.					
FLUORENE	U	ND	1430	4170	ug/kg	10.					
INDENO(1,2,3-CD)PYRENE	U	ND	1000	4170	ug/kg	10.					
PHENANTHRENE	U	ND	751	4170	ug/kg	10.					
PYRENE	U	ND	901	4170	ug/kg	10.					
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	ND	62.5	125	mg/kg	1.0	AAT	01/27/99	1000	140704	4

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-08

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0103

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

The following prep procedures were performed:

Volatiles 8260 High Level	RMB	01/15/99		139880	5
GC/MS Base/Neutral Compounds	AEJ	01/15/99	2130	139859	2

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	0.00*	(30.0 - 115.)
itrobenzene-d5	M610-TETR	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	0.00*	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	98.1	(53.3 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	91.4	(65.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	75.9	(72.1 - 137.)

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

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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'.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-08

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0103

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

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

(843) 556-8171 • Fax (843) 766-1178

9901346-08

Printed on recycled paper.

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 01, 1999

Sample ID	: 09SLB0203
Lab ID	: 9901346-09
Matrix	: Soil
Date Collected	: 01/13/99
Date Received	: 01/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE		19.2	0.426	5.00	ug/kg	1.0	RMB	01/15/99	1813	139880	1
ETHYLBENZENE	J	1.65	0.256	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.152	5.00	ug/kg	1.0					
~~NAPHTHALENE~~	~~J~~	~~1.52~~	~~0.578~~	~~5.00~~	~~ug/kg~~	~~1.0~~					
TOLUENE		10.5	0.890	5.00	ug/kg	1.0					
XYLENES, TOTAL	J	3.37	0.237	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		12.0	1.00	1.00	wt%	1.0	GJ	01/15/99	1605	139911	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	1820	3790	ug/kg	10.	TSD	01/21/99	1844	139859	3
ACENAPHTHYLENE	U	ND	1670	3790	ug/kg	10.					
ANTHRACENE	U	ND	997	3790	ug/kg	10.					
BENZO(A)ANTHRACENE	U	ND	771	3790	ug/kg	10.					
BENZO(A)PYRENE	U	ND	815	3790	ug/kg	10.					
BENZO(B)FLUORANTHENE	U	ND	1610	3790	ug/kg	10.					
BENZO(G,H,I)PERYLENE	U	ND	925	3790	ug/kg	10.					
BENZO(K)FLUORANTHENE	U	ND	1500	3790	ug/kg	10.					
CHRYSENE	U	ND	622	3790	ug/kg	10.					
DIBENZ(A,H) ANTHRACENE	U	ND	944	3790	ug/kg	10.					
FLUORANTHENE	U	ND	743	3790	ug/kg	10.					
FLUORENE	U	ND	1300	3790	ug/kg	10.					
INDENO(1,2,3-CD)PYRENE	U	ND	913	3790	ug/kg	10.					
PHENANTHRENE	U	ND	682	3790	ug/kg	10.					
PYRENE	U	ND	819	3790	ug/kg	10.					

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-09

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0203

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

The following prep procedures were performed:

Volatiles 8260 High Level	RMB	01/15/99		139880	4
GC/MS Base/Neutral Compounds	AEJ	01/15/99	2130	139859	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	0.00*	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	103.	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	153.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	109.	(68.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	98.9	(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'.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-09

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0203

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

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

(843) 556-8171 • Fax (843) 766-1178

9901346-09

Printed on recycled paper.

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 01, 1999

Sample ID	: 09SLB0303
Lab ID	: 9901346-10
Matrix	: Soil
Date Collected	: 01/13/99
Date Received	: 01/13/99
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	0.464	5.00	ug/kg	1.0	RMB	01/15/99	1847	139880	1
ETHYLBENZENE	U	ND	0.278	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.165	5.15	ug/kg	1.0					
NAPHTHALENE	U	ND	0.628	5.00	ug/kg	1.0					
TOLUENE	U	ND	0.968	5.00	ug/kg	1.0					
XYLENES, TOTAL	U	ND	0.258	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		13.0	1.00	1.00	wt%	1.0	GJ	01/15/99	1605	139911	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	184	383	ug/kg	1.0	TSD	01/21/99	1916	139859	3
ACENAPHTHYLENE	U	ND	169	383	ug/kg	1.0					
ANTHRACENE	U	ND	101	383	ug/kg	1.0					
BENZO(A)ANTHRACENE	U	ND	78.5	383	ug/kg	1.0					
BENZO(A)PYRENE	U	ND	82.3	383	ug/kg	1.0					
BENZO(B)FLUORANTHENE	U	ND	163	383	ug/kg	1.0					
BENZO(G,H,I)PERYLENE	U	ND	93.5	383	ug/kg	1.0					
BENZO(K)FLUORANTHENE	U	ND	152	383	ug/kg	1.0					
CHRYSENE	U	ND	62.8	383	ug/kg	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	95.4	383	ug/kg	1.0					
FLUORANTHENE	U	ND	75.1	383	ug/kg	1.0					
FLUORENE	U	ND	131	383	ug/kg	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	92.3	383	ug/kg	1.0					
PHENANTHRENE	U	ND	68.9	383	ug/kg	1.0					
PYRENE	U	ND	82.7	383	ug/kg	1.0					

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-10

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0303

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

The following prep procedures were performed:

Volatiles 8260 High Level	RMB	01/15/99		139880	4
GC/MS Base/Neutral Compounds	AEJ	01/15/99	2130	139859	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	63.1	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	59.2	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	86.6	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	97.0	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	102.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	84.2	(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'.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-10

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0303

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

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

(843) 556-8171 • Fax (843) 766-1178

9901346-10

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0903
Lab ID : 9901346-12
Matrix : Soil
Date Collected : 01/13/99
Date Received : 01/13/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep											
EVAPORATIVE LOSS @ 105 C		22.0	1.00	1.00	wt%	1.0	GJ	01/15/99	1605	139911	1
General Chemistry											
Total Organic Carbon		41100	345	800	mg/kg	1.0	LS	01/28/99	1448	140209	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:
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'.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178
Printed on recycled paper.

9901346-12

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 01, 1999

Sample ID : 09SLB0903

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

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

(843) 556-8171 • Fax (843) 766-1178

9901346-12

Printed on recycled paper.

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 01, 1999

Sample ID	: 09SLB0501
Lab ID	: 9901346-13
Matrix	: Soil
Date Collected	: 01/13/99
Date Received	: 01/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE		6.22	0.518	5.00	ug/kg	1.0	RMB	01/18/99	1409	139880	1
ETHYLBENZENE		7.90	0.311	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.184	5.75	ug/kg	1.0					
NAPHTHALENE	J	0.832	0.702	5.00	ug/kg	1.0					
TOLUENE		7.32	1.08	5.00	ug/kg	1.0					
XYLENES, TOTAL	J	1.31	0.288	5.00	ug/kg	1.0					
Organic Prep											
EVAPORATIVE LOSS @ 105 C		10.0	1.00	1.00	wt%	1.0	GJ	01/15/99	1605	139911	2
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE		1950	710	1480	ug/kg	4.0	TSD	01/21/99	2020	139859	3
ACENAPHTHYLENE	U	ND	653	1480	ug/kg	4.0					
ANTHRACENE		2870	389	1480	ug/kg	4.0					
BENZO(A)ANTHRACENE		5910	303	1480	ug/kg	4.0					
BENZO(A)PYRENE		4810	318	1480	ug/kg	4.0					
BENZO(B)FLUORANTHENE		5820	630	1480	ug/kg	4.0					
BENZO(G,H,I)PERYLENE		2010	361	1480	ug/kg	4.0					
BENZO(K)FLUORANTHENE		4090	586	1480	ug/kg	4.0					
CHRYSENE		6250	243	1480	ug/kg	4.0					
DIBENZ(A,H) ANTHRACENE	U	ND	369	1480	ug/kg	4.0					
FLUORANTHENE		11600	290	1480	ug/kg	4.0					
FLUORENE		1640	508	1480	ug/kg	4.0					
INDENO(1,2,3-CD)PYRENE		2330	357	1480	ug/kg	4.0					
PHENANTHRENE		11200	266	1480	ug/kg	4.0					
PYRENE		11200	320	1480	ug/kg	4.0					

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-13

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0501

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

The following prep procedures were performed:

Volatiles 8260 High Level	RMB	01/15/99		139880	4
GC/MS Base/Neutral Compounds	AEJ	01/15/99	2130	139859	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	76.2	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	70.2	(23.0 - 120.)
p-Terphenyl-d14	M610-TETR	95.3	(37.3 - 128.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	120.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	78.7	(68.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	79.6	(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'.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-13

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0501

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

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

(843) 556-8171 • Fax (843) 766-1178

9901346-13

Printed on recycled paper.

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 01, 1999

Sample ID	: 09SLB0403
Lab ID	: 9901346-20
Matrix	: Soil
Date Collected	: 01/13/99
Date Received	: 01/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE		33.5	0.450	5.00	ug/kg	1.0	RMB	01/15/99	1922	139880	1
ETHYLBENZENE	J	2.56	0.270	5.00	ug/kg	1.0					
TERT-BUTYL METHYL ETHER		ND	0.160	5.00	ug/kg	1.0					
NAPHTHALENE	J	1.44	0.610	5.00	ug/kg	1.0					
TOLUENE		17.4	0.940	5.00	ug/kg	1.0					
XYLENES, TOTAL		5.16	0.250	5.00	ug/kg	1.0					
Organic Prep											

The following prep procedures were performed:

Volatiles 8260 High Level	01/21/99	139880	2

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	137.	(53.5 - 154.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	105.	(63.4 - 136.)
Toluene-d8	BTEX/NAP/MTBE-8260B	97.9	(72.1 - 137.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 5035

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-20

Printed on recycled paper.

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 01, 1999

Sample ID : 09SLB0403

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.

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

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-20

Printed on recycled paper.

CHAIN OF CUSTODY

CHAIN OF CUSTODY RECORD

9901346 ok

PROJECT NO.: 7912

SITE NAME: CJC Bore H

SAMPLERS (SIGNATURE): [illegible]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	BTEX/MTBE	PAH	TPH	TOC	Grain Size		REMARKS
	11/2	1250	✓		055LB0303	9	✓	✓	✓		✓		
	11	1410	✓		055LB0503	4	✓	✓					
	11	1500	✓		055LB0403	4	✓	✓					
	11	1530	✓		055LBH1112	4	✓	✓					
	11	1630	✓		055LB1302	1				✓			
	11/4/99	1100	✓		CNCT-0001	3	✓						Trip Blank

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
[illegible]	11/2 1700				
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY (SIGNATURE): [illegible]	DATE/TIME: 11/5/99 1700	REMARKS: Standard turnaround	

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

CHAIN OF CUSTODY RECORD

9901405%

Client Name/Facility Name: TetraTech NUS / CNC

Collected by/Company: James R. Nill / TetraTech 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/TOX	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PAH	TPH	Coliform - specify type	Grain Size	TO	Remarks
07	Ø58LBØ7Ø3	1-13-99	0755		X		X	4						X							X					BTEX/MTBE
08	Ø95LBØ1Ø3		0905		X		X	9						X							X	X		X		
09	Ø95LBØ2Ø3		0940		X		X	4						X							X					
10 ~~04~~	Ø95LBØ3Ø3		1015		X		X	4						X							X					
11 ~~05~~	Ø95LBØ4Ø3		1038		X		X	4						X							X					
12 ~~06~~	Ø95LBØ9Ø3		1058		X		X	1		X																
13 ~~07~~	Ø95LBØ5Ø1		1115		X		X	4						X							X					
14 ~~08~~	Ø35LBØ9Ø2		1430											X							X					
15 ~~09~~	Ø35LBØ9Ø2D		1430											X							X					Dupe
16 ~~10~~	Ø35LBØ7Ø5		1510											X							X					
17 ~~11~~	Ø35LBØ5Ø3		1540							X				X							X					
18 ~~12~~	~~Ø35LBØ5~~ JRD																									
19 ~~13~~	Ø36LB1ØØ2		1615											X							X					

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

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
[signature]	1-13-99	1713	Patricia [signature]	1/13/99	17:05	

White = sample collector Yellow = file Pink = with report

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

CHAIN OF CUSTODY RECORD

Client Name/Facility Name: Tetra Tech NUS / CNC

Collected by/Company: James R Hill / Tetra Tech 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			Remarks
19 ZHTL0029	11-24-98	1120											X												BTEX/MTBE

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
James R Hill	1-13-99	1713	Patricia K Lover		1/13/99	17:05	

Remarks:

White = sample collector Yellow = file Pink = with report

COOLER RECEIPT CHECKLIST

FEDERAL SAMPLE RECEIPT REVIEW

Client TETR Received by [illegible] Date 1/12/99

GEL COOLER___ GEL POLY COOLER___ CLIENT COOLER___ OTHER___

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? Call project Manager if No	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? Call Project Manager if No	✓		
Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?		✓	
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed properly ? (Ink, signed, match containers)	✓		
5. Did all samples container arrive intact? (sealed , unbroken)? Call Project Manager if No	✓		
6. Were all sample containers properly labeled?	✓		
7. Were proper sample containers received?	✓		
8. Preserved samples checked for proper pH?	—	—	Soil
9. Were samples preserved properly? If no, list samples & tests	—	—	
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (4+2C) If no, Call Project Manager	✓		4°C
12. Were samples received within holding time? if No, Call Project Manager	✓		
13. Were VOA vials free of headspace?	—	—	
14. ARCOC# IF REQUIRED	—	—	
15. SDG# IF REQUIRED	✓		CT068

REVIEW [illegible] DATE 1/12/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

INDUSTRIAL SAMPLE RECEIPT REVIEW

Client TEJR Received by [illegible] Date 1/13/99

GEL COOLER____ GEL POLY COOLER____ CLIENT COOLER____ OTHER____

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? Call project Manager if No	✓		
2. Is the shipment identified as RADIOACTIVE and/or from a DOE site or subcontainer (see list in EPI SOP S-007)?	✓		
If YES, was the shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? Call Project Manager if No.		✓	
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed properly ? (Ink, signed, match containers)	✓		
5. Did all samples container arrive intact? (sealed , unbroken)? Call Project Manager if No	✓		
6. Were all sample containers properly labeled?	✓		
7. Were proper sample containers received?	✓		
8. Preserved samples checked for proper pH?	—		Soil
9. Were samples preserved properly? If no, list samples & tests	—		
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (4+2C) If no, Call Project Manager	✓		4°C
12. Were samples received within holding time? if No, Call Project Manager	✓		
13. Were VOA vials free of headspace?	—		

REVIEW [illegible] DATE 1/13/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

CERTIFICATE OF ANALYSIS

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8745'
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	: 09SLB0403
Lab ID	: 9901565-04
Matrix	: Soil
Date Collected	: 01/19/99
Date Received	: 01/20/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep											
EVAPORATIVE LOSS @ 105 C		15.0	1.00	1.00	wt%	1.0	GJ	01/20/99	1550	140228	1
Extractable Organics											
Polyaromatic Hydrocarbon Compounds - 15 items											
ACENAPHTHENE	U	ND	18800	39200	ug/kg	100	JCB	01/22/99	2234	140222	2
ACENAPHTHYLENE	U	ND	17300	39200	ug/kg	100					
ANTHRACENE	U	ND	10300	39200	ug/kg	100					
BENZO(A)ANTHRACENE	U	ND	8040	39200	ug/kg	100					
BENZO(A)PYRENE	U	ND	8430	39200	ug/kg	100					
BENZO(B)FLUORANTHENE	U	ND	16700	39200	ug/kg	100					
BENZO(G,H,I)PERYLENE	U	ND	9560	39200	ug/kg	100					
BENZO(K)FLUORANTHENE	U	ND	15500	39200	ug/kg	100					
CHRYSENE	U	ND	6430	39200	ug/kg	100					
DIBENZ(A,H) ANTHRACENE	U	ND	9760	39200	ug/kg	100					
FLUORANTHENE	U	ND	7680	39200	ug/kg	100					
FLUORENE	U	ND	13400	39200	ug/kg	100					
INDENO(1,2,3-CD)PYRENE	U	ND	9450	39200	ug/kg	100					
PHENANTHRENE	U	ND	7060	39200	ug/kg	100					
PYRENE	U	ND	8470	39200	ug/kg	100					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds CPU 01/21/99 2400 140222 1

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	0.00*	(30.0 - 115.)
Nitrobenzene-d5	M610-TETR	0.00*	(23.0 - 120.)

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

9901565-04

Printed on recycled paper.

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 08, 1999

Sample ID : 09SLB0403

Surrogate Recovery	Test	Percent%	Acceptable Limits
p-Terphenyl-d14	M610-TETR	0.00*	(37.3 - 128.)

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 8270C

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'.

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(843) 556-8171 • Fax (843) 766-1178

9901565-04

Printed on recycled paper.

CHAIN OF CUSTODY

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Caroli 07
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9901565/.

Client Name/Facility Name: Tetra Tech NUS / CNC

Collected by/Company: James R. Hill / TTNUS

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

	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 PAH	Herbicide TPH	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Grain Size		Remarks
-01	ZHTLØØ5Ø1	1/19/99	0730		✓✓			3						3												Trip Blank
-02	Ø4SLB17Ø4	"	0825		✓✓			1								1										
-03	Ø4SLBØ4Ø4	"	0840		✓✓			1								1										
-04	~~Ø9SLBØ4Ø3~~ ~~Ø4SLBØ4Ø~~ (Ø24)	"	0912		✓✓			1								1										
-05	Ø6SLBØ5Ø6	"	1010		✓✓			~~4~~ 3						3		1										
-06	Ø6SLBØ9Ø4	"	1100		✓✓			4						3		1										
-07	Ø6SLBØ8Ø1	"	1130		✓✓			4						3		1										
-08	Ø6SLBØ2Ø3	"	1230		✓✓			4						3		1										
-09	Ø6SLBØ4Ø5	"	1425		✓✓			4						3		1										
-10 -11	Ø6SLBØ6Ø7	"	1515		✓✓			8						3		1	1							3		
-10	Ø6SLB18Ø4	"	1545		✓✓			1		1																

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

3,7781
.2
.3
.4
.5

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	1-14-99	1700	Patricia Nauer	1/19/99	17:00	

White = sample collector Yellow = file Pink = with report

COOLER RECEIPT CHECKLIST

FEDERAL SAMPLE RECEIPT REVIEW

Client TETR Received by [illegible] Date 1/19/99

GEL COOLER ✓ GEL POLY COOLER ___ CLIENT COOLER ___ OTHER ___

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? Call project Manager if No	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? Call Project Manager if No	✓		
Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?		✓	
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed properly ? (Ink, signed, match containers)	✓		
5. Did all samples container arrive intact? (sealed , unbroken)? Call Project Manager if No	✓		
6. Were all sample containers properly labeled?	✓		
7. Were proper sample containers received?	✓		
8. Preserved samples checked for proper pH?	—		
9. Were samples preserved properly? If no, list samples & tests	—		Soil
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (4+2C) If no, Call Project Manager	✓		4°C
12. Were samples received within holding time? if No, Call Project Manager	✓		
13. Were VOA vials free of headspace?	—		
14. ARCOC# IF REQUIRED	—		
15. SDG# IF REQUIRED	✓		CT068CW

REVIEW [illegible] DATE 1/19/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

Certificate of Analysis

Quanterra Incorporated
5307 Industrial Oaks Boulevard, Suite 160
Austin, Texas 78735

512 892-6684 Direct
512 892-6652 Fax

Quanterra

ANALYTICAL REPORT

PROJECT NO. CTO-068

CNC-ZONE H UST

Lot #: I9C300160

VALERIE DAVIS

General Engineer Laboratory

QUANTERRA INCORPORATED

Sandra L. Green
Project Manager

April 2, 1999

GENERAL ENGINEER LABORATORY

Client Sample ID: 09GLM0101

GC Volatiles

Lot-Sample #...:	I9C300160-003	Work Order #...:	CT56T101	Matrix.....:	WATER
Date Sampled...:	03/19/99 13:10	Date Received..:	03/30/99		
Prep Date.....:	03/30/99	Analysis Date..:	03/30/99		
Prep Batch #...:	9090371	Analysis Time..:	15:26		
Dilution Factor:	1				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	450 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: 09GLM0101

GC Volatiles

Lot-Sample #...:	I9C300160-003	Work Order #...:	CT56T201	Matrix.....:	WATER
Date Sampled...:	03/19/99 13:10	Date Received..:	03/30/99		
Prep Date.....:	03/30/99	Analysis Date..:	03/30/99		
Prep Batch #...:	9090371	Analysis Time..:	16:16		
Dilution Factor:	100				
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	7200 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 ENGINEER LABORATORY

Client Sample ID: 09GLM0301

GC Volatiles

Lot-Sample #...: I9C300160-004 Work Order #...: CT56W101 Matrix.....: WATER
Date Sampled...: 03/19/99 13:45 Date Received..: 03/30/99
Prep Date.....: 03/30/99 Analysis Date..: 03/30/99
Prep Batch #...: 9090371 Analysis Time..: 15:32
Dilution Factor: 1
Method.....: RSK SOP-175

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	180 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: 09GLM0301

GC Volatiles

Lot-Sample #...: I9C300160-004 Work Order #...: CT56W201 Matrix.....: WATER
Date Sampled...: 03/19/99 13:45 Date Received..: 03/30/99
Prep Date.....: 03/30/99 Analysis Date..: 03/30/99
Prep Batch #...: 9090371 Analysis Time..: 16:22
Dilution Factor: 3
Method.....: RSK SOP-175

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	160 B,D	1.5	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 ENGINEER LABORATORY

Client Sample ID: 09GLM0601

GC Volatiles

Lot-Sample #...: I9C300160-005 Work Order #...: CT570101 Matrix.....: WATER
Date Sampled...: 03/19/99 14:40 Date Received..: 03/30/99
Prep Date.....: 03/30/99 Analysis Date..: 03/30/99
Prep Batch #...: 9090371 Analysis Time..: 15:38
Dilution Factor: 1
Method.....: RSK SOP-175

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	400 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: 09GLM0601

GC Volatiles

Lot-Sample #...: I9C300160-005 Work Order #...: CT570201 Matrix.....: WATER
Date Sampled...: 03/19/99 14:40 Date Received..: 03/30/99
Prep Date.....: 03/30/99 Analysis Date..: 03/30/99
Prep Batch #...: 9090371 Analysis Time..: 16:28
Dilution Factor: 100

Method.....: RSK SOP-175

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	4000 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

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 01, 1999

Sample ID	: ZHTL00201
Lab ID	: 9901346-19
Matrix	: Water
Date Collected	: 11/24/98
Date Received	: 01/13/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX/NAP/MTBE - 6 items											
BENZENE	U	ND	0.300	5.00	ug/l	1.0	RMB	01/16/99	1908	139932	1
ETHYLBENZENE	U	ND	0.300	5.00	ug/l	1.0					
TERT-BUTYL METHYL ETHER		ND	3.60	5.00	ug/l	1.0					
NAPHTHALENE	U	ND	0.600	5.00	ug/l	1.0					
TOLUENE	U	ND	0.500	5.00	ug/l	1.0					
XYLENES, TOTAL	U	ND	1.10	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	94.4	(60.2 - 139.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	78.6	(70.6 - 152.)
Toluene-d8	BTEX/NAP/MTBE-8260B	79.4	(68.4 - 135.)

M = Method	Method-Description
M 1	SW846 8260B

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

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

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29414
(843) 556-8171 • Fax (843) 766-1178

9901346-19

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 01, 1999

Sample ID : ZHTL00201

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

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

(843) 556-8171 • Fax (843) 766-1178

9901346-19

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

CHAIN OF CUSTODY RECORD

9901405%

Client Name/Facility Name: TetraTech NUS / CNC

Collected by/Company: James R. Nill / TetraTech 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/[illegible]	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method Required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PAH	TPH	Coliform - specify type	Grain Size	TO	Remarks
07	Ø5SLBØ7Ø3	1-13-99	0755		X		X	4						X							X					BTEX/MTBE
08	Ø9SLBØ1Ø3		0905		X		X	9						X							X	X		X		
09	Ø9SLBØ2Ø3		0940		X		X	4						X							X					
10	Ø9SLBØ3Ø3		1015		X		X	4						X							X					
11	Ø9SLBØ4Ø3		1038		X		X	4						X							X					
12	Ø9SLBØ9Ø3		1058		X		X	1		X																
13	Ø9SLBØ5Ø1		1115		X		X	4						X							X					
14	Ø3SLBØ9Ø2		1430											X							X					
15	Ø3SLBØ9Ø2D		1430											X							X					Dupe
16	Ø3SLBØ7Ø5		1510											X							X					
17	Ø3SLBØ5Ø3		1540							X				X							X					
18	Ø3SLBØ(JRN)																									
19	Ø3SLB1ØØ2		1615											X							X					

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. Nill	1-13-99	1713	Patricia Power	1/13/99	17:05	

White = sample collector Yellow = file Pink = with report

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

CHAIN OF CUSTODY RECORD

Client Name/Facility Name: Tetra Tech NUS / CNC

Collected by/Company: James R Hill / Tetra Tech 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			Remarks
19 ZHTL0029	11-24-98	1120											X												BTEX/MTBE

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	1-13-99	1713	Patricia Kfoury	1/13/99	17:05	

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: February 04, 1999

Sample ID : ZHRL00101
Lab ID : 9901446-01
Matrix : Water
Date Collected : 01/14/99
Date Received : 01/14/99
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	SLG	01/19/99	1700	140142	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	J	1.37	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	2.31	10.5	ug/l	1.0	JPA	01/22/99	1957	140060	2
ACENAPHTHYLENE	U	ND	1.37	10.5	ug/l	1.0					
ANTHRACENE	U	ND	2.42	10.5	ug/l	1.0					
BENZO(A)ANTHRACENE	U	ND	2.94	10.5	ug/l	1.0					
BENZO(A)PYRENE	U	ND	2.10	10.5	ug/l	1.0					
BENZO(B)FLUORANTHENE	U	ND	4.94	10.5	ug/l	1.0					
BENZO(G,H,I)PERYLENE	U	ND	2.63	10.5	ug/l	1.0					
BENZO(K)FLUORANTHENE	U	ND	2.73	10.5	ug/l	1.0					
CHRYSENE	U	ND	2.31	10.5	ug/l	1.0					
DIBENZ(A,H) ANTHRACENE	U	ND	2.31	10.5	ug/l	1.0					
FLUORANTHENE	U	ND	3.26	10.5	ug/l	1.0					
FLUORENE	U	ND	2.21	10.5	ug/l	1.0					
INDENO(1,2,3-CD)PYRENE	U	ND	3.57	10.5	ug/l	1.0					
PHENANTHRENE	U	ND	1.89	10.5	ug/l	1.0					
PYRENE	U	ND	2.63	10.5	ug/l	1.0					
General Chemistry											
Total Rec. Petro. Hydrocarbons		10.3	1.22	2.00	mg/l	1.0	AAT	02/01/99	1000	141158	3

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

Printed on recycled paper.

9901446-01

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: February 04, 1999

Sample ID : ZHRL00101

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
The following prep procedures were performed:											
GC/MS Base/Neutral Compounds							ES	01/19/99	1245	140060	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-TETR	72.2	(41.2 - 107.)
Nitrobenzene-d5	M610-TETR	74.4	(35.3 - 108.)
p-Terphenyl-d14	M610-TETR	77.0	(36.6 - 110.)
Bromofluorobenzene	BTEX/NAP/MTBE-8260B	112.	(60.2 - 139.)
Dibromofluoromethane	BTEX/NAP/MTBE-8260B	107.	(70.6 - 152.)
Toluene-d8	BTEX/NAP/MTBE-8260B	117.	(68.4 - 135.)

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

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

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

Valerie A Davis

Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

9901446-01

Printed on recycled paper.

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

990446

Client Name/Facility Name: Tetra Tech NUS / CNC

Collected by/Company: James R. Hill / 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	BTEX/MTBE	Chloride, Fluoride, Sulfide	Nitrate/Nitrite	VOC - Specify Method Required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	PAH	TPH	Remarks
-01	ZHRL0001 01	1-14-99	0715				✓	8			X			3										2	2	
-02	ZHTL0030	—	—				✓	3						3												
-03	ZHFL0010	1-14-99	0700				✓	3						3												
901446 -04	035LB0305	0"	0830		✓	✓		8			3			3										1	1	
-02	035LB0804	0"	0900		✓	✓		4						3										1		
03	035LB1101	"	0925		✓	✓		4						3										1		
-04	045LB2104	"	1110		✓	✓		4						3										1		
05	045LB2004	"	1135		✓	✓		4						3										1		
06	045LB0404	"	1330		✓	✓		8			3			3										1	1	
07	045LB0404D	"	1330		✓	✓		5						3										1	1	duplicate
08	045LB0404M	"	1330		✓	✓		5						3										1	1	matrix spike
09	045LB0404S	"	1330		✓	✓		5						3										1	1	matrix spike dup.
-10	045LB2203	"	1440		✓	✓		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:
[signature]	1-14-99	1716	[signature]	1/15/99	17:15	BTEX/MTBE = VOC, Standard turnaround time

White = sample collector Yellow = file Pink = with report

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

CHAIN OF CUSTODY RECORD

9901446

Client Name/Facility Name: Tetra Tech NUS / CNC

Collected by/Company: James R. Hill / TTNUS

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

Use P 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	PAH		Remarks
01 Ø45LB19Ø2	1-14-99	1515		✓			4						3										1		
02 Ø45LB1204	"	1545		✓			4						3										1		broken
03 Ø45LB1204	"	1625		✓			4						3										1		
01144																									
01																									
02																									
03																									
04																									
05																									
06																									
07																									
08																									
09																									
10																									

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

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
[signature]	1-14-99	1716	[signature]	1/14/99	17:16	BTEX/MTBE - VOC, standard turnaround

White = sample collector Yellow = file Pink = with report

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

CHAIN OF CUSTODY RECORD

Client Name/Facility Name: TENUS / CNC Zone H.

Collected by/Company: TENUS / James R. Hill

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

Use P 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	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	TPH	TPH	Remarks
04 990144 ZHTZ00401	1-15	—	✓			✓	3						3												trip blank
-01 04SLB1504	1-15	0740		✓✓			4						3										1		
-02 04SLB1104	1-15	0803		✓✓			4						3										1		
-03 04SLB1004	1-15	0840		✓✓			4						3										1		
-04 04SLB0204	1-15	0910		✓✓			4						3										1		
-15 04SLB3404D #45		0945		✓✓			1		1																
-16 04SLB3404	1-15	0945		✓✓			1		1																

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	1-15-99	1111	B Franco	1/15/99	1111	BTEX/MTBE = VOC, standard turnaround

White = sample collector Yellow = file Pink = with report

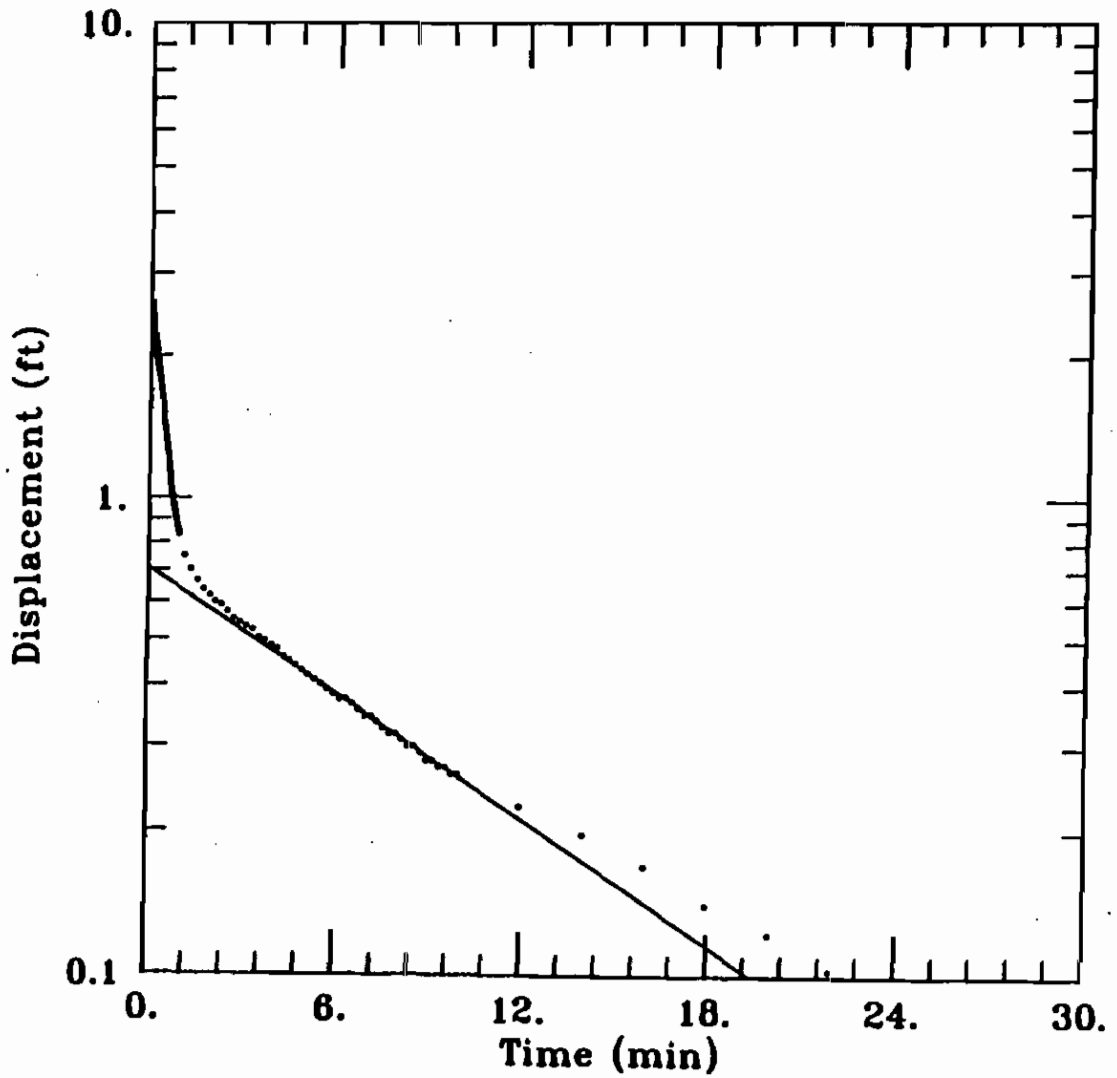
37708.2
37710.2
.4

APPENDIX E

AQUIFER CHARACTERIZATION GRAPHS

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

NBCH666001 Rising Head Slug Test



DATA SET:
66601RIS.AQT
01/16/95

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

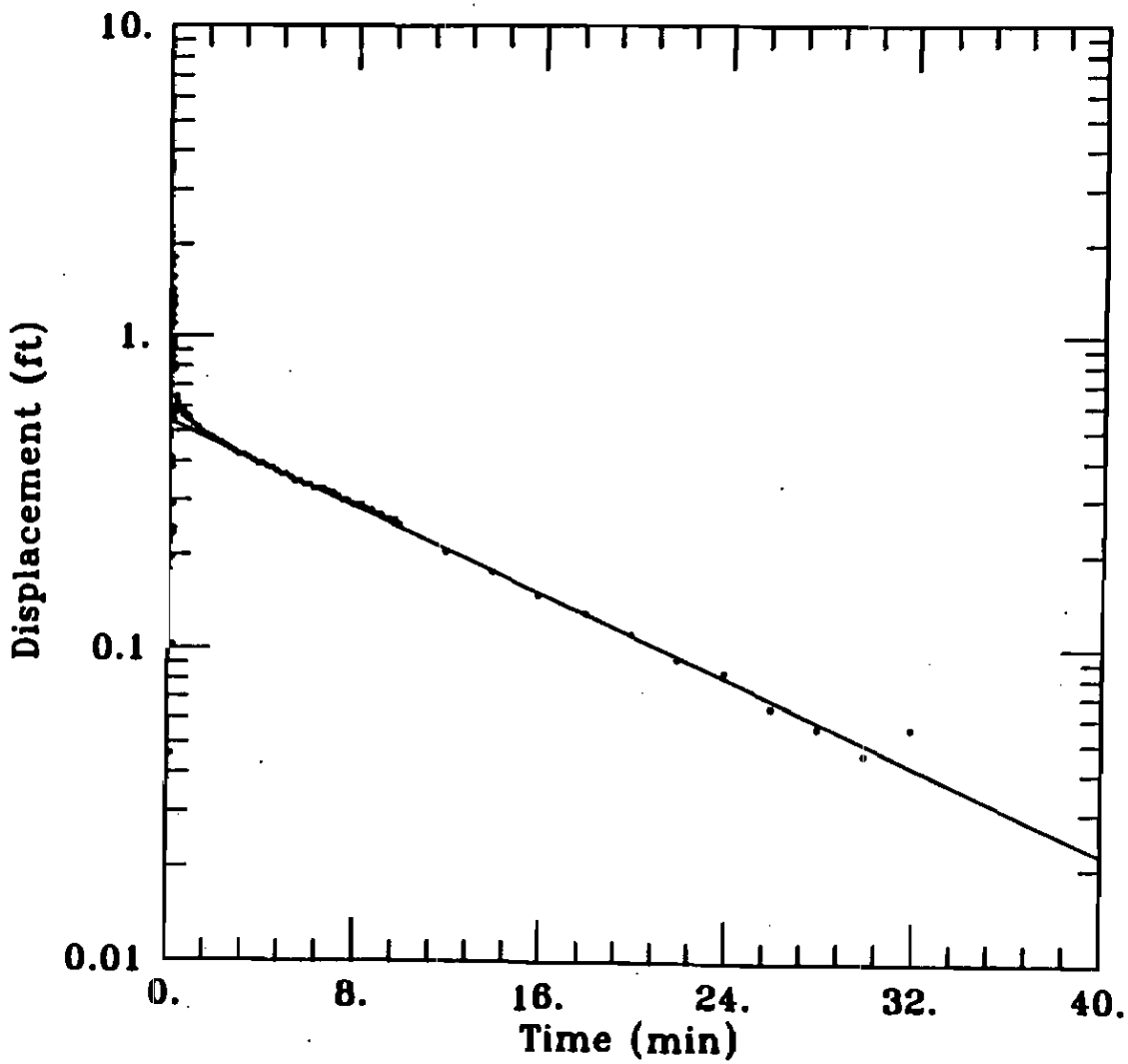
TEST DATA:
H0 = 1.7 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 8. ft
b = 12. ft
H = 8. ft

PARAMETER ESTIMATES:
K = 0.0004346 ft/min
y0 = 0.7086 ft

AQTESOLV

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

NBCH666001 Falling Head Slug Test



DATA SET:
66601FAL.AQT
01/16/95

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
H0 = 1.7 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 8. ft
b = 12. ft
H = 8. ft

PARAMETER ESTIMATES:
K = 0.0003523 ft/min
y0 = 0.5417 ft

AQTESOLV

APPENDIX F

SOIL LEACHABILITY MODEL

IN-SITU SOIL RISK EVALUATION

Site Data

SITE ID #		COUNTY	Charleston
FACILITY NAME	**Site 9, Building 654**		
STREET ADDRESS	**Charleston Naval Complex, North Charleston, SC**		

Soil Risk Evaluation Data

					Figure
TPH		0	mg/kg		
Soil % SAND (Estimated)		44.7	%		
Soil % CLAY (Estimated)		30.5	%		
Worst Case	**Benzene**	**0.0335**	mg/kg	Cs	
Soil Analyses					
Natural Organic Carbon Content		41100	mg/kg	foc	
Average Annual Recharge		25	cm	Hw	
Distance from highest Soil Impact to water table		45	cm	L	
Bulk Density of Soil		1.525	g/cc	Bd	1
Wetting Front Suction		-25	cm	Hf	2
Soil Hydraulic Conductivity		1.99E-06	cm/sec	Kf	3
Porosity		0.475	decimal %	Φ	4
Residual Water Content		0.09	decimal %	Wr	5

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

SOIL LEACHABILITY MODEL FOR BENZENE

RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site:	Site 9, Building 654
Location:	Charleston Naval Complex, North Charleston, SC

REFERENCES: Site 9, Building 654

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

INPUT:

COC	Chemical of Concern		BENZENE
Bd	Soil Bulk Density (1)	g/cm3	1.525
Crsbl	Risk Based Screening Level	mg/L	0.005
Cs	Concentration of COC in soil	mg/kg	0.0335
DAF	Dilution/Attenuation Factor (2)	unitless	8
foc	Organic Carbon Content in Soil	mg/kg	41100
H'	Henry's Law Constant (4)	unitless	0.23
Hf	Wetting front suction head (always negative) (5)	cm	-25
Hw	Average Annual Recharge (3)	cm	25.00
Kf	Soil Hydraulic Conductivity	cm/s	1.99E-06
Koc	Soil/Water Partioning Coefficient (2)	ml/g	81
L	Depth between soil sample with greatest COC concentration to groundwater.	cm	45
Φ	Porosity (7)	unitless	0.48
t1/2	Biodegradation "half life" (2)	days	16
TPH	Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg	0
Wr	Residual Water Content (8)	volume fraction	0.09

CALCULATIONS:

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

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

fcs = (foc +TPH/1.724)*1E-6 = 0.0411 decimal %

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

Cw = Cs*((Wr *1g/cc+Bd)/((Bd*Koc*fcs)+Wr+((ø-Wr)*H'))) = 0.0103 mg/l

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

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

f = Ø - Wr = 0.39 decimal %

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

t = (f/Kf)*(L-((Hw-Hf)*(ln((Hw+L-Hf)/(Hw-Hf))))) = 2,502,046 seconds

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

Vw = (L/30.48cm/ft)/(t/31,500,000sec/year) = 19 ft/year

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

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

Kd = Koc*foc*1E-6 = 3.3291 ml/g

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

Vc = Vw/(1+((Bd*Kd)/ø)) = 2 ft/year

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

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

Tc = 365 day/yr*((L/30.48cm/ft)/Vc) = 338.86 days

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

Cp = 10^(log (Crsbl)+((Tc/2.3)*(0.693/t1/2))) = 11802.0664 mg/l

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

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

Csstl for BENZENE in soil = Cp*DAF*(((Bd*Koc*fcs)+Wr+(F*'H'''))/(Wr*1g/cc+Bd)) = **307154.075047 mg/kg**

or

307154075 ug/kg

PREPARED BY: Renna D. Ayers _____ _____ Date

CHECKED BY: _____ _____ Date

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID #
FACILITY NAME Site 9, Building 654

Instructions

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

Data

List Constituent:	BENZENE		0	
(BTEX, Napth.)				Table
Bioremediation "half-life"	16	days	t 1/2	1
Soil/water partitioning coefficient	81	ml/g	K oc	1

Results

				Equation Set	Step
Total Organic Carbon Content	0.0411	decimal %	f cs	I	1
Leachate Concentration	0.010	mg/l	C w	I	2
Air Filled Porosity	0.39	decimal %	f	II	1
Infiltration Rate Time	2,502,046	seconds	t	II	2
Velocity of Water	19	ft/year	V w	II	3
Soil/Water Distribution Coefficient	3.3291	ml/g	K d	III	1
Contaminant Percolation Rate	2	ft/year	V c	III	2
Time to Reach Groundwater	338.86	days	T c	IV	1
Concentration reaching Groundwater	11802.0664	mg/l	C p	IV	2
Site Specific Target Level	**307154.0750**	mg/kg	C sstl	V	

Conclusions

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

Risk of Human Exposure due to contaminated soil.

_____ **YES** X _____ **NO**